NATO STANDARD

AATMP-38

AIRFIELD AND HELIPORT/ HELIPAD CLEARANCE PLANES

Edition A Version 1
DECEMBER 2017

NORTH ATLANTIC TREATY ORGANIZATION

ALLIED AIR TRAFFIC MANAGEMENT PUBLICATION
Published by the
NATO STANDARDIZATION OFFICE (NSO)

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

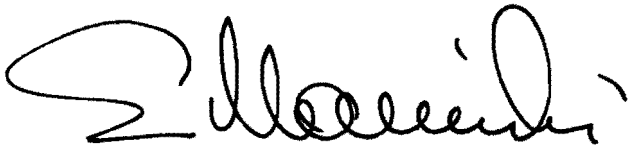
6 December 2017

1. The enclosed Allied Air Traffic Management Publication AATMP-38 Edition A, Version 1, AIRFIELD AND HELIPORT/HELIPAD CLEARANCE PLANES, which has been approved by the nations in the AIR TRAFFIC MANAGEMENT, COMMUNICATIONS, NAVIGATION AND SURVEILLANCE ADVISORY GROUP, is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 7174.

2. AATMP-38, Edition A, Version 1, is effective upon receipt.

3.

4. This publication shall be handled in accordance with C-M(2002)60.



Edvardas MAŽEIKIS
Major General, LTUAF
Director, NATO Standardization Office

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS

Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
CAN	(1) For airfields, Canada reserves the right to utilize the standards outlined in “TP 312, 5th Edition, Aerodrome Standards and Recommended Practices”, at Canadian bases in Canada. This document is produced in harmony with Transport Canada, and therefore can be the expected standard at all Canadian airfields; and (2) For heliports and helipads, Canada reserves the right to utilize the standards outlined in “Mil 312, Part II – Heliport Standards”, at Canadian bases in Canada. This document is produced in harmony with Transport Canada, and therefore can be the expected standard at all Canadian heliports and helipads.
DEU	Germany reserves the right to apply national regulations following ICAO Annex 14 Vol I (sixth edition) July 2016 not completely.
FRA	ICAO Annexes are not directly applicable in France and have regulatory value only when transposed into French or European law. In particular, Annex 14 was transposed into French law by the decree dated 7 June 2007 and subsequent amendments as reflected in the attached instruction 4450/DSAE/DIRCAM, dated 1 March 2017
GRC	There is a number of old, but in use facilities, that penetrate the surfaces and that are marked and lighted. Moreover, certain flight procedures have been established. Due to the large number of these facilities, they cannot be removed. However, new structure-objects within these planes will not be allowed, during the design phase.
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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1.1. RELATED DOCUMENTS

1.1.1. Airfield Clearance Planes

a. ICAO Annex 14, Volume I, Aerodrome Design and Operations

b. ICAO Doc 9137, Airport Services Manual, Part 6

c. SHAPE, BI-CD 85-5 NATO Criteria and Standards for Airfields

d. STANAG 3316 Airfield Lighting

e. STANAG 3346 Marking and Lighting of Airfield Obstructions

f. STANAG 3998 Tactics, Techniques and Procedures for NATO Air Transport Operations - ATP-3.3.4.3 (A)

1.1.2. Heliport/Helipad Clearance Planes

a. STANAG 3619 AS – Helipad Marking and Lighting

b. UFC 3-260-01 – Airfield and Heliport Planning and Design

c. STANAG 3346 – Marking and Lighting of Airfield Obstructions

d. AAP-06, Edition 2012 Version 2 – NATO Glossary of Terms and Definitions

1.2. PURPOSE

1.2.1. Airfield Clearance Planes

The purpose of this publication is to standardize Airfield Clearance Planes for runways 1829 m (6000 ft) or longer, taxiways and aprons, except for landing zones at forward operating location described in STANAG 3601.

1.2.2. Heliport/helipad Clearance Planes

Heliport/helipad clearance plane requirements allow for the safe approach, hover, landing, and take-off of helicopters. The aim of this publication is to standardize clearance plane requirements for heliport/helipads under Visual Flight Rules (VFR) and Instrument Flight Rules (IFR).

1.3. SCOPE

1.3.1. Airfield Clearance Planes.

Participating nations agree:

a. To use the criteria in ICAO Annex 14, Volume I, Aerodrome Design and Operations of July 2016, Airport Services Manual, Part 6, 2nd Edition 1983, to establish Airfield Clearance Planes for runways at NATO Airfields as detailed in this STANAG.

b. To use the criteria in SHAPE, BI-CD 85-5 NATO Criteria and Standards for Airfields, to establish taxiway and apron clearances.

c. That objects which could penetrate any of the surfaces should not be allowed except those necessary for the safe and efficient operation of aircraft.

d. To map and report to the airfield authority any objects that penetrate any of the protected surfaces, and ensure that such obstructions are removed or marked and lighted in accordance with STANAG 3346 AMLI Marking and Lighting of Airfield Obstructions.

1.3.2. Heliport/Helipad Clearance Planes

Participating nations agree:

a. To adopt the surface dimensional criteria, layout, imaginary surface criteria, and the land use compatibility guidelines for the type of heliport/helipad selected for installation.

b. That objects which could penetrate any of the surfaces (other than those necessary for the safe and efficient operation of helicopter) should not be allowed.

c. For land use requirements within Accident Potential Zones comply with Status of Forces Agreements (SOFA), host nation requirements or national criteria as applicable.

d. To map and report to the airfield authority any objects that penetrate any of the protected surfaces, and ensure that such obstructions are removed or marked and lighted in accordance with STANAG 3346 AMLI Marking and Lighting of Airfield Obstructions.

1.4. TERMS AND DEFINITIONS

The definitions in ICAO Annex 14, Volume I, Chapter 1, paragraph 1.1 as related to airfield clearance planes apply. The definitions in AAP-06 Edition 2012 Version 2

NATO Terms and Definitions as related to heliport/helipad surfaces and clearance planes apply.

1.5. SAFETY CONSIDERATIONS

Safety considerations for implementing STANAG 7174 (AATMP-38) are contained in Annex A.

1.6. CUSTODIAN ADDRESSES

Airfield Clearance Planes

Air Force Civil Engineering Center
139 Barnes Dr, Suite 1,
Tyndall AFB FL 32403-5319

Heliport/Helipad Clearance Planes

U.S. Army Corps of Engineers
Transportation Systems Center
1616 Capital Avenue
Omaha, NE 68102-4901

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CHAPTER 2. Airfield Clearance Planes

2.1. GENERAL

The Airfield Clearance Planes will be established according to ICAO Annex 14 and ICAO Doc 9137 Airport Services Manual Part 6 of 2nd Edition of 1983 as follows:

2.1.1. Reference Code

The ICAO runway reference code to be used shall be Code number 4, as in ICAO Annex 14, Chapter 1, Table 1-1.

2.1.2. Runway Strip

The runway strip shall be established in accordance with ICAO Annex 14, Chapter 3, Runway Code 4, paragraphs 3.4.2 and 3.4.3.

2.1.3. Obstacle Restriction and Removal

The Obstacle Limitation Surfaces and Obstacle Limitation Requirements shall be used as described in ICAO Annex 14, Chapter 4. This chapter also provides guidance for Objects Outside the Obstacle Limitation Surfaces, and Other Objects.

a. Approach Runways. ICAO Annex 14, Chapter 4, Table 4-1, Runway Code number 4, provides dimensions for the following surfaces:
   (1) Conical
   (2) Inner Horizontal
   (3) Inner Approach
   (4) Approach
   (5) Transitional
   (6) Inner Transitional
   (7) Balked Landing

   For all approach runways up to Category I, Items 1, 2, 4 and 5 are required and items 3, 6, and 7 are recommended. For approach runways Categories II and III all items are required.

b. Runways Meant for Take-Off. See ICAO Annex 14, Chapter 4, Table 4-2, Code number 4.

c. Outer Horizontal Surface. Should be established in accordance with ICAO Doc 9137, Airport Services Manual, Part 6, Chapter 1, Paragraph 1.2.2 as referenced in Annex 14, Chapter 4.

d. Applicability. These obstacle limitation surfaces apply to SHAPE Document BI-MNCD 85-5 NATO Airfield Engineering Criteria which includes runway widths down to 23 m (75 ft).

2.2. MILITARY AIRFIELDS WITH CIVIL CO-USE

These facilities will use the more stringent of SHAPE, BI-CD 85-5 NATO Criteria and Standards for Airfields and ICAO Annex 14, Volume I, Aerodrome Design and Operations, as applicable for taxiways, aprons and runway cleared end zones/runway end safety areas.

2.3. AIRFIELD CLEARANCE PLANE SURFACES

An overall view of the Airfield Clearance Plane Surfaces of a single one-direction runway described in this STANAG are shown in Annex B.

CHAPTER 3. Heliport/Helipad Clearance Planes

3.1. GENERAL

This chapter presents design standards and requirements for rotary-wing (helicopter) runways, helipads and hoverpoints.

3.1.1. Landing and Take-off Layout Requirements

The landing design requirements for rotary-wing landing facilities, which include rotary-wing runways, helipads are similar to the requirements for fixed-wing runways.

3.1.2. Rotary-Wing Runway

The rotary-wing runway allows for a helicopter to quickly land and roll to a stop, compared to the hovering stop used during a vertical helipad approach.

a. Orientation and Designation. Consider the strength, direction, and frequency of the local winds when orienting a runway to minimize crosswinds. Runways are identified by the whole number, nearest one-tenth (1/10), of the magnetic azimuth of the runway centerline when viewed from the direction of approach.

b. Dimensions. Annex C presents dimensional criteria for the layout and design of rotary-wing runways.

c. Layout. The layout for rotary-wing runways, including clearway, is illustrated in Annex D for VFR runways and Annex E for IFR runways.

d. Overruns. Are required at the end of all rotary-wing runways. Annex C shows the dimensional requirements for overruns. The pavement in the overrun is considered a paved shoulder. Overruns for rotary-wing runways are illustrated in Annexes D and E.

3.2. HELIPADS

Helipads allow for a helicopter hovering, landing, and take-off. Except at facilities where helicopter runways are provided, helipads are the landing and take-off locations for helicopters. The type of helipad depends on these operational requirements:

3.2.1. Standard VFR Helipad

VFR design standards are used when no requirement exists or will exist in the future for an IFR helipad.

3.2.2. Limited Use VFR Helipad

This is a VFR rotary-wing facility for use only by helicopters with a single main rotor diameter that does not exceed 16.4 m (53.7 ft). These types of helipads support only occasional operations at special locations such as hospitals, headquarters facilities, missile sites, and other similar locations. Limited use VFR helipads may be located on airfields where one or more helipads are required to separate traffic from heavy and cargo helicopter traffic or fixed wing traffic.

3.2.3. IFR Helipad

IFR design standards are used when an instrument approach capability is essential to the mission and no other instrument landing facilities, either fixed-wing or rotary-wing, are located within an acceptable commuting distance of the site.

3.2.4. Elevated Helipad

This is a facility that has an elevation above ground level (e.g., mounted on pilings, roof tops, etc.).

3.2.5. Helipad Location

A helipad location should be selected with regard to mission requirements, overall facility development, approach-departure surfaces, and local wind conditions.

a. Near Runways. When a helipad is to be located near fixed- and rotary-wing runways, its location should be based on the type of operations in accordance with the criteria in Annex C.

b. Parking Pads. At individual helipad sites where it is necessary to have one or more helicopters on standby, an area adjacent to the helipad but clear of the landing approach and transitional surfaces should be designated for standby parking.

3.2.6. Dimensional Criteria

Annex F presents dimensional criteria for the layout and design of helipads.

3.2.7. Layout Criteria

Layouts for standard, limited use, and IFR helipads, including clear zones, are illustrated in Annexes G, H and I).

3.3. SAME DIRECTION INGRESS/EGRESS

Helipads with same direction ingress/egress allow a helicopter pad to be located in a confined area where approach-departures are made from only one direction. The approach may be either VFR or IFR.

3.3.1. Dimensions Criteria

Annexes F, J, and K present dimensional criteria for VFR and IFR one direction ingress/egress helipads.

3.3.2. Layout Criteria

Layout for VFR and IFR same direction ingress/egress helipads are illustrated in Annexes L and G.

3.4. HOVERPOINTS

3.4.1. General

A hoverpoint is a prepared surface used as a reference or control point for air traffic control purposes. Generally used by arriving or departing helicopters.

3.4.2. Hoverpoint Location

A hoverpoint is located in a non-traffic area.

3.4.3. Dimensions

Annex F and M presents dimensional criteria for the layout and design of hoverpoints.

3.4.4. Layout

Hoverpoint design standards are illustrated in Annex M.

3.5. ELEVATED HELIPADS

3.5.1. General

Helipads should be constructed of metal or concrete. Surfaces should have a broomed pavement or other roughened finish that provides a skid-resistant surface for helicopters and non-slippery footing for people. The helipad and primary surface shall be contained on the structure. Elevated helipads and any supporting helipad structure should be capable of supporting the dynamic loads of the design helicopter (stressed to 1.5 times the weight of the design helicopter). Elevating helipads 2 m (6 ft) or more above the level of the roof will generally minimize the turbulent effect of air flowing over the roof edge. While elevating the platform helps reduce or eliminate the air turbulence effects, a safety net may be required.

3.5.2. Dimensions

Annex F presents dimensional criteria for the layout and design of elevated helipads.

3.5.3. Layout

Elevated helipad design standards are illustrated in Annex N.

3.5.4. Safety Net

When the helipad is on a platform elevated more than 76 cm (30 inches) above its surroundings, a safety net, not less than 1.5 m (5 ft) wide, should be provided. A railing or fence should not be used since it would be a safety hazard during helicopter operations. The safety net should have a load carrying capability of 122 kg/m^2 (25 lb/ft^2). The net should not project above the level of the helipad. Both the inside and outside edges of the safety net should be fastened to a solid structure.

3.5.5. Access to Elevated Helipads

Two separate access points for an elevated structure such as an elevated helipad are required. Hospital helipads should provide access to and from the helipad via a ramp in order to provide for quick and easy transportation of a patient on a gurney. Ramps should be built in accordance with state and local requirements. The width of the ramp, and any turns in the ramp, should be wide enough to accommodate a gurney with a person walking on each side. Straight segments of the ramp should be not less than 2 m (6 ft) wide. Additional width may be required in the turns. The ramp surface should provide a slip-resistant surface. The slope of the ramp should be no steeper than 12:1 (12 unit horizontal in 1 units vertical). Inside the primary surface any handrails should not extend above the elevation of the helipad. Where a handrail is not provided, other means should be provided to protect personnel from fall hazards.

3.5.6. Fixed Objects within a Primary Surface

No fixed object shall be permitted within a primary surface or protection zone, except for frangibly mounted objects fixed by function in support of helipad operations that, must be located there. Those objects whose functions require them to be located within these areas shall be frangible or, not exceed a height of 20 cm (8 inches). These objects shall not penetrate any other adjacent imaginary surfaces.

3.5.7. Obstructions

Elevator penthouses, cooling towers, exhaust vents, fresh-air vents, and other raised features can adversely impact the safe and efficient operations of both the helicopter and helipad operations. Helicopter exhausts can impact building air quality if the helipad is too close to fresh-air vents. These issues shall be resolved during the design phase of the facility. In addition, control mechanisms should be established to ensure that obstruction hazards are not installed after the helipad is operational.

3.5.8. Protection Zone

The protection zone takes the place of a clearway for elevated helipads. (See Paragraph 3.10.a). All incompatible objects or facilities should be removed from this area. Incompatible facilities include occupied structures, main entrances, other areas where people congregate, and facilities that might create smoke or steam that would obscure visibility.

3.6. SURFACE DIMENSIONAL CRITERIA

3.6.1. Helipads

The dimensional criteria for helipads are provided at Annex F for Standard VFR - One and Two Direction; IFR Helipad - One and Two Direction; and Limited Use VFR - Two Direction; and includes the following items:

a. Size (Item 1).

b. Grade (Item 2).

c. Paved shoulders (Item 3).

d. Size of primary surface (Item 4).

e. Grades within the primary surface in any direction (Item 5).

f. Clearway length, width, and grades in any direction (Items 6, 7, and 8).

g. Accident potential zone length and width (Items 9 and 10).

3.6.2. Rotary-Wing Runways

The dimensional criteria for Rotary-Wing Runways are provided in Annex C for VFR and IFR Helicopter runways and include the following items:

a. Basic length and width (Items 1 and 2)

b. Longitudinal and Transverse grade (Items 3 and 4)

c. Lateral Clearance Zone (Item 5)

d. Grades within the Primary Surface Area in any direction (Item 6)

e. Clearway length, width and grades in any direction (Items 7, 8 and 9)

f. Accident potential zone length and width (Items 10 and 11)

g. Overrun (Items 12, 13 and 14)

h. Distances from centerlines (Items 15 and 16)

3.7. LAYOUT CRITERIA

The layout criteria including plan view, longitudinal profile, transverse section, and isometric are provided for each type of helicopter runway/helipad.

a. Helicopter VFR Runway (Annex D).

b. Helicopter IFR Runway (Annex E).

c. Standard VFR Helipad - One Direction (Annex L), Two Direction (Annex O).

d. IFR Helipad - One Direction (Annex G), Two Direction (Annex H).

e. Limited Use VFR - Two Direction (Annex I).

f. Elevated Helipad (Annex N).

3.8. IMAGINARY SURFACE CRITERIA

Further details of layout criteria legends at Annexes J and K, which includes the following items:

a. Primary Surface width, length and elevation (Items 1, 2, and 3).

b. Clearway surface (Item 4).

c. Start and length of sloped portion of approach-departure surface (Items 5 and 6).

d. Slope of approach-departure surface (Item 7).

e. Width of sloped portion of approach-departure surface at start and end of sloped portion (Items 8 and 9).

f. Elevation of sloped portion of approach-departure surface at start and end of sloped portion (Items 10 and 11).

g. Length and start of approach-departure zone (Items 12 and 13).

h. Transitional surface slope (Annex J item 14 and Annex K item 12).

3.9. OBSTACLE

If the imaginary surface around a helipad is penetrated by manmade or natural objects, the penetrating object is considered an obstruction.

3.10. LAND USE COMPATIBILITY

Land use compatibility is controlled by the use of clearways and accident potential zones.

a. Clearway. These are areas on the ground, located at approach or departure ends of a helicopter runway/helipad. These areas possess a high potential for accidents and their grading and use are restricted to be compatible with aircraft operations. The size and grading of the clearway are shown at Items 6, 7 and 8 of Annex F.

b. Accident Potential Zone (APZ). These are areas on the ground located beyond the clearway at approach or departure end of the helicopter runway/helipad. They possess a potential for accidents and use is restricted to be compatible with aircraft operations. The size of the APZ is shown at Items 9 and 10 of Annex F. Land use restrictions within APZ shall be in accordance with SOFA, host nation requirements or national criteria as applicable.

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ANNEX A.
Safety Considerations

STANAG 7174 – Airfield and Heliport/Helipad Clearance Planes

Custodian POC: USA, Barry Mines, PhD, PE, Barry.Mines.2@us.af.mil

AFCEC/COSC, 139 Barnes Drive Suite 1, Tyndall AFB, FL, 32403-5319

Introduction:
This Annex is intended for NATO Led Service Providers in implementing this STANAG at existing or planned airfields as well as during deployed operations.

It includes general considerations such as the suitability of the STANAG/AATMP for the required operations, currency with regard to edition number and amendments, applicability of related documents, nations ratifying and reservations.

Specific safety considerations are identified by the custodian of the STANAG/AATMP and national SMEs along with consequences and possible mitigations.

Custodian POC. For users to provide any comments and lessons learned: Barry Mines (USA), Barry.Mines.2@us.af.mil

General:
In the implementation of any STANAG/AATMP, the NATO Led Service Provider should verify the items listed below using the NATO Standardization Office (NSO) pass word protected Website https://nso.nato.int

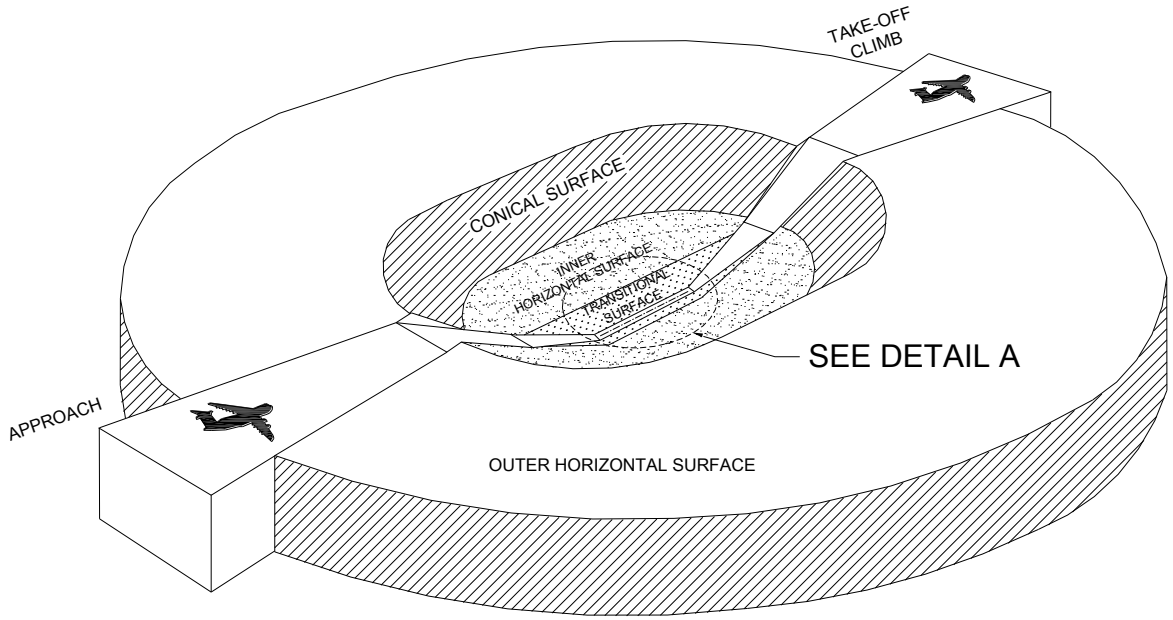
A. Suitability	Review STANAG 7210 (AEP-68) *Guidance in the Selection of STANAGs for Deployed Operations, to determine* if the STANAG/AATMP is suitable for the type of operation required.
B. Currency	Ensure that STANAG/AATMP Edition and any Amendments are the most current as shown on the NSO website.
C. Related Documents	Obtain related documents cited in the STANAG/AATMP and, in particular, review those documents where criteria as been adopted. STANAGs are available on the NSO Website whereas civilian documents, such as ICAO, may be available from your Aviation or Engineering Commands.
D. Implementation Status	Review the ratification status along with any reservations to the STANAG/AATMP on the NSO Website and, in particularly, the status for those for nations taking part in the operation.
E. Compliance	For existing airfield facilities and procedures, determine if they are in compliance with the criteria and standards specified in the STANAG/AAMTP.

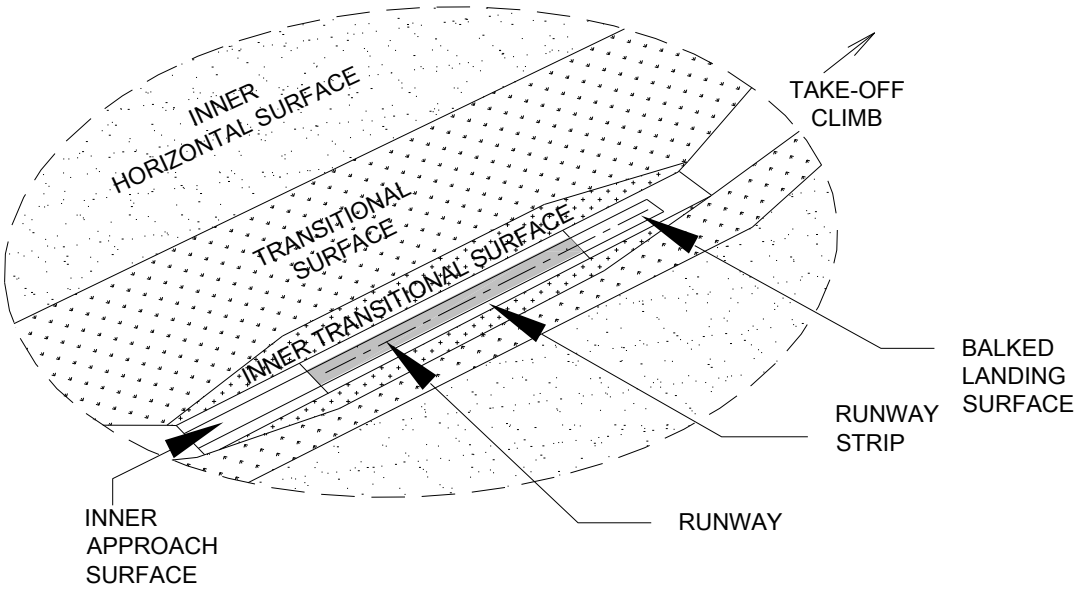
Specific:
The safety considerations, consequences and possible mitigations listed below by the STANAG/AATMP Custodian assisted by Subject Matter Experts are by no means exhaustive or fully applicable to all environments or situations.

Full safety surveys in accordance with STANAG 4720 *NATO Standard for Air Traffic Management (ATM) Safety Management System (SMS)*, shall still be carried out.

Safety Considerations	Consequences	Possible Mitigations
Objects penetrate airfield and heliport/helipad clearance planes (manmade and natural).	Possible aircraft/helicopter collision with obstruction penetrating clearance planes	Periodically resurvey clearance planes to check for object penetration.
Fixed object within a Primary surface is not frangible or exceeds height requirements	Damage to aircraft	Check that height does not exceed 8 inches and that object meets frangible requirements per ICAO Annex 14 and Aerodrome Design Manual, Part 6, Frangibility
Accident Potential Zone design size is too small and is not compatible with aircraft operations.	Extremely high potential for accident.	Design per guidelines in Annex F – inspect to ensure design functionality
Land use is not compatible with operations	High accident potential	Review Annex F and determine land use compatibility with current operations.
Elevated helipad ramp access is difficult and slippery	Possible personnel hazard due to potentials for slips and falls, gurney cannot be used on ramp because of tight turns.	Review ramp access guidelines in STANAG 7174

ANNEX B.
Airfield Clearance Plane Surfaces
(Single One-Direction Runway)





DETAIL A

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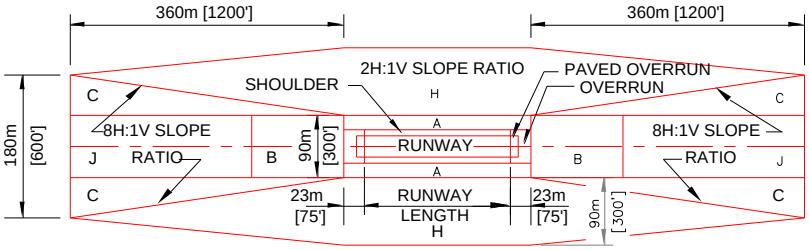
ANNEX C.
Rotary-Wing Runways Surface Dimensional Criteria

Rotary-Wing Runways			
Item		Requirement	Remarks
No.	Description		
1	Basic length	488 m (1,600 ft)	Basic length up to 1,220 m (4,000 ft) in elevation above mean sea level (AMSL). Increase basic length to 610 m (2,000 ft) when above 1,220 m (4,000 ft) in elevation above MSL. For a special mission or proficiency training such as autorotation operations, the length may be increased up to 305 m (1,000 ft); in that case, make no additive corrections.
2	Width	23 m (75 ft)	
3	Longitudinal grade	Max. 1.0 percent	Maximum longitudinal grade change is 0.167 percent per 30 linear meters (100 linear ft) of runway. Exceptions: 0.4 percent per 30 linear meters (100 linear ft) for edge of runways at runway intersections.
4	Transverse grade	Min. 1.0 percent Max. 1.5 percent	From centreline of runway. Runway may be crowned or cross-sloped.
5	Runway lateral safety clearance zone (corresponds to half the width of primary surface area) See Remarks	45 m (150 ft)	VFR operations
		114 m (375 ft)	IFR operations
			Measured perpendicularly from centreline of runway. This area is to be clear of fixed and mobile obstacles. In addition to the lateral clearance criterion, the vertical height restriction on structures and parked aircraft as a result of the transitional slope must be taken into account. (1) Fixed obstacles include man-made or natural features constituting possible hazards to moving aircraft. Navigational aids and meteorological equipment are possible exceptions. Siting exceptions for navigational aids and meteorological facilities that are fixed by function are permissible deviations. (2) Mobile obstacles include parked aircraft, parked and moving vehicles, railroad cars and similar equipment. (3) Taxiing aircraft are exempt from this restriction. However, parallel taxiways (exclusive of shoulder width) must be located in excess of the lateral clearance distance.
6	Grades within the primary surface area in any direction	Min. 2.0 percent Max. 5.0 percent	Exclusive of pavement and shoulders.
7	Clearway length[1]	120 m (400 ft)	Clearway begins at the end of the primary surface.

Rotary-Wing Runways			
Item		Requirement	Remarks
No.	Description		
8	Clearway width[1]	90 m (300 ft)* 225 m (750 ft)**	Centre width on extended runway centre line. Corresponds to the width of the primary surface * VFR rotary-wing runways. ** IFR rotary-wing runways
9	Grades in clearway in any direction[1]	2.0 percent Min. 5.0 percent Max.	Area to be free of obstructions. Rough-grade and turf when required.
10	APZ length[1]	240 m (800 ft)	No grading requirements for APZ
11	APZ width[1]	90 m (300 ft)* 225 m (750 ft)**	No grading requirements for APZ * VFR rotary-wing runways. ** IFR rotary-wing runways.
12	Overrun total length	23 m (75 ft)	
13	Overrun paved length	7.5 m (25 ft)	
14	Overrun width	38 m (125 ft)	Width of runway plus paved shoulders A minimum width of 45 m (150 ft) for airfields that regularly accommodate H-53 aircraft (30 m (100 ft) runway and 7.5 m (25 ft) shoulders)
15	Distance from the centreline of a fixed-wing runway or helicopter runway/helipad to the centreline of a parallel rotary-wing runway, or helipad	Min. 213 m (700 ft)	Non-simultaneous VFR and IFR operations. Distance may be reduced to 61 m (200 ft); however, waiver must be based on wake-turbulence and jet blast. Rotary-wing aircraft must be located on the apron side of the hold position markings (away from the runway) during runway operations.
		Min. 305 m (1,000 ft)	Simultaneous VFR operations
		Min. 762 m (2,500 ft)	IFR using simultaneous operations (depart-depart) (depart-approach).
		Min. 1,310 m (4,300 ft)	IFR using simultaneous approaches.

ANNEX D.
Helicopter VFR Runway



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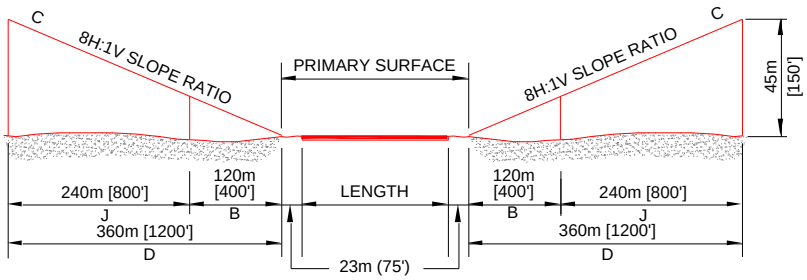

LONGITUDINAL PROFILE
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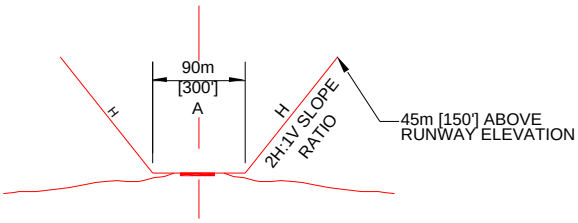
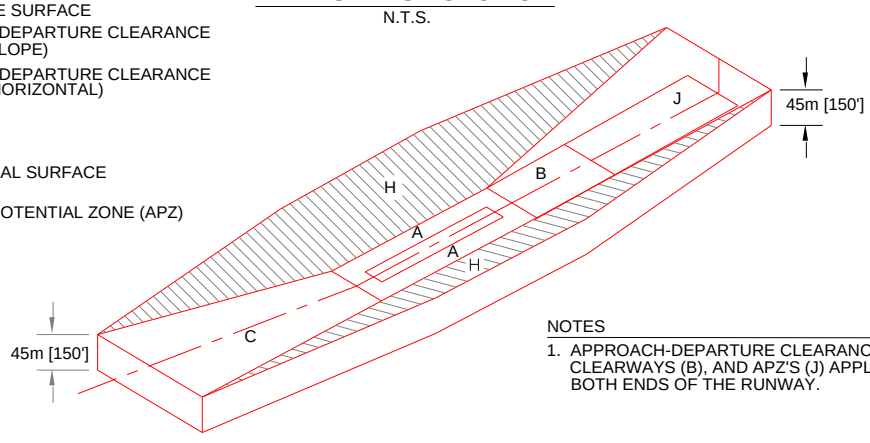


TRANSVERSE SECTION
N.T.S.

LEGEND

- A PRIMARY SURFACE
- B CLEAR ZONE SURFACE
- C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE)
- D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
- E NOT USED
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT POTENTIAL ZONE (APZ)



NOTES

1. APPROACH-DEPARTURE CLEARANCE SURFACE (C), CLEARWAYS (B), AND APZ'S (J) APPLICABLE TO BOTH ENDS OF THE RUNWAY.

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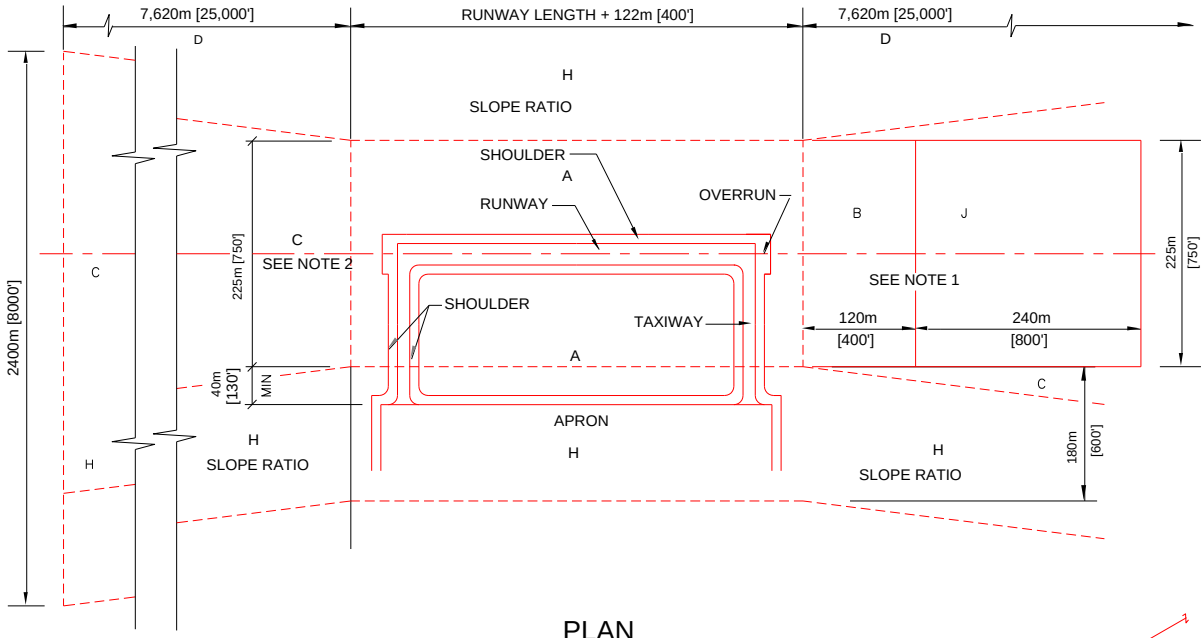
ANNEX E.
Helicopter IFR Runway



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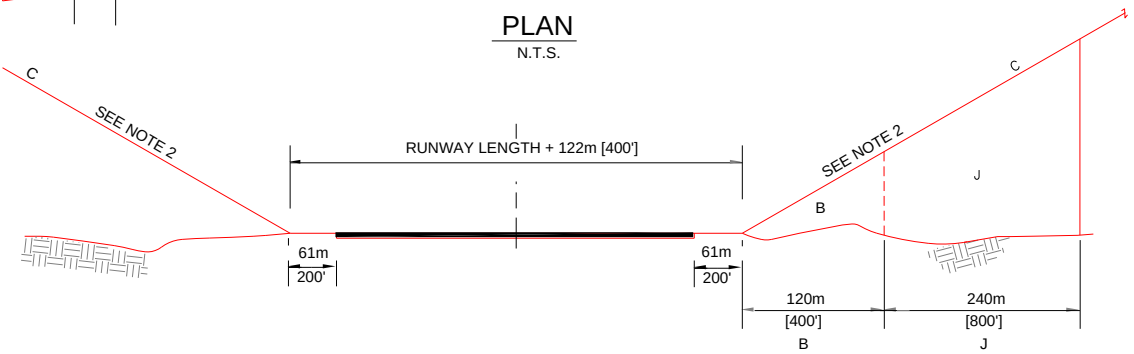
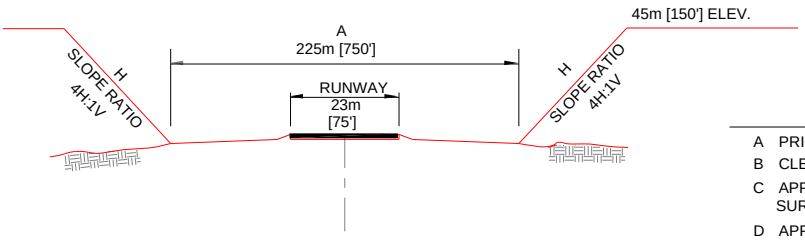


LONGITUDINAL PROFILE
N.T.S.



TRANSVERSE SECTION
N.T.S.

NOTES

1. CLEARWAY AND APZ TYPICAL AT BOTH ENDS OF RUNWAY.
2. APPROACH-DEPARTURE CLEARANCE SURFACE SLOPE RATIO IS 34H:1V

LEGEND

- A PRIMARY SURFACE
- B CLEARWAY SURFACE
- C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE)
- D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
- E NOT SHOWN
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT POTENTIAL ZONE (APZ 1)

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ANNEX F.
Helipad Surface Dimensional Criteria

Rotary-Wing Helipads and Hoverpoints			
Item		Requirement	Remarks
No.	Description		
1	Size	15 m x 15 m (50 ft x 50 ft) min.	VFR limited use helipads
		30 m x 30 m (100 ft x 100 ft) min.	Standard VFR and IFR helipad
	Elevated helipad	17 m x 17 m (55 ft x 55 ft)* 23 m x 23 m (75 ft x 75 ft)**	*Aircraft max gross wt.10433kg (23000lbs) or less **Aircraft max gross wt. >10433kg (23000lbs)
		9 m (30 ft) diameter	Hoverpoints
2	Grade	Min. 1.0 percent Max. 1.5 percent	Grade helipad in one direction. Hoverpoints should be domed to a 150-mm (6-in) height at the centre.
3	Paved shoulders	7.5 m (25 ft)	
4	Size of primary surface (centre primary surface on helipad)	45 m x 45 m (150 ft x 150 ft) min.	Hoverpoints Limited use VFR helipad
		90 m x 90 m (300 ft x 300 ft)	Standard VFR helipad
		470 m x 225 m (1,550 ft x 750 ft)	Standard IFR helipad. Long dimension in direction of helicopter approach.
		225 m x 225 m (750 ft x 750 ft)	IFR same direction ingress/egress.
	Elevated helipad	60 m x 60 m (195 ft x 195 ft)* 84 m x84 m (275 ft x 275 ft)**	*Aircraft max gross wt. 10433kg (23000lbs) or less **Aircraft max gross wt. >10433kg (23000lbs)
5	Grades within the primary surface area in any direction	Min. of 2.0 percent prior to channelization.[1] Max. 5.0 percent	Exclusive of pavement and shoulders. For IFR helipads, the grading requirements apply to a 90 m × 90 m (300 ft × 300 ft) area centred on the helipad. The balance of the area is to be clear of obstructions and rough graded to the extent necessary to reduce damage to aircraft in event of an emergency landing. For VFR helipads, the grade requirements apply to the entire primary surface.
6	Length of clearway/ Protection Zone[2] (begins at the end of the primary surface.)	120 m (400 ft)	Hoverpoints, VFR helipads, and standard IFR helipads.
		250 m (825 ft)	IFR same direction ingress/egress.
7	Width of clearway/ Protection Zone[2]		Corresponds to the width of the primary surface at the start of the clearway/protection zone. Centre clearway width on extended centre of the pad.

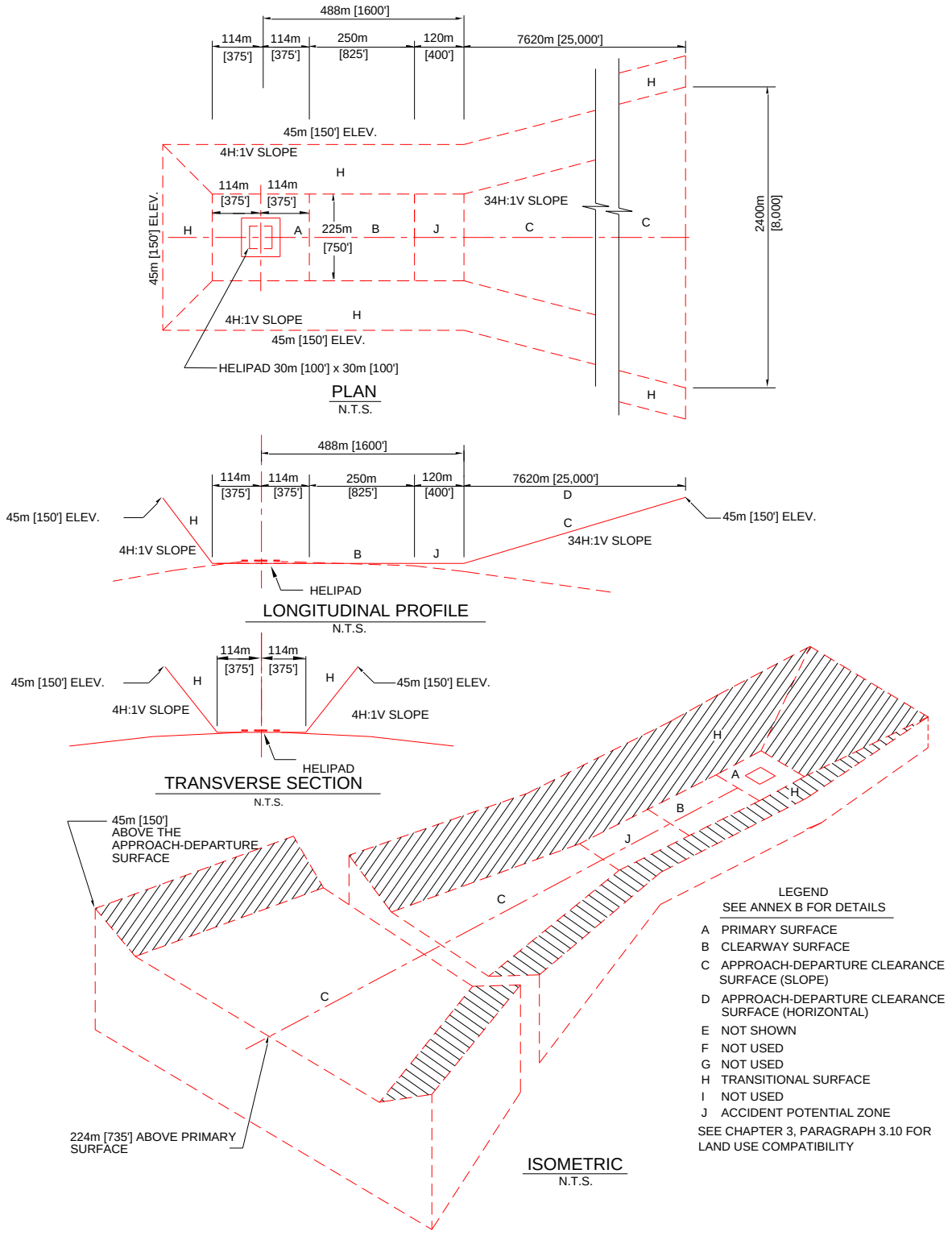
Rotary-Wing Helipads and Hoverpoints			
Item		**Requirement**	**Remarks**
No.	**Description**		
		45 m (150 ft)	VFR limited use helipads and hoverpoints.
		90 m (300 ft)	Standard VFR helipad and VFR helipad with same direction ingress/egress.
		225 m (750 ft)	Standard IFR helipad
	Elevated helipad	60m (195 ft) at start of Protection Zone expanding to 90 m (295 ft) at end of Protection Zone.* 84 m (275 ft) at start of Protection Zone expanding to 114 m (375 ft) at the end of Protection Zone**	* Aircraft max gross wt 10433kg (23000 lbs) or less) ** Aircraft max gross wt > 10433kg (23000 lbs)
8	Grades of clearway any direction	5.0 percent max	Area to be free of obstructions. Rough grade and turf when required. For elevated helipads no obstacles may penetrate the elevation of the helipad.
9	APZ I length[3]	240 m (800 ft)	Elevated helipads, hoverpoints, VFR, and standard IFR helipads
		120 m (400 ft)	IFR same direction ingress/egress
10	APZ I width[3]	45 m (150 ft)	VFR limited use and hoverpoints;
		90 m (300 ft)	Standard VFR
		225 m (750 ft)	Standard IFR
11	Elevated helipads	90 m (295 ft)* 114 m (375 ft)**	* At 120 m (400 ft) the width is 90 m (295 ft) **At 120 m (400 ft) the width is 115 m (375 ft)
12	Distance between centreline of helipad and fixed- or rotary-wing runways		See Annex C Item 15

1 Bed of channel may be flat.

2 Land use in the Clearway/Protection Zone and Accident Potential Zone for helipads shall comply with SOFA, host nation requirements, or national criteria as applicable.

3 There are no grading requirements for APZ.

ANNEX G.
Helipad Layout Criteria for IFR - One Direction



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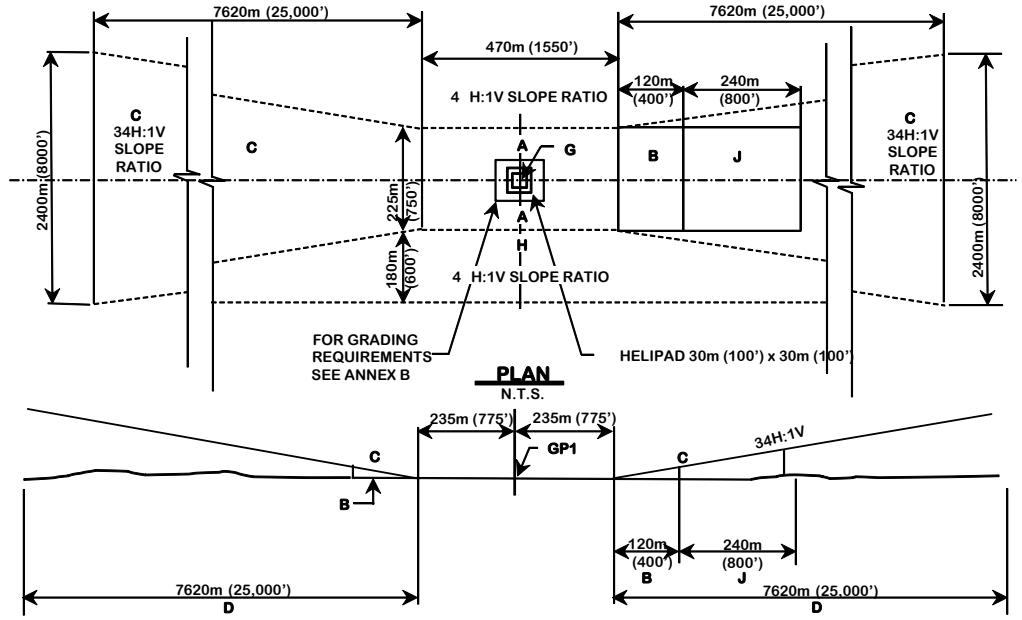
ANNEX H.
Helipad Layout Criteria for IFR Helipad - Two Direction



LONGITUDINAL PROFILE
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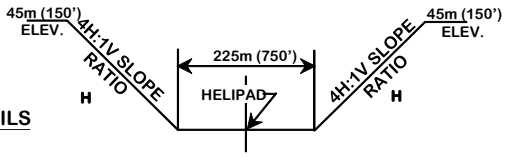
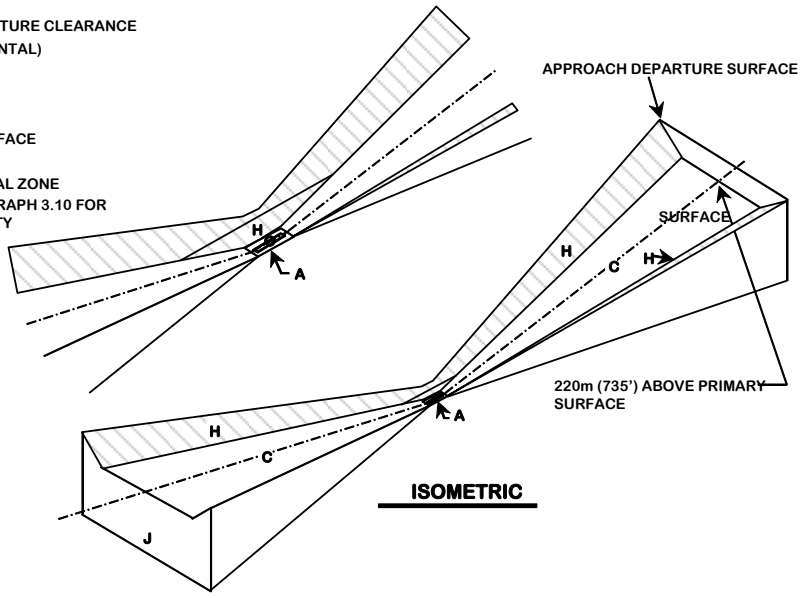


TRANSVERSE SECTION
N.T.S.

LEGEND
SEE ANNEX B FOR DETAILS

- A PRIMARY SURFACE
- B CLEARWAY SURFACE
- C APPROACH DEPARTURE CLEARANCE SURFACE (SLOPE)
- D APPROACH DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
- E NOT USED
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT POTENTIAL ZONE

SEE CHAPTER 3, PARAGRAPH 3.10 FOR LAND USE COMPATIBILITY



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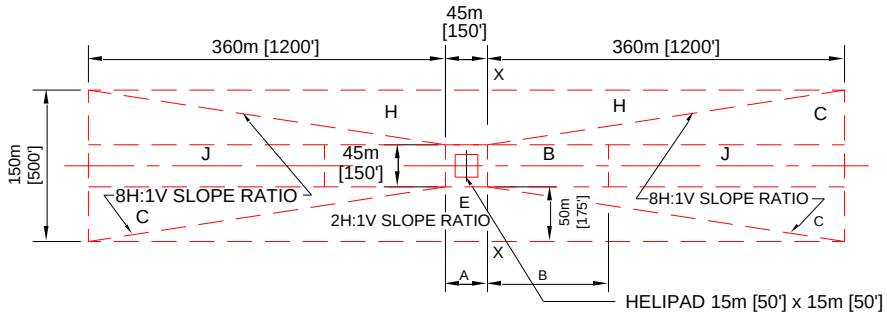
ANNEX I.
Helipad Layout Criteria for Limited Use VFR Helipad - Two Direction



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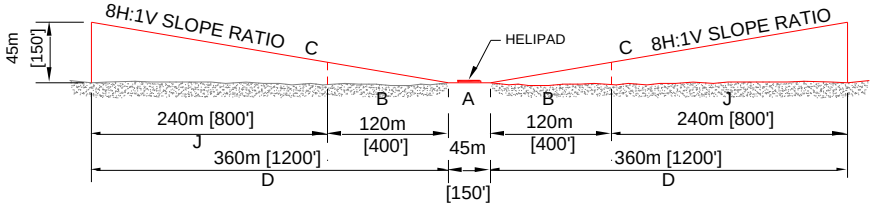
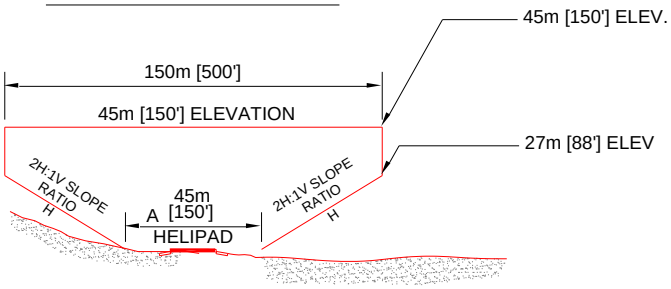


LONGITUDINAL PROFILE



TRANSVERSE SECTION
N.T.S

LEGEND

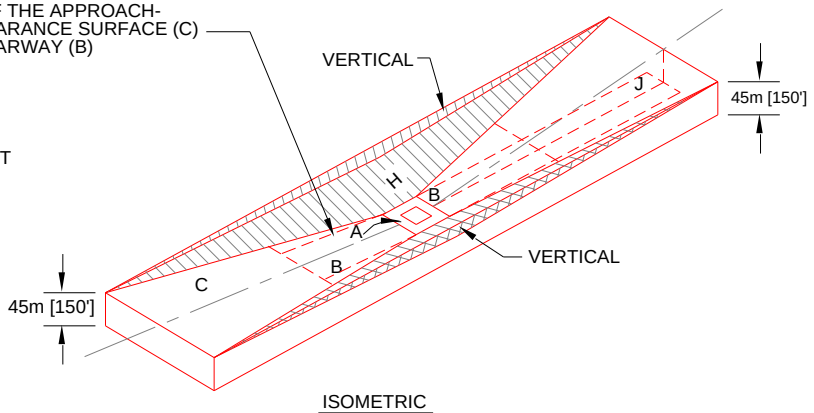
SEE ANNEX B FOR DETAILS

- A PRIMARY SURFACE
- B CLEARWAY SURFACE
- C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE)
- D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
- E NOT USED
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT POTENTIAL ZONE (APZ 1)

SEE CHAPTER 3, PARAGRAPH 3.10 FOR LAND USE COMPATIBILITY

THIS PORTION OF THE APPROACH-DEPARTURE CLEARANCE SURFACE (C) IS ALSO THE CLEARWAY (B)

NOTE:
CLEARWAY & ACCIDENT PREVENTION ZONE TYPICAL AT BOTH ENDS OF RUNWAY.



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ANNEX J.
Rotary-Wing Imaginary Surface for VFR Approaches

Item		Rotary-Wing Imaginary Surface for VFR Approaches					
				Helipad			
No.	Description	Legend in Figures	Helicopter Runway	VFR Standard	VFR Limited Use Helipad and Hoverpoints	Elevated Helipad	Remarks
1	Primary surface width (centred on the ground point of intercept (GPI))	A	90 m (300 ft)	90 m (300 ft)	45 m (150 ft)	60 m (195 ft)* 84 m (275 ft)**	*aircraft max gross wt. 10433kg (23000lbs) or less **aircraft max gross wt. >10433kg (23000lbs)
2	Primary surface length	A	Runway length plus 23 m (75 ft) at each end	90 m (300 ft) centred on facility	45 m (150 ft) centred on facility	60 m (195 ft) * 84 m (275 ft)**	*aircraft max gross wt. 10433kg (23000lbs) or less **aircraft max gross wt. >10433kg (23000lbs)
3	Primary surface elevation	A	The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centreline or at the established elevation of the landing surface.				
4	Clearway surface	B	See ANNEX C	See ANNEX F	See ANNEX F		
5	Start of approach-departure clearance (starts at the end of the primary surface)	C	23 m (75 ft) from end of runway	45 m (150 ft) from GPI	23 m (75 ft) from GPI	30 m (98 ft)* 42 m (138 ft)** from GPI	*aircraft max gross wt. 10433kg (23000lbs) or less **aircraft max gross wt. >10433kg (23000lbs)
6	Length of sloped portion of approach-departure surface	C	360 m (1,200 ft)	360 m (1,200 ft)	360 m (1,200 ft)	360 m (1,200 ft)	Measured horizontally.

Item		Rotary-Wing Imaginary Surface for VFR Approaches					
				Helipad			
No.	Description	Legend in Figures	Helicopter Runway	VFR Standard	VFR Limited Use Helipad and Hoverpoints	Elevated Helipad	Remarks
7	Slope of approach-departure surface	C	8H:1V	8H:1V	8H:1V	8H:1V	Slope ratio is 8 horizontal units to 1 vertical unit.
8	Width of sloped portion of approach- departure surface at start of sloped portion	C	90 m (300 ft)	90 m (300 ft)	45 m (150 ft)	60 m (195 ft)* 84 m (275 ft)**	* Aircraft max gross 10433kg (23000 lbs) or less ** Aircraft max gross >10433kg (23000 lbs) Centred on the extended centre-line, and is the same width as the primary surface.
9	Width of sloped portion of approach- departure surface at end of sloped portion	C	180 m (600 ft)	180 m (600 ft)	152 m (500 ft)	152 m (500 ft)	Centred on the extended centre-line
10	Elevation of approach-departure surface at start of sloped portion	C	0 m (0 ft)	0 m (0 ft)	0 m (0 ft)	0 m (0 ft)	Above the established elevation of the landing surface.
11	Elevation of approach-departure surface at end of sloped portion	C	45 m (150 ft)	45 m (150 ft)	45 m (150 ft)	45 m (150 ft)	Above the established elevation of the landing surface.
12	Length of approach-departure zone	D	360 m (1,200 ft)	360 m (1,200 ft)	360 m (1,200 ft)	360 m (1,200 ft}	Measured horizontally from the end of the primary surface and is the same length as the approach-departure clearance surface length

Item		Rotary-Wing Imaginary Surface for VFR Approaches					
				Helipad			
No.	Description	Legend in Figures	Helicopter Runway	VFR Standard	VFR Limited Use Helipad and Hoverpoints	Elevated Helipad	Remarks
13	Transitional surface slope	H	2H:1V See remark 1	2H:1V See remark 1	2H:1V See remark 2	2H:1V See remark 2	(1) The transitional surface starts at the lateral edges of the primary surface and the approach-departure clearance surface. It continues outward and upward at the prescribed slope to an elevation of 45 m (150 ft) above the established airfield elevation. (2) The transitional surface starts at the lateral edges of the primary surface and the approach-departure clearance surface. It continues outward and upward at the prescribed slope to an elevation of 27 m (88 ft) above the established airfield elevation. It then rises vertically to an elevation of 45 m (150 ft) above the established airfield elevation. See Annexes D, L, O, I and N and 4-10 for the shape of transitional surfaces.

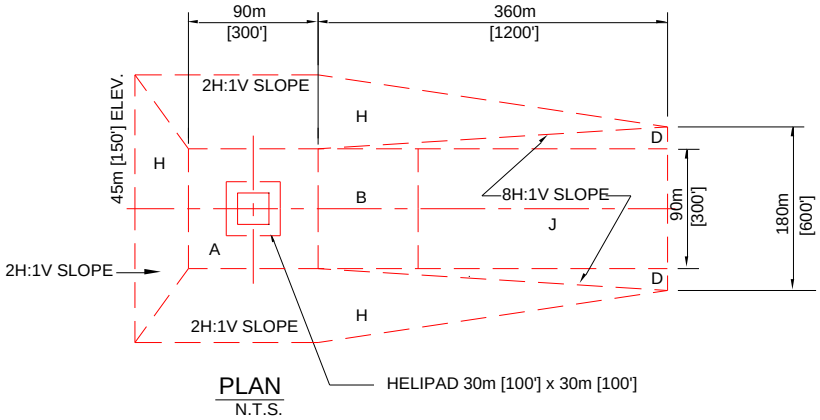
Item		Rotary-Wing Imaginary Surface for VFR Approaches					
				Helipad			
No.	Description	Legend in Figures	Helicopter Runway	VFR Standard	VFR Limited Use Helipad and Hoverpoints	Elevated Helipad	Remarks
14	Horizontal surface	G	Not required	Not required	Not required	Not required	

ANNEX K.
Rotary-Wing Imaginary Surfaces for IFR Approaches

Rotary-Wing Imaginary Surfaces for IFR Approaches						
Item		Legend in Figures	Helicopter Runway	Helipad		Remarks
No.	Description			Standard	Same Direction Ingress/Egress	
1	Primary surface width	A	225 m (750 ft)	225 m (750 ft)	225 m (750 ft)	Centred on helipad
2	Primary surface length	A	Runway length plus 61 m (200 ft) at each end;	470 m (1,550 ft) centred on GPI	114 m (375 ft) centred on GPI	
3	Primary surface elevation	A	The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centreline or established elevation of the helipad.			
4	Clearway surface	B	See ANNEX C	See ANNEX F	See ANNEX F	
5	Start of approach-departure surface	C	Begins 61 m (200 ft) beyond the end of runway, coincident with end of primary surface See Remarks	236 m (775 ft) from GPI See Remarks	488 m (1,600 ft) from GPI See Remarks	Starts at the end of the primary surface
6	Length of approach-departure surface	D	7,620 m (25,000 ft) See Remarks	7,620 m (25,000 ft) See Remarks	7,620 m (25,000 ft) See Remarks	Measured horizontally
7	Slope of approach-departure surface	C	34H:1V See Remarks	34H:1V See Remarks	34H:1V See Remarks	Slope ratio is 34 horizontal units to 1 vertical unit.
8	Width of approach-departure surface at start of sloped portion	C	225 m (750 ft) See Remarks	225 m (750 ft) See Remarks	225 m (750 ft) See Remarks	Centred on the extended centreline and is the same width as the primary surface
9	Width of approach-departure surface at end of sloped portion	C	2,400 m (8,000 ft) See Remarks	2,400 m (8,000 ft) See Remarks	2,400 m (8,000 ft) See Remarks	Centred on the extended centreline

Rotary-Wing Imaginary Surfaces for IFR Approaches						
Item		Legend in Figures	Helicopter Runway	Helipad		Remarks
No.	Description			Standard	Same Direction Ingress/Egress	
10	Elevation of approach-departure surface at start of sloped portion	C	0 m (0 ft) See Remarks	0 m (0 ft) See Remarks	0 m (0 ft) See Remarks	Above the established elevations of the landing surface
11	Elevation of approach-departure clearance surface at end of sloped portion	C	224 m (735 ft)			
12	Transitional surface slope	H	4H:1V	4H:1V	4H:1V	The transitional surface starts at the lateral edges of the primary surface and the approach-departure clearance surface. It continues outward and upward at the prescribed slope to 45 m (150 ft) above the established airfield elevation.

ANNEX L.
Helipad Layout Criteria for Standard VFR Helipad - One Direction



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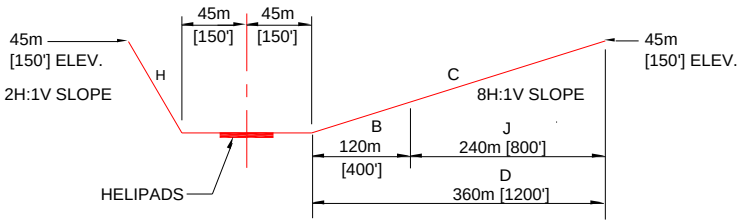
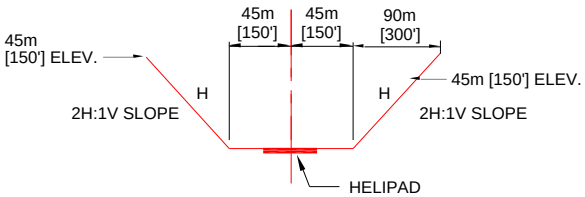


LONGITUDINAL PROFILE
N.T.S.

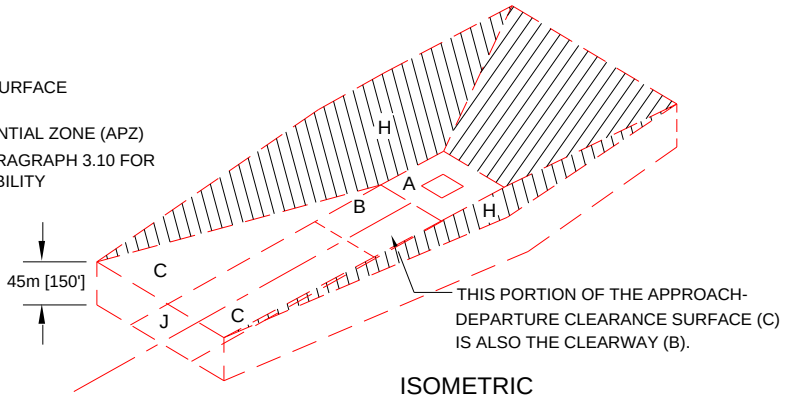


TRANSVERSE SECTION
N.T.S.

LEGEND
SEE ANNEX B FOR DETAILS

- A PRIMARY SURFACE
- B CLEARWAY SURFACE
- C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE)
- D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
- E NOT USED
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT POTENTIAL ZONE (APZ)

SEE CHAPTER 3, PARAGRAPH 3.10 FOR LAND USE COMPATIBILITY



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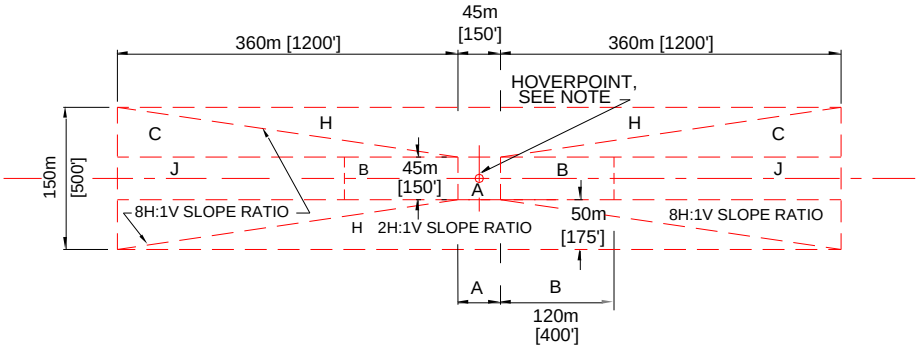
ANNEX M.
Helicopter Hoverpoint



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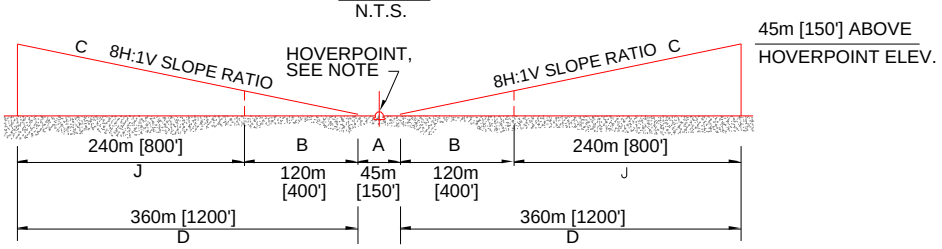
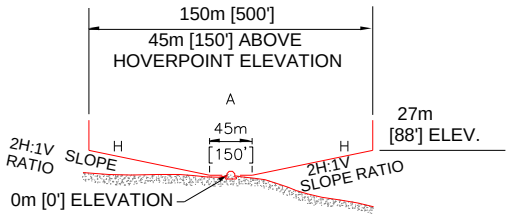


LONGITUDINAL PROFILE
N.T.S.

NOTE

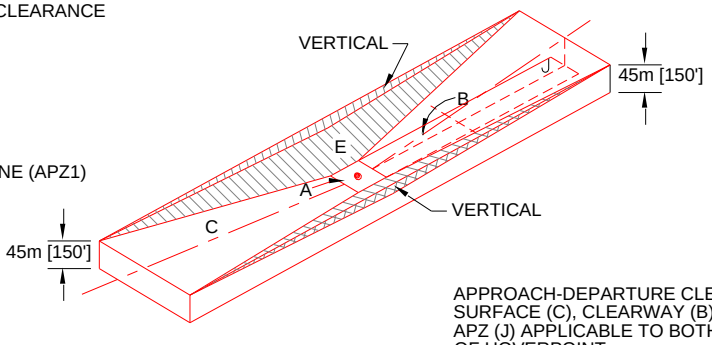
A HOVERPOINT CONSISTS OF A PAVED AREA 9m [30'] IN DIAMETER. DOMED TO A 150mm [6"] HEIGHT AT THE CENTER.



TRANSVERSE SECTION
N.T.S.

LEGEND

- A PRIMARY SURFACE
- B CLEARWAY SURFACE
- C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE)
- D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
- E NOT USED
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT POTENTIAL ZONE (APZ1)



APPROACH-DEPARTURE CLEARANCE SURFACE (C), CLEARWAY (B), AND APZ (J) APPLICABLE TO BOTH ENDS OF HOVERPOINT.

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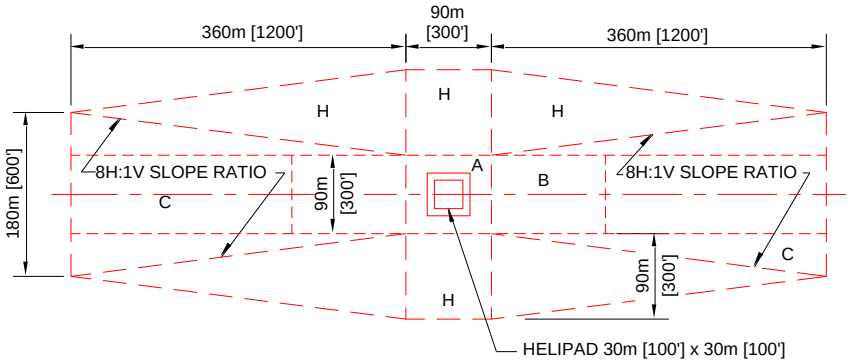
ANNEX N.
Helipad Layout Criteria for Standard VFR Helipad - Two Direction



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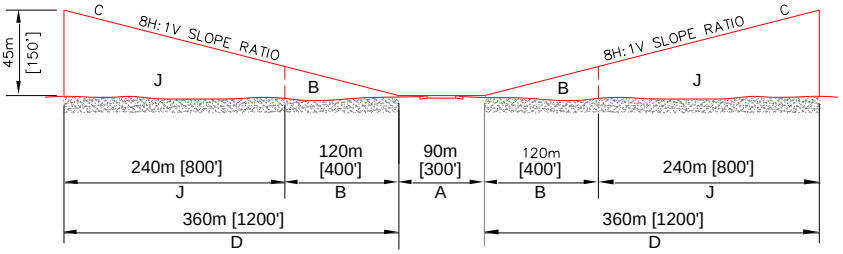

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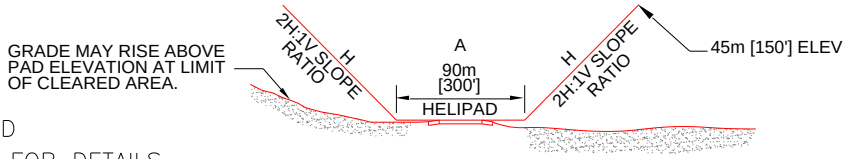


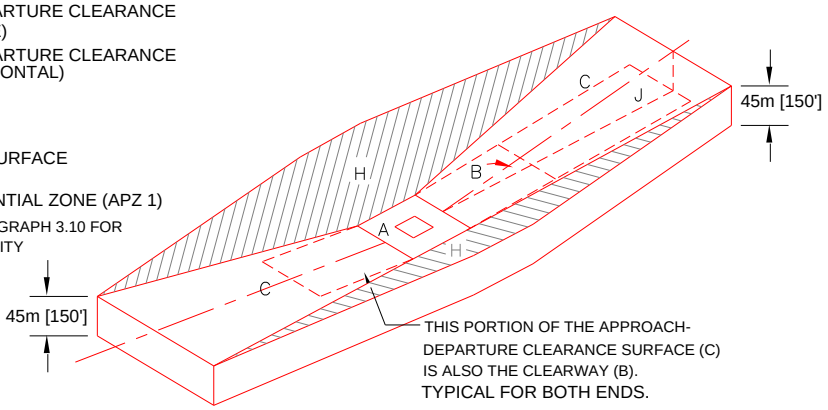
TRANSVERSE SECTION
N.T.S.

LEGEND

SEE ANNEX B FOR DETAILS

- A PRIMARY SURFACE
- B CLEARWAY SURFACE
- C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE)
- D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
- E NOT USED
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT POTENTIAL ZONE (APZ 1)

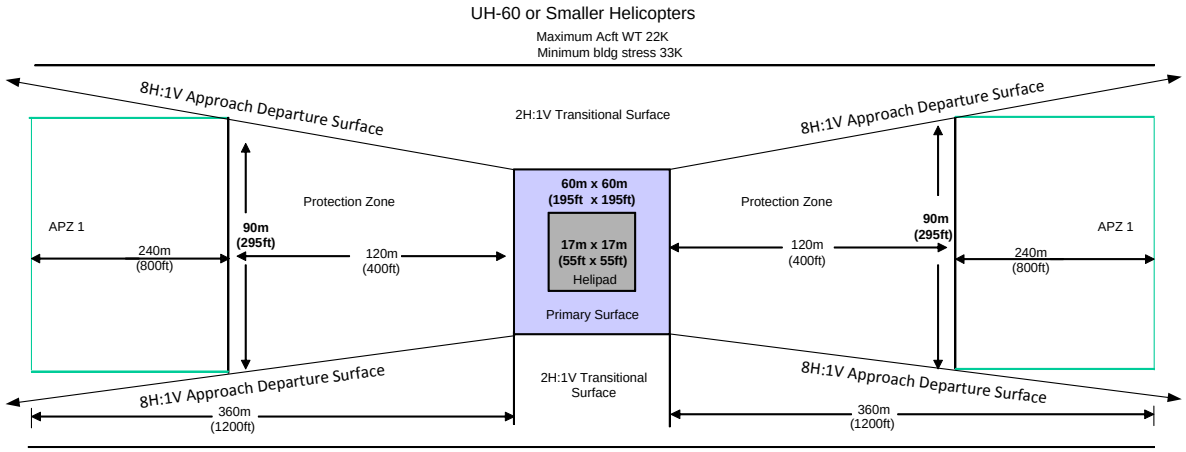
SEE CHAPTER 3, PARAGRAPH 3.10 FOR LAND USE COMPATIBILITY



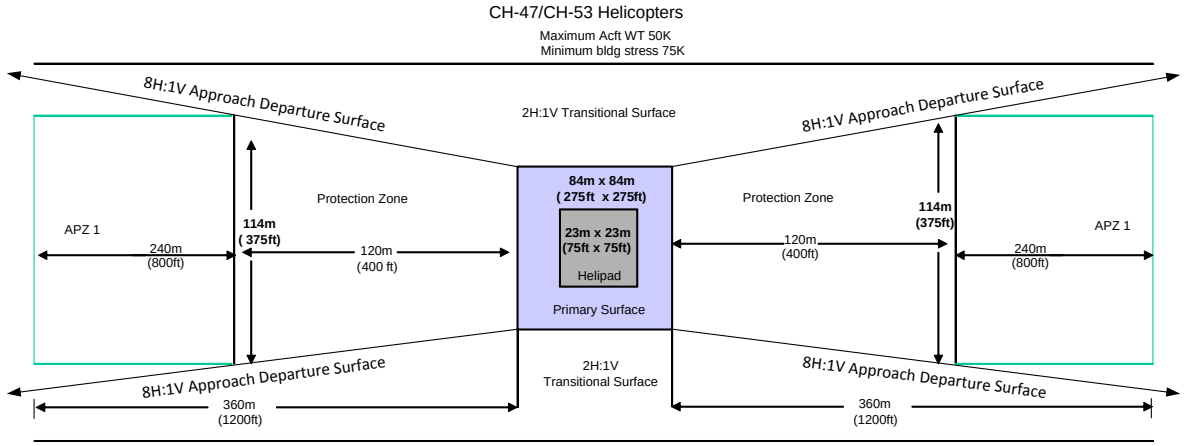
ISOMETRIC
N.T.S.

INTENTIONALLY BLANK

ANNEX O.
Elevated Helipad Layout Criteria



N.T.S



N.T.S.

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