EQUATORIAL LAUNCH AUSTRALIA

ASC Helicopter Operations Plan

ELA-000040

Version 1.0

Handling Instruction : Commercial-In-Confidence

VERSION HISTORY

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APPROVAL HISTORY

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1 PURPOSE

This plan provides instruction on how helicopter operations are to be conducted at the Arnhem Space Centre (ASC) site.

2 SCOPE

This document presents and identifies the management of helicopter operations at the ASC site as related to the following:

1. Location of Helicopter Take-off and Landing Sites
2. Location of Helicopter Aborted/ Forced Take-off and Landing Sites
3. Approach and Departure Routes
4. Hazards of Radiation to Personnel (HERP)
5. Hazards of Radiation to Ordnance (HERO)
6. Operations
7. Communications
8. Required Supporting Infrastructure and
9. Limitations and Conditions for Safe Helicopter Operations.

3 REFERENCES

3.1 ELA DOCUMENTS

Serial	DIN	Title	Version
A	ELA-000037	ASC Site Master Plan	Latest Version
B	ELA-0000XX	ASC Site Detailed Drawings	
C	ELA-000021	ELA Operations Manual	
D	ELA-000015	ELA Organisation Plan	
E	ELA-000031	ELA Terminology and Definitions	

3.2 DEFINITIONS AND ACRONYMS

Definitions and acronyms applicable to this document may be listed in ELA-000031, ELA Terminology and Definitions (reference E).

4 HELICOPTER LANDING SITE (HLS)

The helicopter take-off and landing site, also referred to the as the helicopter landing site (HLS), is an area of land intended for the arrival and departure of helicopters. It is a cleared site on a firm ground surface with a surface finish to minimise creating excessive dust or engine foreign object damage (FOD). The helicopters generally used for supporting launch operations (range surveillance and recovery) requires a minimum diameter of 20 metres for the HLS.

The requirements for the HLS consist of the following:

1. An area with a minimum diameter of 20 metres, consisting of a firm ground surface;
2. Sufficient obstacle clearance on approach and departure at less than 35 feet (10.7 metres) above ground level (AGL);
3. Usage only for operations during the daytime or during visual meteorological conditions (VMC); and
4. Presence of a windsock or a similar indicator for wind direction.

4.1 LOCATION OF ASC HLS

The detailed design drawings for the ASC site layout are included at reference B. The HLS's are located at COORDS;

HLS North: 12.3706°S, 136.8048°E

HLS East: 12.3863°S, 136.8099°E

HLS West: 12.3880°S, 136.7984°E

4.2 LOCATION OF FORCED LANDING SITE – SUBJECT TO CHANGE

A forced landing site is an area of land on which the helicopter could make a forced landing with a reasonable expectation that there would be no injuries to persons in the helicopter or on the ground.

The approach and departure tracks, indicated in refernce B, are clear of obstacles. There is sufficient area on approach and departure for an emergency set-down if required.

5 DEPARTURE AND APPROACH CORRIDORS

The establishment of departure and approach corridors are recommended to ensure sufficient obstacle clearance, deconfliction and personal awareness. The selected departure and approach corridors minimise the exposure of the helicopter to meteorological operations into and out of the HLS and ensure that helicopter radiation emissions do not intersect with any other HERP and HERO distances on the ASC site. Further information on HERO and HERP distances are provided below.

5.1 HAZARDS OF RADIATION TO PERSONNEL

The location of HLS is not within any HERP hazard areas and details on the HERP distances can be found at reference Annex A.

5.2 HAZARDS OF RADIATION TO ORDNANCE

The location of HLS is not within any HERO hazard areas and details on the HERO distances can be found at Annex A.

6 OPERATIONS

All helicopter operations will be established in accordance with this plan and conducted in accordance with Helicopter Operations Procedure at reference C.

6.1 TYPES OF OPERATIONS

Permitted operations include:

1. Passengers/Cargo
2. Slung load

3. Hover
4. Engine start
5. Touch-down
6. Take-off
7. Refuelling

Prohibited operations include:

8. Overflight of the ASC compound expect when required for the conduct of permitted operations as per 6.1.

6.2 AUTHORISED PERSONNEL

Untrained or unauthorised personnel are prohibited from performing helicopter operations. Authorised personnel and their responsibilities are listed below:

1. Pilot In Command (PIC): The PIC is the authorised pilot for the helicopter and is responsible for all permitted flight operations.
2. Load Crew (LC): The LC consists of the authorised personnel who will receive the space hardware as transported via slung load or cargo from the recovery site.
3. ELA CEO*
4. General Manager Operations and Launch*
5. Airspace and Marine Coordinator (AMCO)*
6. Facility Maintenance and Security Manager (FM)*
7. Launch Operations Manager (LOM)*
8. Head of Site Operations ASC*
9. Range Safety Supervisor (RSS)*
10. Range and Recovery Specialist (Air and Sea) (RAS)
11. Other ELA or guests at discretion of CEO and GM Ops, where training and PIC approval has been completed

*Refer to ELA Organisation Plan at Reference D for role descriptions.

6.3 PRIOR TO HELICOPTER OPERATIONS

6.3.1 RECORD OF ACTIVITY AND DECONFLICTION

Prior to conducting helicopter operations, the requested helicopter operation will be recorded in the ASC Facility Activity Register to be deconflicted with other existing activities. The following information must be recorded:

1. The resources required for the conduct of helicopter operations,
2. The window required to conduct helicopter operations,
3. The time required to conduct helicopter operations, and
4. The personnel to be onboard helicopter operations.

6.3.2 BRIEFING

Once the helicopter operations activity has been approved, the PIC and all personnel involved with the helicopter operation are briefed by AMCO and PIC on the sortie and any supporting plans dependent on the sortie.

6.3.3 CLEARING THE HLS

Prior to take-off or landing, the HLS must be cleared of all objects, people, and animals likely to be a hazard to the helicopter, other than supporting infrastructure that is essential to the helicopter operation.

No person may be within 30 metres of the closest point of a hovering helicopter, other than authorised persons who are essential to the safe conduct of the operation or the specific nature of the task.

6.4 SUPPORTING INFRASTRUCTURE REQUIREMENTS

Table 1 below summarises the required supporting infrastructure and its corresponding function for helicopter operations. Supporting infrastructure equipment must be authorised for use for helicopter operations.

Table 1: Supporting Infrastructure

	Infrastructure	Function
1	Windsock	To indicate wind direction on the landing pad.
2	Fixed signage	Date
3	Personal Protective Equipment (PPE)	To ensure safety. The pilot must wear required PPE per Civil Aviation Safety Authority (CASA) regulations. Passengers must wear shoes with covered toes.
4	Radios	To enable communications between on ground supporting roles.
5	PA System	To enable communications to full ASC site.
6	Fuel truck, refuelling system & fuel	To refuel the helicopter on the HLS. This is provided and operated by the PIC.
7	Spill kit	To be used in case of emergencies, namely the spilling of chemicals and hazardous materials. This is provided by the PIC.
8	Fire extinguisher	To be used in case of emergencies. This is provided by the PIC.
9	VHF/UHF radio transmitter and receiver	To enable communications between the PIC and AMCO.

6.5 HELICOPTER OPERATIONS GUIDELINES

In the event that helicopter operations are required at the ASC site, the following steps will be enacted in accordance with the Helicopter Operations Procedure at Reference C.

6.5.1 FOR OUTBOUND ROUTING:

1. Any helicopter movement event must be deconflicted with other activities and approved prior to operations.
2. The PIC will notify the AMCO 10 minutes prior to the requested take-off.
3. The AMCO will confirm clearance of the HLS and announce via the PA system that helicopter operations are to commence.
4. When the helicopter departs, the AMCO will record time of departure as well as who/what is departing.
5. Once the helicopter has departed, the AMCO will announce that the helicopter departure is complete.

6.5.2 FOR INBOUND ROUTING:

1. Any helicopter movement event must be deconflicted with other activities and approved prior to operations.
2. The PIC will notify the AMCO 10 minutes prior to the requested landing.
3. The AMCO will confirm clearance of the HLS and announce via the PA system that helicopter operations are to commence.
4. When the helicopter lands, the AMCO will record time of approach as well as who/what is received.
5. After the helicopter has landed, the AMCO will announce that the helicopter landing is complete.

6.5.3 HOT OR HOVER EXIT/ENTRY:

1. Ensure all gear is stowed in bags and the passenger compartment is free of loose lightweight items prior to opening the door.
2. Follow the PIC's directions and wait for the PIC's cue to disembark.

3. Once on the ground, avoid the tail boom; always approach and depart forward of the aircraft at a 45 degree angle.
4. Move slowly around the helicopter and be aware of the main rotor, particularly in uneven or sloping terrain.
5. Carry long items such as shovels horizontally.
6. Do not loiter in areas directly in front of the helicopter–once outside the rotor disc, move to one side or the other.

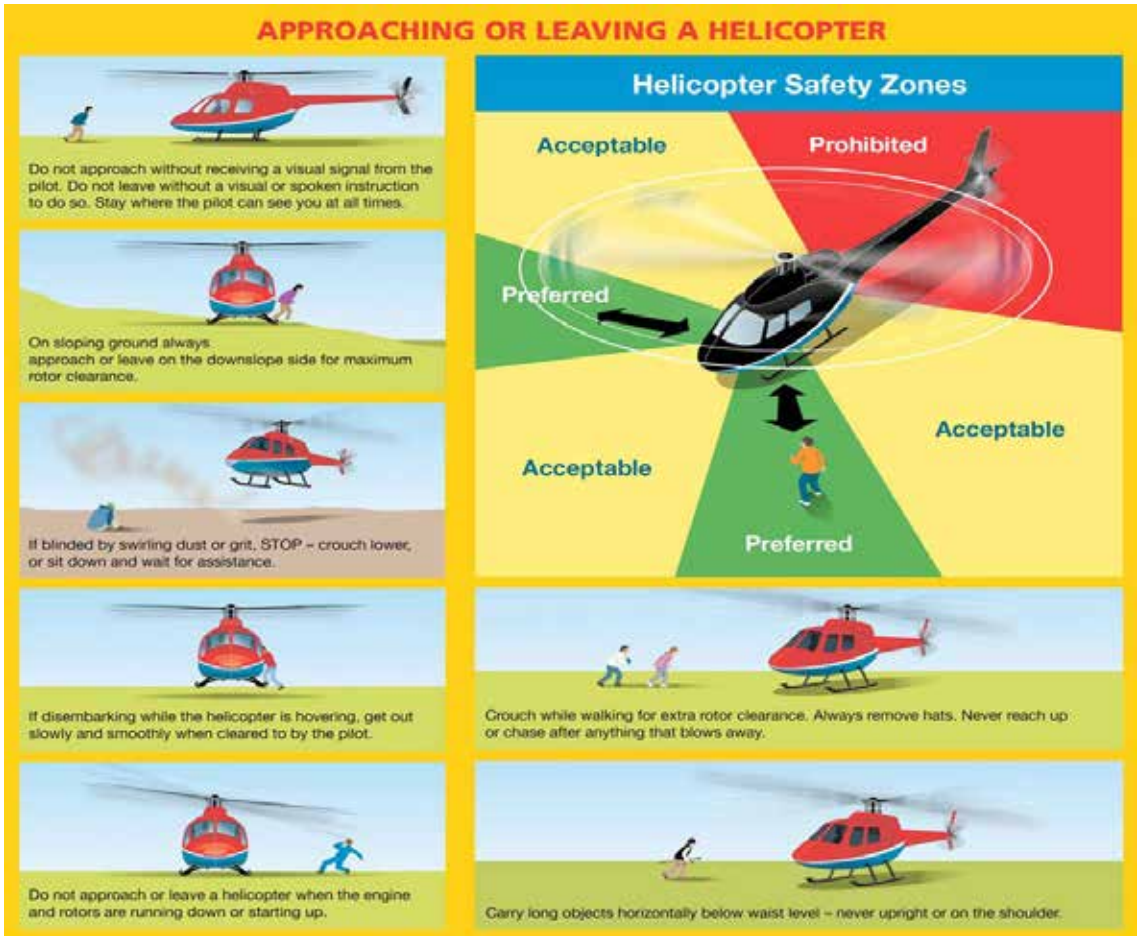


Figure 1: Helicopter Safety

6.5.4 General Rigging and Sling Operations:

1. Remain outside of a 10-m radius from the hovering helicopter and/or suspended load at all times unless hooking the load.
2. Avoid the area upwind of the load. This is typically the direction in which the helicopter will depart with the load.
3. If hooking a load, immediately vacate the 10-m radius and the upwind area after completing the hook.
4. Maintain visual contact with the load until it is no longer a hazard.
5. The PIC and all members of the LC review and are familiar with Annex B: Helicopter Marshalling Signals.
6. Any team member who hooks a sling load, must be trained for Hooking Loads While at a Hover.

6.6 Landing Zones on Recovery Operations

During a recovery sortie, the PIC will choose a safe landing zone (LZ), as close as possible to the target component's landing site.

Living vegetation such as small shrubs may be trimmed to improve helicopter LZs in the interest of safety, but living shrubs where possible are not removed completely. Standing dead wood may be cut to improve LZs and prevent sling gear from snagging during lifting operations.

If no LZ, that will allow the helicopter to land safely and power-down, can be found within a reasonable walking distance of the component landing site, then an insertion point suitable for safe hover-exit by the LC is identified. In this case, a safe, full-down LZ as close as possible to the planned hover insertion point needs to be chosen as a staging location. The staging LZ will be within 5 km of and at a higher elevation than the insertion point to allow for strong UHF radio communication between the PIC and the LC.

6.7 COMMUNICATIONS

Table 2 below outlines the communications to be performed in the event of a helicopter movement on the ASC site.

Table 2: Radio and PA System Communications

Time		Communication	Means
Take-Off and Departure			
1	Prior to Approach	10 mins prior to departure, the PIC is to notify the AMCO of departure.	VHF/UHF Radio
2	Prior to Departure	The AMCO is to make the following announcement: “Helicopter Operations to commence at the Helicopter Pad in xx minutes,” and specify commencement time of helicopter operation.	UHF Radio
3	After Departure	The AMCO is to announce that helicopter operations have been completed	UHF Radio
Approach and Landing			
1	Prior to Approach	10 mins prior to approach, the PIC is to transmit a “Helicopter Inbound” call to the AMCO	VHF/UHF Radio
2	Prior to Approach	The AMCO is to make the following announcement: “Helicopter Operations to commence at the Helicopter Pad in 10 minutes,” and specify commencement time of helicopter operation.	UHF Radio
3	After Landing	The AMCO is to announce that helicopter operations have been completed	UHF Radio

7 VISUAL METEOROLOGICAL CONDITIONS

Recovery sorties proceed when Visual Meteorological Conditions (VMC) exist at base and are expected to prevail, so that worsening conditions are not likely to prevent the aircraft from returning to base after the sortie is completed. This is particularly true when the recovery target or schedule is critical (such as in the case of a re-useable payload).

While the PIC alone must decide whether safety of flight can be assured, the PIC, AMCO and RAS work together to determine whether a sortie is to be attempted by consulting weather resources and considering the tasks planned for the sortie.

The GM-OPS has the final say as to whether a flight is attempted, provided the PIC deems it safe to launch in current conditions.

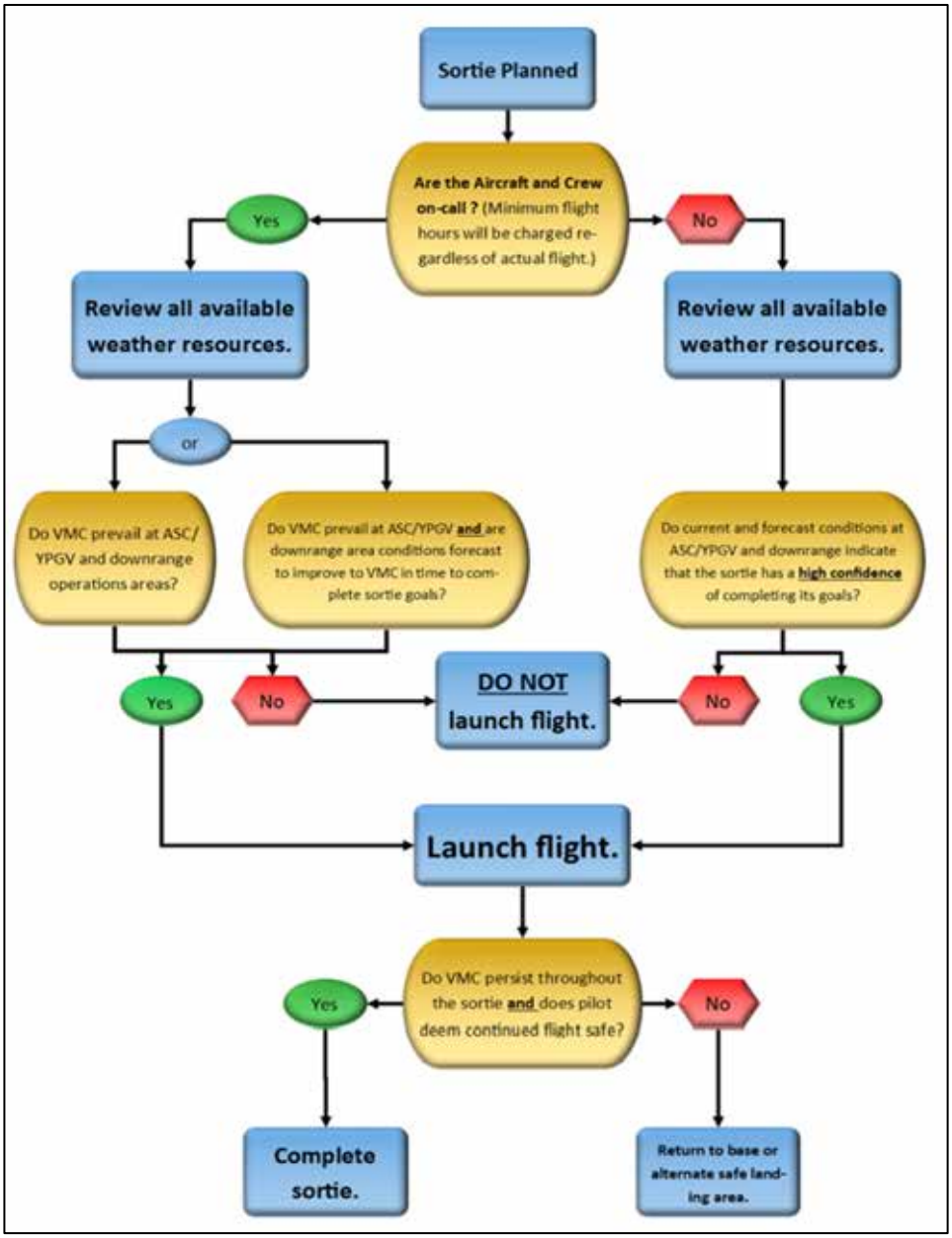
Examples of circumstances that could prompt the GM-OPS to call off a sortie despite VMC at base or criticality of a target include:

1. The aircraft and aircrew are on-demand (i.e., not on-call), and downrange forecast conditions indicate a low probability of a successful sortie.
2. VMC prevail at base, but downrange conditions are not VMC, with no forecast improvement.

3. VMC prevail at base with VMC or improving conditions downrange, but conditions at base are forecast to deteriorate before the sortie will be completed.
4. The sortie is intended as a spotting flight or aerial search flight and downrange visibility is forecast less than 5 NM and/or downrange turbulence is forecast greater than light.

The flow chart in Figure 2, below, provides the weather decision-making process flow.

Figure 2: HELO Weather decision making flow



The Australian Government maintains both aviation-specific and general weather resources. The Bureau of Meteorology's Aviation Weather Services are available to access.

LC can also review other resources that provide general awareness of local weather through global weather models. Two internet sites for hyperlocal weather conditions and reasonably accurate 48-hour forecasts are Windy.com (https://windy.com) and The Australian Bureau of Meteorology (http://www.bom.gov.au/)

8 LIMITATIONS

Table 3 below provides a summary of limitations and conditions for the conduct of helicopter operations.

Table 3: Limitations and Conditions for Safe Helicopter Operations

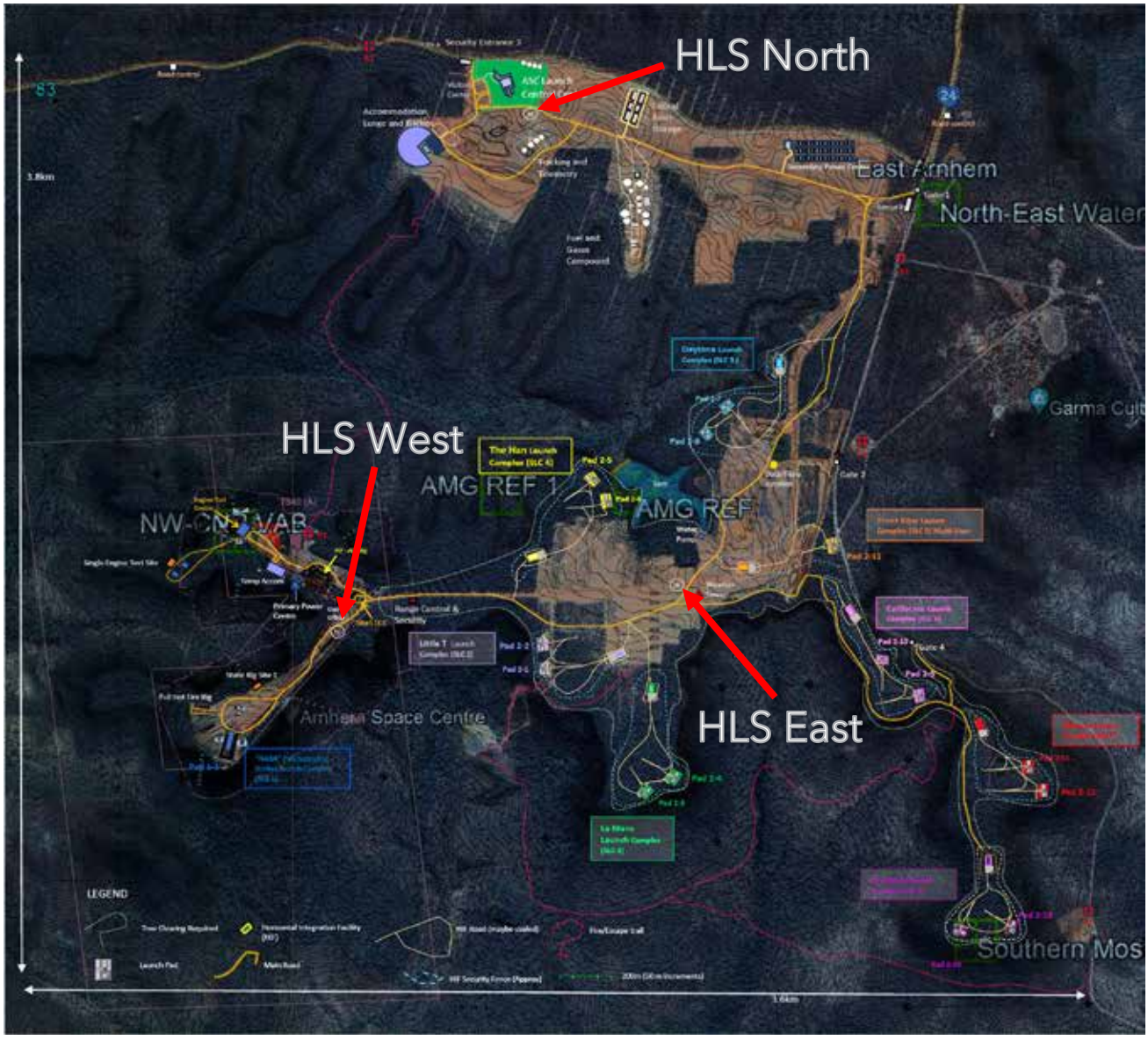
Limitation Type	Limitation
Meteorological	Exposure to meteorological conditions that may endanger the aircraft must be minimised.
Meteorological	The landing pad may only be used during daylight and during VMC.
Emissions	The range of helicopter emissions must not at any point intersect any HERO and/or HERP ranges on site.
Conflicting Activities	Helicopter activity must be deconflicted prior to operations.
HLS	The HLS must be cleared prior to operations.
HLS	The HLS must have a minimum diameter of 20 metres.
HLS	The HLS must consist of a firm ground surface (confirmed by AMCO when internal to the ASC, or a member of the recovery team when external to the ASC. The PIC always maintains confirmation discretion).
Infrastructure	A windsock or similar indicator for wind must be present at the HLS.
Personnel	All personnel involved in helicopter operations must be authorised.
In-flight	The helicopter is prohibited from flying over the ASC compound unless required for the execution of approved duties or safety.

9 ANNEXES

A ASC HLS Locations
B Helicopter Marshalling Signals

ANNEX A

ASC HLS LOCATIONS



ANNEX B

HELICOPTER MARSHALLING SIGNALS