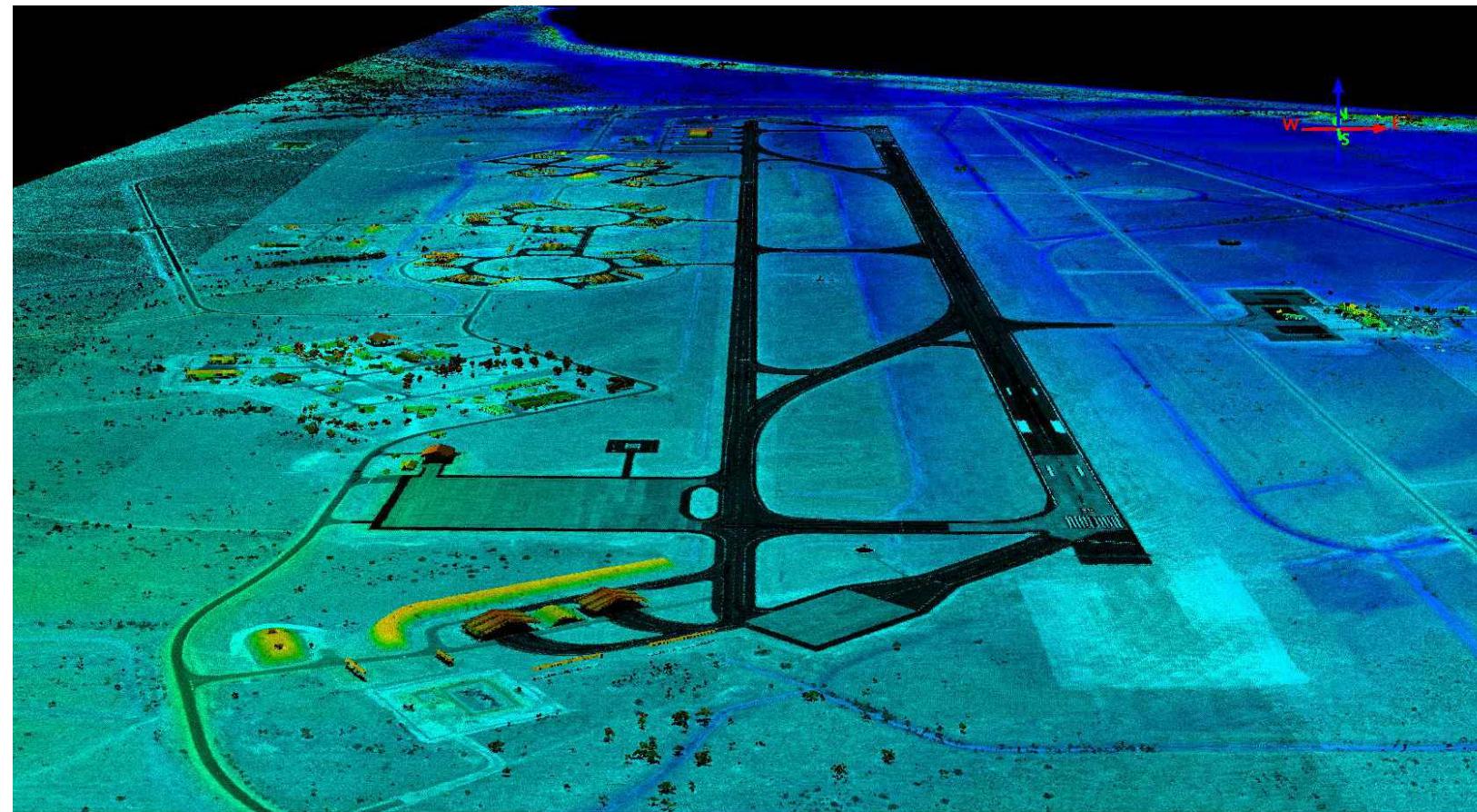


OBSTACLE LIMITATION SURVEYS AND ASSESSMENT

RAAF BASE LEARMONT
AERODROME OBSTACLE CHART ICAO TYPE A
(OPERATING LIMITATIONS) ISSUED NOVEMBER 2024



DECLARED DISTANCES FOR RUNWAY 18		
TAKE OFF RUN AVAILABLE (TORA)	3047m (9996')	
TAKE OFF DISTANCE AVAILABLE (TODA)	3352m (10997')	3.15%
ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	3047m (9996')	
LANDING DISTANCE AVAILABLE (LDA)	3047m (9996')	
SUPPLEMENTARY TAKE OFF DISTANCE AVAILABLE (STODA)	3208m (10524') 1.6%, 3256m (10682') 1.9%, 3267m (10718') 2.0%, 3289m (10790') 2.2%, 3314m (10872') 2.5%	

LEGEND

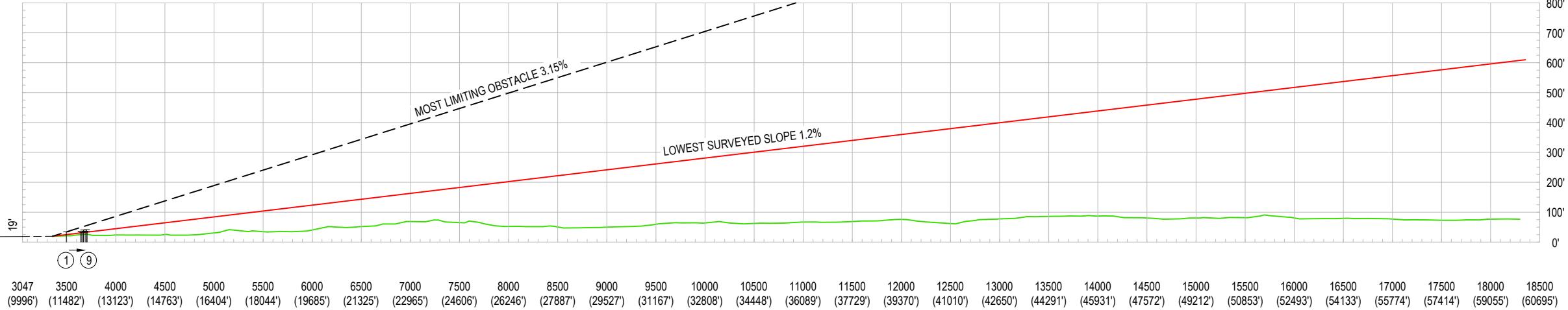
— LOWEST SURVEYED SLOPE
— GROUND LEVEL
- - - - - MOST LIMITING OBSTACLE

1 OBSTACLE

SEE
SHEET 2

A vertical scale bar with markings for 0, 50', 100', 150', 200', 250', 300', 350', and 400' feet. Above the scale, the word 'FEET' is written in all caps. To the right of the scale, the word 'METERS' is written in all caps. The scale is labeled '(X10 EXAGGERATED)' at the bottom.

FOR RUNWAY DETAILS



RUNWAY 18

1:25000 (A1) 250 0 500 1000m
 1:50000 (A3) SCALE 1:25000

RUNWAY STRIP: 3167m (10390') x 150m (492')
RUNWAY: 3047m (9996') x 45m (147') SEALED

184°

004°

CLEARWAY
305m (1000')

INSET A

① 34'

③ 34'

④ 33'

⑤ 34'

② 35'

⑦ 36'

⑥ 40'

⑧ 41'

⑨ 35'

1:5000 (A1)
1:10000 (A3)

50 0 100 200m
SCALE 1:5000

MAGNETIC NORTH

18
18R
36L
36

KEY DIAGRAM

THE TYPE A SURVEY HAS BEEN CONDUCTED IN ACCORDANCE WITH ICAO ANNEX 4 AND DEPARTMENT OF DEFENCE REQUIREMENTS. THE CHART CLEARLY SHOWS THE GRAPHICAL RESULTS OF THE SURVEY AND HAS BEEN CHECKED FOR ACCURACY AND COMPLETENESS OF INFORMATION. THE CHART IS CERTIFIED CORRECT FOR PUBLICATION.

DANIEL GEEVES
REGISTERED SURVEYOR

5/11/2024
DATE

.....
DATE

 aurecon
www.aurecongroup.com



Australian Government
Department of Defence
Security and Estate Group

DECLARED DISTANCES FOR RUNWAY 36	
TAKE OFF RUN AVAILABLE (TORA)	3047m (9996')
TAKE OFF DISTANCE AVAILABLE (TODA)	3352m (10997') 2.40%
ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	3047m (9996')
LANDING DISTANCE AVAILABLE (LDA)	3047m (9996')
SUPPLEMENTARY TAKE OFF DISTANCE AVAILABLE (STODA)	3330m (10925') 1.6%, 3340m (10958') 1.9% 3343m (10967') 2.0%, 3348m (10984') 2.2%

LEGEND

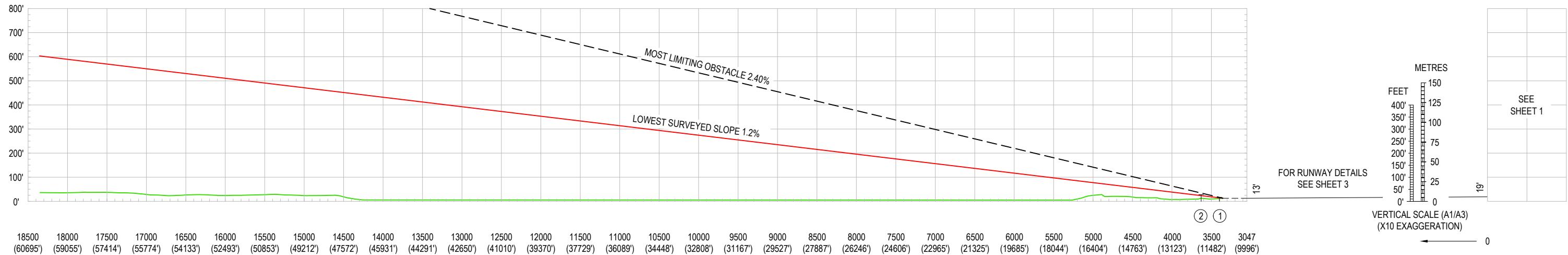
- LOWEST SURVEYED SLOPE
- GROUND LEVEL
- MOST LIMITING OBSTACLE
- ① OBSTACLE

NOTES

- AZIMUTH AND COORDINATES FOR THIS SURVEY ARE BASED ON MGA2020 ZONE 50 THE VERTICAL DATUM BEING AHD.
- HORIZONTAL DIMENSIONS IN METRES (FEET) ELEVATIONS IN FEET
- USERS OF THIS CHART SHOULD NOTIFY ANY ERRORS OR OMISSIONS AS SOON AS THEY BECOME APPARENT TO :-
- AERONAUTICAL INFORMATION SERVICE - AIR FORCE EMAIL: AIS.AF@DEFENCE.GOV.AU
- FOR FURTHER INFORMATION REGARDING THIS CHART CONTACT THE ABOVE
- MAGNETIC VARIATION 0°15' E (MARCH 2023)
- AERIAL SURVEY COMPLETED MARCH 2016. GROUND SURVEY CHECKS AND VERIFICATION NOVEMBER 2022.

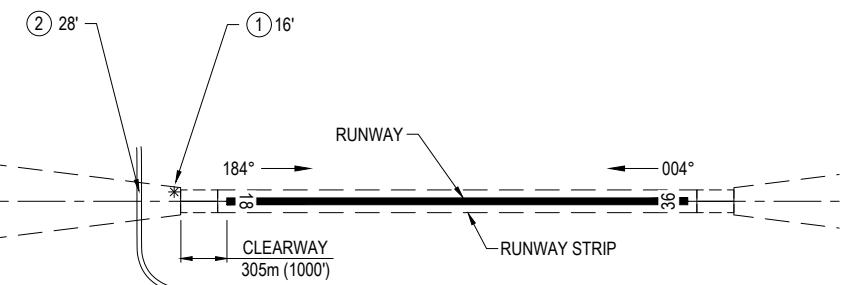
LEGEND

- OBSTRUCTIONS AND OBSTACLES**
- ① OBJECT NUMBER
 - 392' TOP ELEVATION IN FEET
 - * TREE(S) OR VEGETATION
 - BUILDING OR LARGE STRUCTURE
 - POLE, TOWER, SPIRE ETC
 - △ ANTENNA
 - MOVING (ROADS, RAILWAY TRACKS ETC)
 - TERRAIN PENETRATING LOWEST SURVEYED SLOPE
 - OVERHEAD TRANSMISSION LINE
 - FENCE LINE



RUNWAY 36

1:25000 (A1) 250 0 500 1000
1:50000 (A3) SCALE 1:25000



RUNWAY STRIP: 3167m (10390') x 150m (492')
RUNWAY: 3047m (9996') x 45m (147') SEALED

THE TYPE A SURVEY HAS BEEN CONDUCTED IN ACCORDANCE WITH ICAO ANNEX 4 AND DEPARTMENT OF DEFENCE REQUIREMENTS. THE CHART CLEARLY SHOWS THE GRAPHICAL RESULTS OF THE SURVEY AND HAS BEEN CHECKED FOR ACCURACY AND COMPLETENESS OF INFORMATION. THE CHART IS CERTIFIED CORRECT FOR PUBLICATION.



KEY DIAGRAM

DANIEL GEEVES
REGISTERED SURVEYOR
aurecon

15/11/2024
DATE

DEPARTMENT OF DEFENCE

SECURITY AND ESTATE GROUP

AERODROME OBSTACLE CHART - ICAO TYPE A
(OPERATING LIMITATIONS) NOVEMBER 2024, COMPILED BY AURECON

TO BE READ IN CONJUNCTION WITH CURRENT NOTAMS

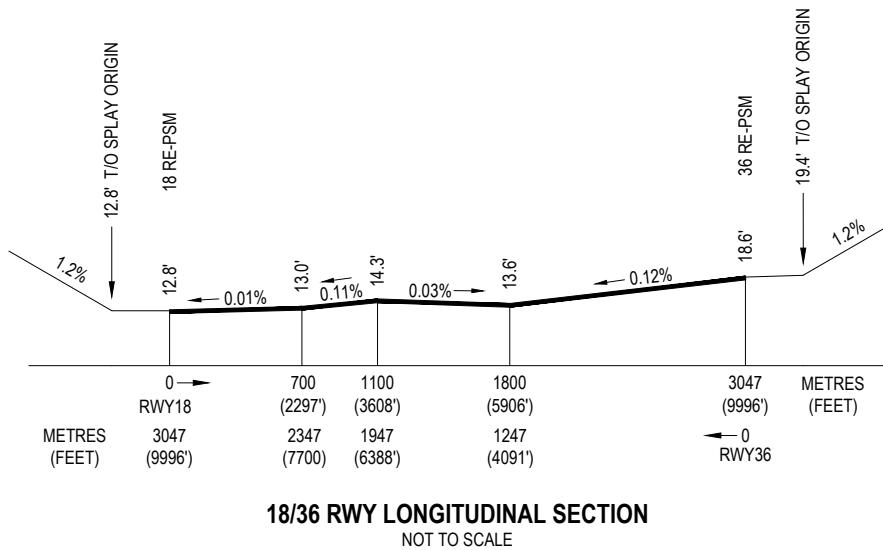
THE ORIGIN OF THE TAKE OFF SURFACE IS LOCATED AT THE END OF THE CLEARWAY
DISTANCES COMMENCE FROM THE RAAF RE-PSM AT THE START OF THE TAKE-OFF RUNWAY (SOT)

DATUM

AZIMUTH AND COORDINATES FOR THIS SURVEY ARE BASED ON MGA2020 ZONE 50
THE VERTICAL DATUM BEING AHD.

DEFINITIONS

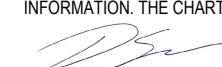
- RE-PSM: RUNWAY END PERMANENT SURVEY MARK
- LENGTH OF INNER EDGE 180m
- RATE OF DIVERGENCE OF SPLAY (EACH SIDE) 12.5%
- FINAL WIDTH 1800m
- OVERALL LENGTH 15000m



18 TAKE OFF																										
REPSM AT START OF TORA (REPSM 18)																										
REF No	GEOGRAPHIC								MGA		ELEVATION			RUNWAY MAGNETIC BEARING			TORA		TODA		ELEVATION AT T.O. ORIGIN					
	LAT				LONG				EASTING	NORTHING	(m)	(Ft)	(DEG)	(MIN)	(SEC)	(m)	(Ft)	(m)	(Ft)	(m)	(Ft)					
	DECIMAL DEG	(DEG)	(MIN)	(SEC)	DECIMAL DEG	(DEG)	(MIN)	(SEC)	-22.2199693	-22° 13' 11.890"	114.0911514	114° 05' 28.145"	200118.84	7539944.79	3.9	12.8	183° 36' 36.076"	3047	9996	3352	10997	5.9	19.4			
OBJECTS THAT APPEAR ON THE CHART															DISTANCE FROM SOT		OFFSET		GRADIENT TO TOP							
REF No	GEOGRAPHIC								MGA		ELEVATION TOP			TYPE OF OBSTACLE			(m)	(Ft)	(m)	(Ft)	LEFT/RIGHT	%				
	LAT				LONG				EASTING	NORTHING	(m)	(Ft)	(DEG)	(MIN)	(SEC)	(m)	(Ft)	(m)	(Ft)	3493.7	11462.1	2.1	6.9	L	3.15	
1	-22.251449	-22° 15' 05.21"	114.088891	114° 05' 20.00"	199952.76	7536452.59	10.4	34.0	TREE																	
2	-22.252761	-22° 15' 09.94"	114.088536	114° 05' 18.72"	199918.92	7536306.50	10.7	35.2	TREE																	
3	-22.252825	-22° 15' 10.17"	114.089072	114° 05' 20.66"	199974.42	7536300.48	10.4	34.1	TREE																	
4	-22.252897	-22° 15' 10.42"	114.088881	114° 05' 19.97"	199954.80	7536292.16	10.1	33.2	TREE																	
5	-22.252890	-22° 15' 10.40"	114.088610	114° 05' 18.99"	199926.86	7536292.43	10.4	34.2	TREE																	
6	-22.252956	-22° 15' 10.64"	114.087681	114° 05' 15.65"	199831.17	7536283.24	12.3	40.2	MOVING																	
7	-22.253155	-22° 15' 11.35"	114.088431	114° 05' 18.35"	199908.95	7536262.73	11.0	36.1	TREE																	
8	-22.253252	-22° 15' 11.70"	114.087591	114° 05' 15.32"	199822.56	7536250.31	12.6	41.3	MOVING																	
9	-22.253317	-22° 15' 11.94"	114.088162	114° 05' 17.38"	199881.56	7536244.20	10.6	34.7	FENCE																	

36 TAKE OFF																										
REPSM AT START OF TORA (REPSM 36)																										
REF No	GEOGRAPHIC								MGA		ELEVATION TOP			TYPE OF OBSTACLE			DISTANCE FROM SOT		OFFSET		GRADIENT TO TOP					
	LAT				LONG				EASTING	NORTHING	(m)	(Ft)	(DEG)	(MIN)	(SEC)	(m)	(Ft)	(m)	(Ft)	3394.9	11138.0	62.0	203.4	R	2.40	
	DECIMAL DEG	(DEG)	(MIN)	(SEC)	DECIMAL DEG	(DEG)	(MIN)	(SEC)	-22.2474242	-22° 14' 50.727"	114.0891620	114° 05' 20.983"	199972.14	7536899.07	5.7	18.6	3°	36'	36.076"	3047	9996	3352	10997	3.9	12.8	
OBJECTS THAT APPEAR ON THE CHART															DISTANCE FROM SOT		OFFSET		GRADIENT TO TOP							
REF No	GEOGRAPHIC								MGA		ELEVATION TOP			TYPE OF OBSTACLE			(m)	(Ft)	(m)	(Ft)	LEFT/RIGHT	%				
	LAT				LONG				EASTING	NORTHING	(m)	(Ft)	(DEG)	(MIN)	(SEC)	(m)	(Ft)	(m)	(Ft)	3627.3	11900.4	69.2	227.0	R	1.64	
1	-22.216873	-22° 13' 00.74"	114.091978	114° 05' 31.12"	200197.55	7540289.43	4.9	16.2	TREE																	
2	-22.214784	-22° 12' 53.22"	114.092200	114° 05' 31.91"	200215.93	7540521.37	8.4	27.6	MOVING																	

THE TYPE A SURVEY HAS BEEN CONDUCTED IN ACCORDANCE WITH ICAO ANNEX 4 AND DEPARTMENT OF DEFENCE REQUIREMENTS. THE CHART CLEARLY SHOWS THE GRAPHICAL RESULTS OF THE SURVEY AND HAS BEEN CHECKED FOR ACCURACY AND COMPLETENESS OF INFORMATION. THE CHART IS CERTIFIED CORRECT FOR PUBLICATION.


15/11/2024
DATE

DANIEL GEEVES
REGISTERED SURVEYOR


OBSTACLE LIMITATION SURVEYS AND ASSESSMENT
RAAF BASE LEARMONT

AERODROME OBSTACLE CHART ICAO TYPE A
(OPERATING LIMITATIONS) ISSUED NOVEMBER 2024
RUNWAY 18 & 36 - SHEET 3 OF 6

PROJECT	OBSTACLE LIMITATION SURVEYS AND ASSESSMENT
TITLE	AERODROME OBSTACLE CHART ICAO TYPE A
DRAWING No.	520002
WBS	-EST09759-
TYPE	DRG
DISC	UU
SITE	LEA
NUMBER	004
REV	E

DECLARED DISTANCES FOR EMERGENCY RUNWAY 18R (TWY A)	
TAKE OFF RUN AVAILABLE (TORA)	1502m (4927')
TAKE OFF DISTANCE AVAILABLE (TODA)	1562m (10997') 1.68%
ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	1502m (4927')
LANDING DISTANCE AVAILABLE (LDA)	1502m (4927')
SUPPLEMENTARY TAKE OFF DISTANCE AVAILABLE (STODA)	1521m (4990') 1.6%

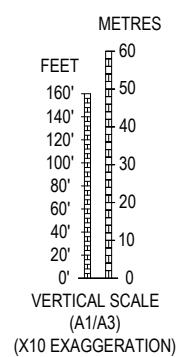
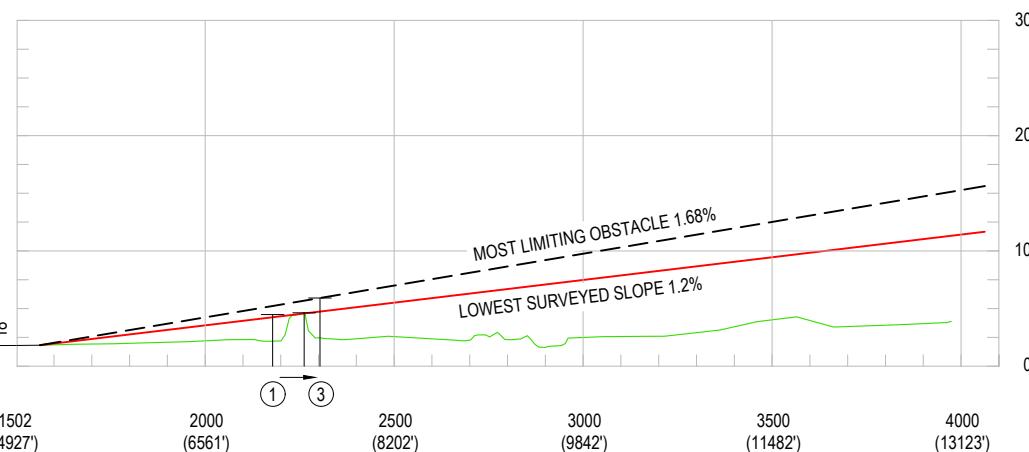
LEGEND

- LOWEST SURVEYED SLOPE
- GROUND LEVEL
- MOST LIMITING OBSTACLE
- ① OBSTACLE



SEE
SHEET 5
FOR RUNWAY DETAILS
SEE SHEET 6

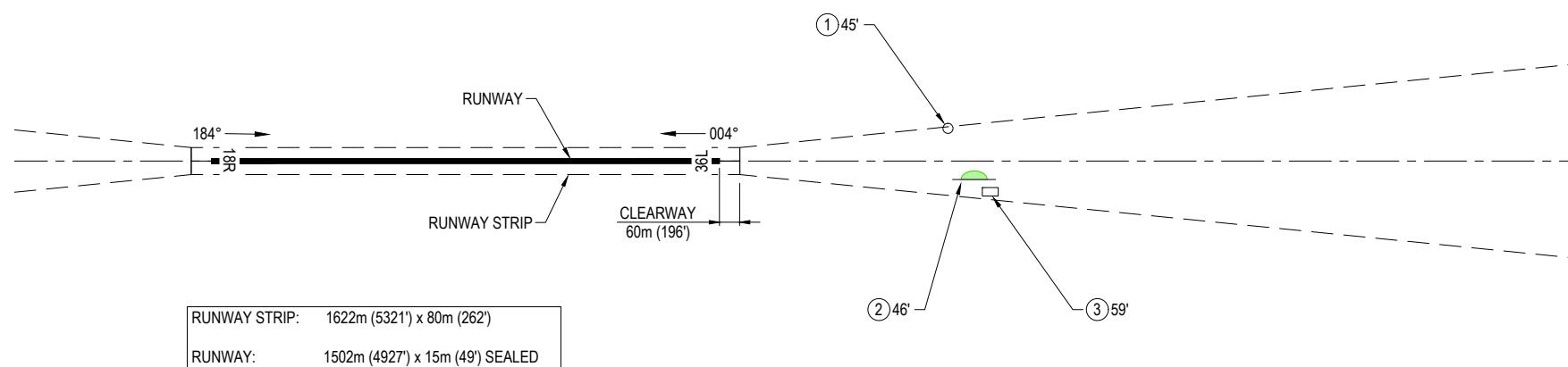
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EMERGENCY RUNWAY 18R

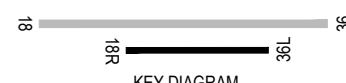
TWY A (CODE 2)

1:10000 (A1)
1:20000 (A3)
SCALE 1:10000



RUNWAY 18R (TWY A) SURVEY HAS BEEN ASSESSED BASED ON THE FOLLOWING "CODE 2" TAKE-OFF PARAMETERS FOR AN EMERGENCY RUNWAY:
LENGTH OF INNER EDGE - 80m
RATE OF DIVERGENCE (EACH SIDE) - 10%
FINAL WIDTH - 580m
OVERALL LENGTH - 2500m

THE TYPE A SURVEY HAS BEEN CONDUCTED IN ACCORDANCE WITH ICAO ANNEX 4 AND DEPARTMENT OF DEFENCE REQUIREMENTS. THE CHART CLEARLY SHOWS THE GRAPHICAL RESULTS OF THE SURVEY AND HAS BEEN CHECKED FOR ACCURACY AND COMPLETENESS OF INFORMATION. THE CHART IS CERTIFIED CORRECT FOR PUBLICATION.



DANIEL GEEVES
REGISTERED SURVEYOR

15/11/2024

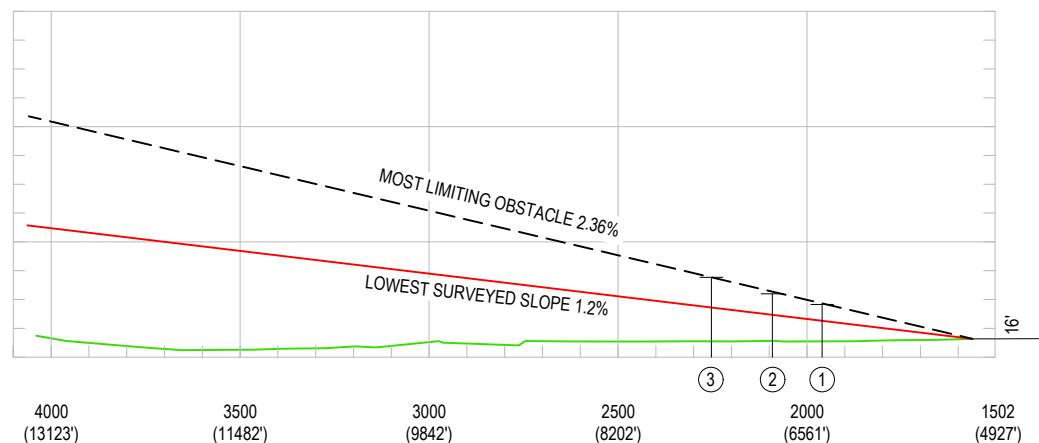
DATE

CLIENT	REV	DATE	REVISION DETAILS	APPROVED	SCALE	SIZE	FOR ISSUE NOT FOR CONSTRUCTION	PROJECT	OBSTACLE LIMITATION SURVEYS AND ASSESSMENT RAAF BASE LEARMONT
	A	10.11.23	FOR REVIEW	DG	AS SHOWN	A1/A3	APPROVED		AERODROME OBSTACLE CHART ICAO TYPE A (OPERATING LIMITATIONS) ISSUED NOVEMBER 2024 EMERGENCY RUNWAY 18R - SHEET 4 OF 6
	B	30.11.23	100% ISSUE FOR REVIEW	DG	DRAWN				
	C	12.02.24	100% ISSUE	DG	MH				
	D	25.03.24	100% ISSUE - AMMEND RWS WIDTH AS PER DEFENCE INSTRUCTION	DG	SURVEYED				
	E	15.11.24	100% ISSUE - UPDATE RWS WIDTH	DG	KI/MH/AAM				
					CHECKED				
					GH				
							DANIEL GEEVES		
PROJECT No.	WBS	TYPE	DISC	SITE	NUMBER	REV			
DRAWING No.	520002	-EST09759-	DRG	UU	LEA	005			

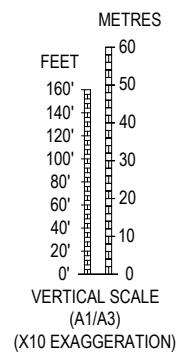
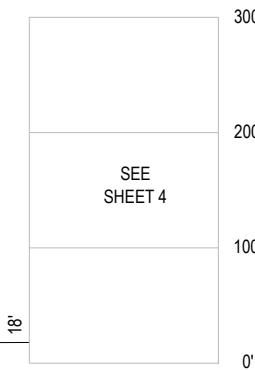
DECLARED DISTANCES FOR EMERGENCY RUNWAY 36L (TWY A)	
TAKE OFF RUN AVAILABLE (TORA)	1502m (4927')
TAKE OFF DISTANCE AVAILABLE (TODA)	1562m (10997') 2.36%
ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	1502m (4927')
LANDING DISTANCE AVAILABLE (LDA)	1502m (4927')
SUPPLEMENTARY TAKE OFF DISTANCE AVAILABLE (STODA)	1242m (4074') 1.6%, 1398m (4586') 1.9% 1432m (4698') 2.0%, 1513m (4963') 2.2%

LEGEND

- LOWEST SURVEYED SLOPE
- GROUND LEVEL
- MOST LIMITING OBSTACLE
- ① OBSTACLE



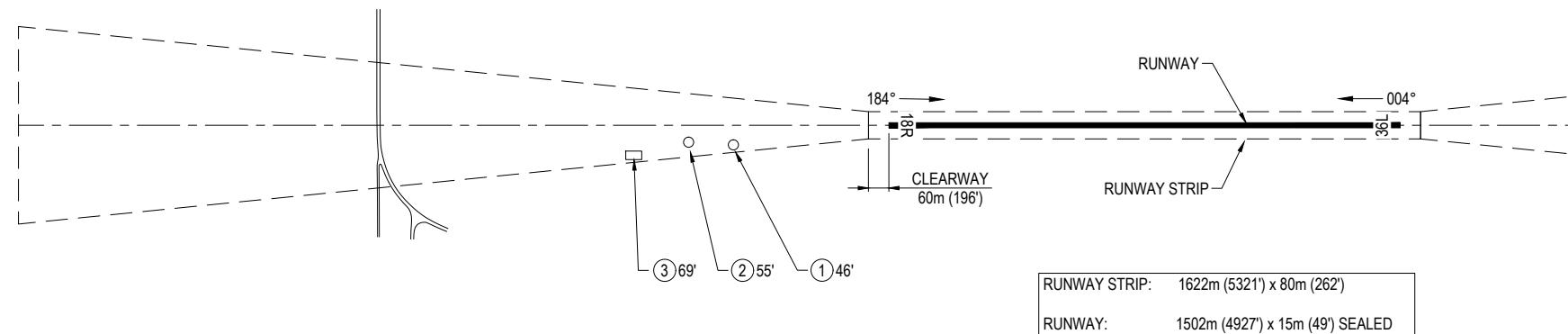
FOR RUNWAY DETAILS
SEE SHEET 6



EMERGENCY RUNWAY 36L

TWY A (CODE 2)

1:10000 (A1)
1:20000 (A3)
SCALE 1:10000



RUNWAY 36L (TWY A) SURVEY HAS BEEN ASSESSED BASED ON THE FOLLOWING "CODE 2" TAKE-OFF PARAMETERS FOR AN EMERGENCY RUNWAY:
LENGTH OF INNER EDGE - 80m
RATE OF DIVERGENCE (EACH SIDE) - 10%
FINAL WIDTH - 580m
OVERALL LENGTH - 2500m

THE TYPE A SURVEY HAS BEEN CONDUCTED IN ACCORDANCE WITH ICAO ANNEX 4 AND DEPARTMENT OF DEFENCE REQUIREMENTS. THE CHART CLEARLY SHOWS THE GRAPHICAL RESULTS OF THE SURVEY AND HAS BEEN CHECKED FOR ACCURACY AND COMPLETENESS OF INFORMATION. THE CHART IS CERTIFIED CORRECT FOR PUBLICATION.



KEY DIAGRAM
80 30 30
80 30 30

DANIEL GEEVES
REGISTERED SURVEYOR
aurecon

15/11/2024
DATE

CLIENT	REV	DATE	REVISION DETAILS	APPROVED	SCALE	SIZE	FOR ISSUE NOT FOR CONSTRUCTION	PROJECT	OBSTACLE LIMITATION SURVEYS AND ASSESSMENT RAAF BASE LEARMONT
	A	10.11.23	FOR REVIEW	DG	AS SHOWN	A1/A3			
	B	30.11.23	100% ISSUE FOR REVIEW	DG	DRAWN				
	C	12.02.24	100% ISSUE	DG	MH				
	D	25.03.24	100% ISSUE - AMMEND RWS WIDTH AS PER DEFENCE INSTRUCTION	DG	SURVEYED				
	E	15.11.24	100% ISSUE - UPDATE RWS WIDTH	DG	KI/MH/AAM				
					CHECKED				
					GH				
							APPROVED 15/11/2024		
							DANIEL GEEVES		
WBS	TYPE	DISC	SITE	NUMBER	REV				
DRAWING No.	520002	-EST09759-	DRG	UU	LEA	006	E		

DEPARTMENT OF DEFENCE

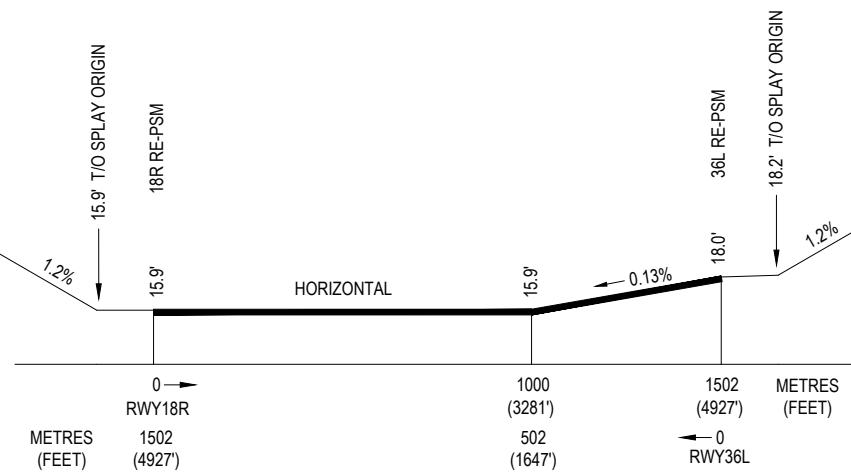
SECURITY AND ESTATE GROUP

AERODROME OBSTACLE CHART - ICAO TYPE A
(OPERATING LIMITATIONS) NOVEMBER 2024, COMPILED BY AURECON

TO BE READ IN CONJUNCTION WITH CURRENT NOTAMS

THE ORIGIN OF THE TAKE OFF SURFACE IS LOCATED AT THE END OF THE CLEARWAY
DISTANCES COMMENCE FROM THE RAAF RE-PSM AT THE START OF THE TAKE-OFF RUNWAY (SOT)DATUM
AZIMUTH AND COORDINATES FOR THIS SURVEY ARE BASED ON MGA2020 ZONE 50
THE VERTICAL DATUM BEING AHD.

- DEFINITIONS
- RE-PSM: RUNWAY END PERMANENT SURVEY MARK
 - LENGTH OF INNER EDGE 80m
 - RATE OF DIVERGENCE OF SPLAY (EACH SIDE) 10%
 - FINAL WIDTH 580m
 - OVERALL LENGTH 2500m



REPSM AT START OF TORA (REPSM 18R)														RUNWAY MAGNETIC BEARING		TORA		TODA		ELEVATION AT T.O. ORIGIN	
REF No	GEOGRAPHIC							MGA		ELEVATION		EASTING	NORTHING	(m)	(Ft)	(DEG)	(MIN)	(SEC)	(m)	(Ft)	
	LAT				LONG																
	DECIMAL DEG	(DEG)	(MIN)	(SEC)	DECIMAL DEG	(DEG)	(MIN)	(SEC)													
	-22.2280889	-22°	13'	41.120"	114.0878414	114°	05'	16.229"	199794.70	7539038.64	4.8	15.9	183°	36'	31.372"	1502	4927	1562	5124	5.6	18.2

OBJECTS THAT APPEAR ON THE CHART														ELEVATION TOP		TYPE OF OBSTACLE		DISTANCE FROM SOT		OFFSET		GRADIENT TO TOP	
REF No	GEOGRAPHIC							MGA		EASTING	NORTHING	(m)	(Ft)	(m)	(Ft)	(m)	(Ft)	(m)	(Ft)				
	LAT				LONG																		
	DECIMAL DEG	(DEG)	(MIN)	(SEC)	DECIMAL DEG	(DEG)	(MIN)	(SEC)															
1	-22.247773	-22°	14'	51.98"	114.087354	114°	05'	14.47"	199786.41	7536856.87	13.7	44.8	WINDSOCK	2178.1	7146.0	96.6	316.8	L	1.32				
2	-22.248114	-22°	14'	53.21"	114.085851	114°	05'	09.06"	199632.16	7536816.04	13.9	45.5	EARTH BUND	2226.3	7304.0	55.4	181.9	R	1.25				
3	-22.248786	-22°	14'	55.62"	114.085457	114°	05'	07.64"	199592.95	7536740.84	18.0	59.1	HANGER	2303.2	7556.4	91.0	298.4	R	1.68				

REPSM AT START OF TORA (REPSM 36L)														RUNWAY MAGNETIC BEARING		TORA		TODA		ELEVATION AT T.O. ORIGIN	
REF No	GEOGRAPHIC							MGA		EASTING	NORTHING	(m)	(Ft)	(m)	(Ft)	(m)	(Ft)	(m)	(Ft)		
	LAT				LONG																
	DECIMAL DEG	(DEG)	(MIN)	(SEC)	DECIMAL DEG	(DEG)	(MIN)	(SEC)													
	-22.2416271	-22°	14'	29.858"	114.0868605	114°	05'	12.698"	199722.40	7537536.76	5.5	18.0	3°	36'	31.372"	1502	4927	1562	5124	4.8	15.9

OBJECTS THAT APPEAR ON THE CHART														ELEVATION TOP		TYPE OF OBSTACLE		DISTANCE FROM SOT		OFFSET		GRADIENT TO TOP	
REF No	GEOGRAPHIC							MGA		EASTING	NORTHING	(m)	(Ft)	(m)	(Ft)	(m)	(Ft)						
	LAT				LONG																		
	DECIMAL DEG	(DEG)	(MIN)	(SEC)	DECIMAL DEG	(DEG)	(MIN)	(SEC)															
1	-22.223935	-22°	13'	26.16"	114.087583	114°	05'	15.30"	199759.23	7539498.37	13.9	45.7	LIGHT POLE	1959.7	6429.5	57.5	188.6	L	2.29				
2	-22.222754	-22°	13'	21.91"	114.087744	114°	05'	15.87"	199773.32	7539629.52	16.8	55.0	LIGHT POLE	2091.3	6861.2	49.7	163.2	L	2.25				
3	-22.2221278	-22°	13'	16.59"	114.087477	114°	05'	14.91"	199742.61	7539792.54	21.1	69.3	HANGER	2252.5	7390.2	88.2	289.4	L	2.36				

THE TYPE A SURVEY HAS BEEN CONDUCTED IN ACCORDANCE WITH ICAO ANNEX 4 AND
DEPARTMENT OF DEFENCE REQUIREMENTS. THE CHART CLEARLY SHOWS THE GRAPHICAL
RESULTS OF THE SURVEY AND HAS BEEN CHECKED FOR ACCURACY AND COMPLETENESS OF
INFORMATION. THE CHART IS CERTIFIED CORRECT FOR PUBLICATION.

**Project
Number and
Title****520002-22-EST09759 National OLS Update****RAAF Base Learmonth****Obstacle Chart ICAO Type A (Operating Limitations) – Survey Report Issued 15/11/2024****Purpose and
Scope**

This report contains the supporting survey information relating to the Aerodrome Obstacle Chart Type A (Operating Limitations) for RAAF Base Learmonth completed and signed in November 2024 by Aurecon.

The information obtained from these surveys is used for the compilation of Type A (Operating Limitations) Charts to be used by flight planners to determine the maximum performance of aircraft on take-off, in recognition of existing obstacles within the take-off area on nominated runways.

Methodology

The runways at RAAF Base Learmonth were surveyed by ground instrument equipment and combined with aerial survey and assessed based on the following classification and physical characteristics:

- | | |
|---|---|
| <ul style="list-style-type: none"> • RWY18/36 • Emergency RWY 18R/36L (TWY A) | Code 4, Instrument, Non-Precision Runway
Code 2, Non-Instrument Runway |
|---|---|

The survey captured all objects and structures which project above a plane surface having a 1.2% slope in accordance with ICAO Annex 4, subject to applying shielding principles. If no obstacles were detected above the 1.2% plane surface, the plane was surveyed down to 1.0%.

The field survey was completed in November 2022 to support the aerial Light Detection and Ranging (LiDAR) survey which was captured in 2016 to support the previous Type A chart produced by Aurecon. It was determined that due to the nature of the terrain surrounding RAAF Base Learmonth an update of the LiDAR survey was not warranted. The November 2022 ground survey is sufficient to identify the changes between the 2016 LiDAR, 2016 ground survey and current conditions on site.

The aerial imagery captured with the LiDAR survey assisted identifying obstructions detected in the LiDAR and ground survey. The LiDAR captured provided a comprehensive coverage of the assessment area and was deemed the most efficient way to survey the Type A Plane which extends up to 15km from the end of the clearway.

The take-off flight path area is listed in ICAO Annex 4, Chapter 3 however, at the request of Defence, the survey of the take-off flight path area is extended for the full length of the take-off climb surface splay to a total distance of 15,000m for a code 3 or 4 runway as annotated in Civil Aviation Safety Authority (CASA) Manual of Standards Part 139 (MOS139) for a take-off runway. Code 1 and 2 runways are to be surveyed to the take-off climb surface OLS elements and dimensions annotated in MOS139 for a take-off runway.

Moving obstacles are assessed to a height of 4.6m above road/track level. Roads and tracks in areas where vehicles are in direct contact with Air Traffic Control (ATC) are considered controlled and not shown on the Type A charts. Likewise, any roads that are acceptably signed or otherwise controlled e.g. traffic lights.

**Obstacle
Summary**

Obstacles listed in this summary are unshielded obstacles and are shown on the Type A charts and listed in the obstacle tables. Objects above the 1.2% plane but below the OLS gradient are shown on the charts and images but are not discussed here. Note that object numbering re-starts from #1 for each take-off.

RWY 18 Obstacles

RWY18 Obstacles consist of a tree (Obs. #1) and a moving object (Obs. #6) as shown on Image 1. Obs. #6 is the main base access road.

The critical obstacle for take-off is Obs. #1 (Tree). The critical climb gradient is 3.15%.

RWY 36 Obstacles

RWY36 Obstacles are a single tree (Obs. #1).

The critical obstacle for take-off is Obs. #1 (Tree) as shown on Image 2. The critical climb gradient is 2.40%.



Image 1 – RWY 18 Take Off Splay



Image 2 – RWY 36 Take Off Splay

Emergency RWY 18R (TWY A) Obstacles

No obstacles infringe the RWY18R take-off.

The critical object for take-off is Obs. #3 (Hanger roof) as shown on Image 3. The critical climb gradient is 1.68%.

Emergency RWY 36L (TWY A) Obstacles

No obstacles infringe the RWY36L take-off.

The critical object for take-off is Obs. #3 (Hanger) as shown on Image 4. The critical climb gradient is 2.36%.



Image 3 – RWY 18R Take Off Splay



Image 4 – RWY 36L Take Off Splay

Moving Objects

RWY 18 Moving Objects (Refer Image 1)

Obs. #6 is the main base access road and Obs. #8 is the track adjacent to the perimeter fence. Neither are controlled roads.

RWY 36 Moving Objects (Refer Image 2)

Obs. #2 has signage on the road either side of the take-off splay but is otherwise uncontrolled. The road is an alternate site access.

Emergency RWY 18R (TWY A) Moving Objects (Refer Image 3)

No uncontrolled roads or tracks infringe the take-off. A moving object hazard exists from aircraft and vehicles on TWYs and Apron areas south of THR 36L. These obstacles are considered to be controlled and hence not considered in the Type A chart calculations.

Emergency RWY 36L (TWY A) Moving Objects (Refer Image 4)

No uncontrolled roads or tracks infringe the take-off. A moving object hazard exists from aircraft and vehicles on TWYs and Apron areas north of THR 18R. These obstacles are considered to be controlled and hence not considered in the Type A chart calculations.

Datum

The ARP and REPSMs are delivered in the following datums:

- Horizontal Datum: Geocentric Datum of Australia 2020 (GDA2020).
- Vertical Datum: Australian Height Datum (AHD).
- UTM Coordinates: Map Grid of Australia 2020 (MGA2020).

Accuracy: Horizontal: +/- 0.010m @95% Confidence Interval
 Vertical: +/- 0.020m @95% Confidence Interval

Survey Control

Table 1 – Survey Control Marks GDA2020

Control	Datum	Easting (m) / Longitude	Northing (m) / Latitude	Elevation (mAHD)
ARP (Existing bolt) Good Condition	UTM Zone 50	199883.228	7538223.080	3.910
	Degrees	E 114° 05' 18.770"	S 22° 14' 07.666"	
	Decimal Degrees	114.0885472	-22.2354627	
REPSM 18 (Existing bolt) Good Condition	UTM Zone 50	200118.837	7539944.789	3.903
	Degrees	E 114° 05' 28.145"	S 22° 13' 11.890"	
	Decimal Degrees	114.0911514	-22.2199693	
REPSM 36 (Existing bolt) Good Condition	UTM Zone 50	199972.143	7536899.067	5.684
	Degrees	E 114° 05' 20.983"	S 22° 14' 50.727"	
	Decimal Degrees	114.0891620	-22.2474242	
REPSM 18R (New bolt) Good Condition	UTM Zone 50	199794.704	7539038.637	4.845
	Degrees	E 114° 05' 16.229"	S 22° 13' 41.120"	
	Decimal Degrees	114.0878414	-22.2280889	
REPSM 36L (New bolt) Good Condition	UTM Zone 50	199722.402	7537536.760	5.481
	Degrees	E 114° 05' 12.698"	S 22° 14' 29.858"	
	Decimal Degrees	114.0868605	-22.2416271	

Photos – Survey Control



Photo 1 – ARP Survey Control Mark (Existing Brass Plaque)

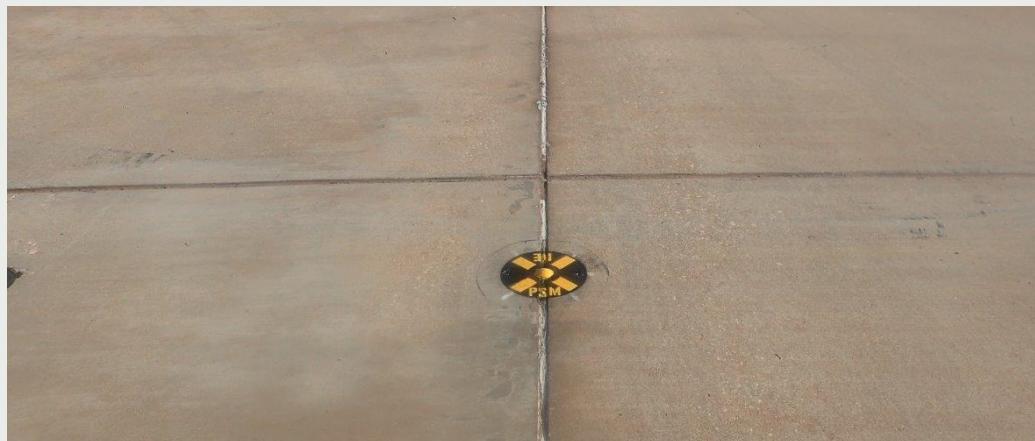


Photo 2 – REPSM18 (Existing bolt in concrete)



Photo 3 – REPSM36 (Existing bolt in concrete)



Photo 4 – Emergency RWY (TWY A) REPSM18R (New bolt in asphalt)



Photo 5 – Emergency RWY (TWY A) REPSM36L (New bolt in asphalt)

Photos - Take
Off Climb
Surface
Horizon



Photo 6 – View North from RWY 18 Threshold



Photo 7 – View South from RWY 36 Threshold



Photo 8 – View North from RWY 18R Threshold



Photo 9 – View South from RWY 36L Threshold

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	Author	Mark Hansen		Spatial Consultant	15/11/2024
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**Project
Deliverables**

Included with this report are the following deliverables:

- Type A Chart as PDF File
- Survey control and obstacles as CSV Files

Any further questions regarding this Type A Chart production should be directed to:

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