NATO STANDARD

AATMP-12

HELIPAD AND HELIPORT MARKING AND LIGHTING

Edition A Version 1
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NORTH ATLANTIC TREATY ORGANIZATION

ALLIED AIR TRAFFIC MANAGEMENT PUBLICATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

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NATO LETTER OF PROMULGATION

23 February 2018

1. The enclosed Allied Air Traffic Management Publication AATMP-12, Edition A, Version 1, HELIPAD AND HELIPORT MARKING AND LIGHTING which has been approved by the nations in the AIR TRAFFIC MANAGEMENT – COMMUNICATIONS, NAVIGATION AND SURVEILLENCE ADVISORY GROUP, is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 3619.

2. AATMP-12, Edition A, Version 1, is effective upon receipt.

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

for

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Branch Head P&C

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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	Canada reserves the right to utilize marking and lighting criteria and DND Standard MIL312/TP312 where dictated by operational requirements
DEU	1. Reference AATMP-12 Chapter 4 Paragraph 4.5□□Approach Lighting System (IMC)□□DEU reserves the right to apply another configuration according to ICAO Annex 14 Volume 1 or Volume 2. 2. Reference AATMP-12 chapter 6 paragraph 6.2.b DEU reserves the right to apply runway edge lights according to ICAO Annex 14 Volume 1. 3. Reference AATMP-12 chapter 6 paragraph 6.3.b DEU reserves the right to apply runway threshold lights according to ICAO Annex 14 Volume 1.
DNK	Perimeter lights on military helipads in DNK are established with green light according to ICAO Annex 14
LVA	□LVA ratifies STANAG requirements relating to heliports and full compliance will be provided during major construction works□
NOR	NOR reserves the right to use yellow paint for markings

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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1.1.5	ICAO Annex 14 Volume I	Aerodrome Design and Operations

1.2 Purpose.

AATMP-12 establishes helipad and heliport marking and lighting standards for Visual Meteorological Conditions (VMC).

1.3 Scope.

Participating nations agree to adopt the methods of helipad and heliport marking and lighting in AATMP-12 as follows:

a. All initial markings and re-marking when required by operational considerations shall be as specified in this agreement.

b. All new lighting systems or the major replacement of existing helipad and heliport lighting systems shall be as specified in this agreement.

c. Colours for aeronautical ground lights, markings, signs, and panels shall be as specified in *ICAO Annex 14, Sixth Edition - July 2013*, Appendix 1.

1.4 Terms and Definitions.

The following terms and definition apply from NATO AAP-6 NATO *Glossary of Terms and Definitions (English and French):*

Helipad - A prepared area, including landing and hover points, designated and used for take-off and landing of helicopters.

Heliport - A facility designated for operating, basing, servicing, and maintaining helicopters.

1.5 Safety Considerations

Safety considerations for implementing STANAG 3619 (AATMP-12) are contained in Annex A.

1.6 Custodian Address

U.S. Army Corps of Engineers
Transportation Systems Center
ATTN: CENWO-ED-TX
1616 Capitol Ave.
Omaha, NE 68102-4901
United States

Chapter 2
Helipad Marking

2.1 Introduction.

The marking of standard helipads and hospital helipads shall be accomplished by the following methods, consisting of identification marking and border edge marking:

a. An identification marking providing the pilot with guidance to the proper landing location.

b. Border edge marking defining the physical limits of the safe touchdown area.

2.2 Standard Helipad Identification (Mandatory).

The identification marking shall consist of a letter “H”, white in colour, dimensioned as shown at Annex B. The marker shall be located in the geometric centre of the helipad with the vertical bars of the letter “H” parallel to the two opposite sides of the helipad and parallel to the approach direction.

2.3 Hospital Identification Marking (Permissive).

The identification marking at hospitals should consist of the letter “H”, red in colour, 3m (10 ft) high, located in the geometric centre of a marking, made of a series of five, 3m (10 ft) squares, white in colour. The marking should be located in the geometric centre of the defined helipad with the vertical bars of the “H” parallel to the intended approach path; details are shown in Annex C.

2.4 Border Edge Marking (Mandatory).

The border edge markings, at the corners and along the edges, shall define the periphery of the safe physical limits of the touchdown area, and shall be white in colour. Locations and dimensions of the edge markings are detailed in Annex B. A solid border edge marking may be used in lieu of the segmented marking shown in Annex B.

2.5 Obstruction Marking (Mandatory).

Obstructions shall be marked as specified in STANAG 3346.

2.6 Taxiway Markings (Permissive).

Taxiway markings include deceptive surfaces, overrun, shoulders and apron markings. When taxiway markings are considered necessary for helipads, they shall be installed in accordance with the criteria stated in STANAG 3158.

2.7 Wind Direction Indicators (Mandatory). (See paragraph 4.2)

2.8 Helipad Marking Materials.

a. The marking materials shall be durable pavement marking media, should not require excessive maintenance, and shall not cause a hazardous or unsafe condition for the operation of a helicopter or personnel in the operating area.

b. The helipad markings shall use aviation surface colours as specified in the current edition of ICAO Annex 14, Volume I.

c. In order to improve conspicuity on helipad surfaces that are light in colour, the markings can be improved by outlining them with a black border of approximately 15cm (6 ins). Additionally the hospital helipad border edge markings and the other markings may be outlined with a red border of approximately 15cm (6 ins).

Chapter 3
Helipad Lighting

3.1 Introduction.

The following light systems are installed to augment the helipad markings for VMC conditions. The criteria is presented for each system as to configuration, construction recommendations and desired luminous features.

3.2 Perimeter Lights (Mandatory).

a. **Configuration**. Aviation yellow light fittings shall be placed around the perimeter of the helipad as shown at Annex D. A light fitting shall be located at each corner of the helipad with three additional light fittings equally spaced between the corner lights on each side. Light fittings on opposite sides of the helipad are to be opposite each other and equidistant and parallel to the extended centreline of the helipad. Light fittings are normally to be placed adjacent to the helipad, but may be located a maximum of 2.25m (7.5 ft) from the edge of the helipad.

b. **Construction**.

(1) Elevated light fittings are to be used except where wheel mounted rotary wing aircraft may be taxied off the helipad. Where light fittings are located in an area of traffic movement, semi-flush light fittings are to be used.

(2) Elevated light fittings are to be as light and frangible as possible. Overall height above ground is not to exceed 46cm (18 ins); and should preferably be 33cm (13 ins) high. The predetermined breaking point in the elevated light fittings shall be placed at the top edge of the mounting plate in order to minimize danger to any aircraft that may impact a light fitting.

Note: *If snow accumulations of 30cm (12 ins) or more are frequent the mounting height may be increased to 60cm (24 ins) max. above ground.*

c. **Luminous Features**.

(1) Perimeter light fittings shall be omnidirectional.

(2) The preferred vertical divergence and the intensity at maximum stage of brilliance shall be as follows:

ELEVATION ANGLE	INTENSITY (CANDELAS)
3 to 15 degrees	40 (Minimum)
15 to 25 degrees	15 (Minimum)
45 to 90 degrees	5 (Maximum)

(3) Where semi-flush or blister light fittings are used, they shall have performance comparable with the above values.

(4) There shall be a minimum of three progressive stages of brilliancy from and including that stage of lighting required for night operations under good visibility up to full intensity. The lowest stage of brilliancy of the light beam between 3 and 15 degrees shall give an intensity in the order of 0.5 candelas.

(5) The elevation of the beam peak is to be between 7 and 9 degrees.

3.3 Hospital Helipad Perimeter Lights (Permissive).

a. **Configuration**. The lighting of hospital helipad is the same as the standard helipad perimeter lights in sub-paragraph 3.2.a. except there are additional wing lights, located on the geometric centrelines of the helipad at a distance of 7.5m (25 ft), as shown at Annex E, outboard of the existing perimeter light fittings.

b. **Construction**. As per sub-paragraph 3.2.b.

c. **Luminous Features**. As per sub-paragraph 3.2.c. except that the colour of the wing lights should be aviation green

3.4 Landing Direction Lights (Permissive).

a. **Configuration**.

(1) Aviation yellow light fittings are to be located in a straight line along one or more of the centrelines of the helipad extended and perpendicular to the perimeter lights as shown at Annex F. These lights shall be installed whenever it has been determined that the need to indicate a landing direction in the procedure for touchdown or hover at the helipad is a requirement.

(2) Landing direction lights are to consist of six light fittings 4.5m (15 ft) on centre. The first light is to be located 7.5m (25 ft) from the centreline of the row of perimeter lights.

b. **Construction of Landing Direction Light Fittings**.

(1) Elevated light fittings are to be used except where interference with taxiing wheel mounted rotary wing aircraft may occur. At such locations, semi-flush fittings shall be used.

(2) Elevated light fittings shall be as light and frangible as possible. These fittings are to be mounted so that the light fitting nearest to the helipad does not exceed 46cm (18 ins) above the grade of the helipad. Light fittings shall be in a horizontal plane except where deviation is necessary, a tolerance of plus two percent or minus one percent in the longitudinal slope is permitted.

Note: *If snow accumulations of 30cm (12 ins) or more are frequent, the mounting height may be increased to 60cm (24 ins) max. above ground.*

c. **Luminous Features**. Landing direction light fittings shall have the same luminous features as perimeter light fittings (see sub-paragraph 12.c.).

3.5 Approach Direction Lights (Permissive).

a. **Configuration**.

(1) Approach direction lights are not to be used without landing direction lights.

(2) Aviation white lights are to be located in two parallel rows extending out from the landing direction lights, one row on each side of the centreline of the helipad extended as shown in Annex G. These lights shall be installed whenever it has been determined that approach guidance is needed to restrict the path of approach to the helipad or additional guidance will be needed by the pilots in the approach of the helipad.

(3) Approach direction lights are to consist of two rows of elevated light fittings, one row l.5m (5 ft), on each side of the helipad centreline extended in the direction of approach. Each row is to be spaced on 15m (50 ft) centres over a length of 60m (200 ft) with the first row located 37.5m (125 ft) from the centreline of the row of perimeter light fittings.

b. **Construction of Approach Direction Light Fittings**.

(1) Elevated light fittings are acceptable throughout the approach system.

(2) Elevated light fittings are to be as light and frangible as possible. The light fittings shall be mounted in a horizontal plane or follow

the slope of the finished grade. Where a deviation in the axis of the light beam is necessary, a tolerance of plus two percent or minus one percent in the longitudinal slope is permitted. Where a slope is established for the landing direction lights in line with the approach direction lights, the same slope shall be continued for the approach direction lights.

c. **Luminous Features**.

(1) Approach direction light fittings are to be omnidirectional.

(2) The vertical divergence and the intensity at maximum stage of brightness should preferably be as follows:

ELEVATION ANGLE	INTENSITY (CANDELAS)
3 to 15 Degrees	100 (Minimum)
15 to 25 Degrees	40 (Minimum)
45 to 90 Degrees	10 (Minimum)

(3) There is to be a minimum of three progressive stages of brilliancy from and including that stage required for night flying under good visibility up to full brilliancy. The lowest stage of brilliancy shall give an intensity in the normal useful portion of the beam in the order of 1.0 candela.

(4) The elevation of the beam peak should occur at approximately 9 degrees.

3.6 Floodlighting (Permissive).

When floodlights are installed, the following provisions apply:

a. **Configuration**. Floodlights shall be located 15m (50 ft) beyond the edges of the helipad on two opposite sides as shown in Annex H. The floodlights are to be located in a position parallel to the normal approach to the helipad.

(1) Where floodlights are installed for the purpose of illuminating only the helipad, they shall be aligned to uniformly illuminate the helipad.

(2) Where floodlights are installed for the purpose of illuminating areas other than the helipad, the configuration may be as required for the purpose.

b. **Construction of Floodlights**. Floodlights shall be mounted on frangible fittings located as near to the ground as possible in order to minimize damage to any aircraft that may strike a floodlight.

c. **Mounting Heights**.

(1) In operational areas the mounting height above the helipad grade is not to exceed 1.2m (4 ft).

(2) Outside of operational areas, and where it is not feasible to stay within the 1.2m (4 ft) limit above the surface of the helipad, the mounting of the floodlights is to be kept to a minimum height above finished grade at the floodlight location.

(3) A small obstruction light should be mounted on the top of each floodlight visible from above and at ground level from any direction around the floodlight.

d. **Luminous Features**.

(1) The floodlights, except for the light emitted by the obstruction light, shall have no upward component of light output, the entire output being directed below the horizontal.

(2) The obstruction light, if used, is to produce a red non-glare light having an intensity of not less than 0.5 or more than 7.5 candelas.

(3) Provision shall be made for the adjustment of the elevation of the floodlight beam after installation. The adjustment is to provide movement of the axis of the projected beam from 1 degree above the plane to 5 degrees below the horizontal reference plane.

3.7 Obstruction Lighting (Mandatory).

Any obstruction that is marked for day VMC in accordance with paragraph 7 of this agreement shall be lit at night and follow the criteria in accordance with STANAG 3346.

3.8 Taxiway Lighting and Signs (Permissive).

When taxiway lights are installed at or near the helipad, the criteria indicated in STANAG 3316 shall be utilized.

3.9 Light Screening (Permissive).

Any lighting near the helipad which might endanger the safety of air operations shall be extinguished, screened or otherwise modified in order to eliminate the source of danger. Attention should be directed to any non-aeronautical ground lights visible from the air to an approaching helicopter

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Chapter 4
Helipad Special Considerations

4.1 Introduction.

The marking and lighting systems in this part of the agreement complement that which has been previously stated. When utilized they will enhance operational capabilities, increase safety and reduce pilot workload during approach and takeoff.

4.2 Wind Direction Indicator (Mandatory).

a. **Configuration**. A helipad should be equipped with at least one wind direction indicator located in a position in order to indicate the wind conditions over the final approach and take-off area. It shall be free from the effects of air flow disturbances caused by nearby objects or rotor wash. It shall be visible from a helicopter in flight, in a hover or on the movement area if applicable. Where a helipad may be subject to a disturbed air flow, additional wind direction indicators located close to the area may be necessary to indicate the surface winds in that area.

b. **Construction**. A wind direction indicator shall be constructed in order to give a clear indication of the wind direction and a general indication of the wind speed. An indicator should be a truncated cone made of lightweight fabric. The approximate minimum dimensions are 2.4m (8 ft) long, 0.6m (2 ft) diameter (large end), and 0.3m (1 ft) diameter (small end). The colour selected should make it clearly visible and understandable from a height of at least 200m (650ft) above the helipad. When practical the preferred colours should be white or orange. Where necessary to provide adequate conspicuity against varied backgrounds, combined colours are permitted, such as orange and white, red and white or black and white.

c. **Illumination**. A wind direction indicator intended for use at night shall be illuminated.

4.3 Helipad Beacon (Permissive).

A helipad beacon should be provided when long-range guidance is considered necessary and not provided by other visual means, or helipad identification is difficult due to surrounding lights.

a. **Configuration**. The beacon shall flash a coloured sequence of lights, double peak white flash, and a single peak green and yellow. The flash rate shall be 10 to 15 sequences of flashes per minute. The time between each colour should be 1/3rd of the total sequence time. The beacon should not be installed within 1.6km (1 mile) of any existing airport beacon or other helipad area.

b. **Construction**. The beacon should be visible for a distance of 1.6km (1 mile), in 1.6km (1 mile), VMC visibility daylight, and in 4.8km (3 miles), VMC at night, both from an altitude of 915m (3000 ft) above ground level. The beacon should be mounted a minimum of 15m (50 ft) above the helipad surface. Where a control tower or area is utilized the beacon should be no closer than 122m (400 ft), nor further than 1067m (3500 ft) from that area, and not located between the control tower and the helipad.

c. **Luminous Features**. The main beam of the light should be aimed a minimum of 5 degrees above the horizontal and should not produce light below the horizontal in excess of 1000 candelas. Light shields may be used to reduce the intensity below the horizontal.

4.4 Visual Glide Slope Indicators, Helipad (Permissive).

The three recommended systems for helipads are the Chase Helicopter Approach Path Indicator (CHAPI), the Abbreviated Precision Approach Path Indicator (APAPI) or the Helicopter Approach Path Indicator (HAPI). A visual glide slope indicator should be provided for a helipad when:

a. **General**.

(1) Obstacle clearance, noise abatement or traffic control procedures require a particular approach slope angle be flown, or

(2) The environment of a helipad provides few visual cues, or

(3) The characteristics of a particular helicopter require a stabilized approach.

b. **Configuration**.

(1) The CHAPI system consists of 2 transition light units projecting red/green/white lights. They are located forward of the helipad on the extended centreline and at a distance determined in order to project an on glide path angle (usually 6 degrees) at the helipad hover-point prior to touchdown. The units are positioned at approximately 6.6m (20 ft) apart laterally (horizontally).

(2) The APAPI system consists of 2 light units positioned on the left side of the helipad, on the lateral centreline of the helipad at 90 degrees to the approach direction. The inner unit should be positioned at l0m (30 ft) from the helipad left edge, and the outer unit at a distance of 6m (20 ft) from the inner unit.

(3) The HAPI system consists of 1 light unit. It is located forward of the pad on the extended centreline.

c. **Construction**.

(1) The CHAPI system shall be constructed and mounted as low as possible, be sufficiently light in weight and be frangible so as not to constitute a hazard to helicopter operations.

(2) The APAPI system should be constructed and mounted as low as possible, usually plus or minus 30cm (1 ft), within the centre of the helipad elevation. The units should be light in weight and on frangible mounts.

(3) The HAPI system should be constructed and mounted as low as possible, be sufficiently light in weight and be frangible so as not to constitute a hazard to helicopter operations.

d. **Illumination**. The CHAPI light units are similar to a PAPI unit, with the addition of a 2.0 degree wide green sector.

(1) The vertical colour sectors for the CHAPI system are:

Above course	7.5 degrees or more	W	W
Slightly high	6.5 to 7.5 degrees	W	G
On course	6.0 degrees	G	G
Slightly low	4.5 to 5.5 degrees	G	R
Below course	4.5 degrees or less	R	R

(2) The vertical colour sectors for APAPI are:

Above course	6.5 degrees or more	W	W
On course	6.0 degrees	W	R
Below course	5.5 degrees or less	R	R

(3) The vertical colour sectors for HAPI are:

Above course	6.75 degrees or more	G	(Flashing)
On course	6.0 to 6.75 degrees	G	
Slightly low	4.5 to 5.5 degrees	R	
Below course	4.5 degrees or less	R	(Flashing)

4.5 Approach Lighting System (IMC), (Permissive).

a. Helipad operations are normally intended for VMC conditions only, except when associated airfields provide adequate cues for IFR operations and the landing may be completed at a helipad.

b. The US Army developed an approach lighting system and has implemented a configuration for IMC. The existing system is shown in Annex I, for guidance and reference purposes.

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Chapter 5
Heliport Marking

5.1 Introduction.

a. Operational areas on a heliport shall be marked in accordance with ICAO Annex 14, Volume II, Heliports. Helipads on heliports shall be marked in accordance with Chapter 2 of this STANAG.

b. Initial marking of runways and taxiways should NOT be accomplished prior to the required pavement curing period to avoid discoloration of the markings by the oils in bitumen bleeding through the paint or thermoplastic, or marking delamination due to the presence of pavement curing compounds on new rigid pavements.

c. Remarking or revising existing marks should be accomplished as often as necessary, but only after the pavement surface has been thoroughly cleaned and is completely dried.

5.2 Rotary Wing Runway Designations and Identifiers (Mandatory).

a. **Rotary Wing Runway Designations.** Markings on serviceable runways will consist of a white numeric runway designation of one or two digits supplemented with the identifier “H”, marked either above, or below the numeric designator. Alpha and numeric characters are longitudinally separated by a 4.5m (15ft) gap. Each character or pair of characters, are centred on the runway centreline. Spacing between the numbers shall be not less than 2.3m (7.5ft) nor more than 2.7m (9ft), except for the numerals “11” in which case spacing shall be increased by a factor of 0.5. For parallel runways on a heliport, the numerals must also be supplemented by letter “L”, “C”, or “R” to indicate the lateral position of the landing surface in relation to the others (left, centre, or right). In these cases, the letter designator should be located between the beginning of the landing surface and the numeric designator with a 4.5m (15 ft) longitudinal gap between each. Numbers and letters assigned will be determined from the approach direction and will conform to the form and dimensions shown in ICAO Annex 14, Volume II, Figure 5.3. The number assigned will be the whole number nearest one tenth of the magnetic azimuth heading for the centreline of the runway, measured clockwise from the magnetic North. Single digits designations may or may not be preceded by a zero**.**

b. **Rotary Wing Runway Identification Marking.** Rotary wing runways will further be identified for use by helicopters with a white “H” Identification marking, with the parallel legs of the “H” aligned with the normal direction of travel to and from the helipad. The “H” will be

formed as shown in ICAO Annex 14, Volume II, figure 5.3 and centred on the runway. It is separated from the designator by a 6m (18ft) gap.

5.3 Runway Centrelines (Permissive).

a. If provided, the Centreline of a rotary wing runway shall be marked with a solid white 300mm (1 ft) wide line.

b. The centreline stripe of each runway will terminate 3 m (20 ft) from the Runway Identifier.

5.4 Holding Positions (Mandatory).

a. For VFR rotary wing runways, locate holding positions not less than 3m (10 ft) or 0.25 of the largest dimension of the most demanding helicopter that will use the runway. Mark VFR hold positions in accordance with ICAO Annex 14, Volume I, Chapter 5.

b. For IFR rotary wing runways, locate holding positions beyond or at the boundary of the Final Approach Takeoff (FATO) Safety Area, as defined by Chapter 3 of ICAO Annex 14, Volume II. The minimum distances are not less than 45m (150 ft) laterally from FATO centreline, or 60 m (200 ft) beyond the ends of the FATO. Mark IFR hold positions in accordance with ICAO Annex 14, Volume I, Chapter 5.

5.5 Taxiway Markings (Mandatory).

Ground taxiway centrelines will be marked in accordance with ICAO Annex 14, Volume I, Chapter 5 requirements for fixed wing runways. Air taxiway markings shall be as prescribed within ICAO Annex 14, Volume II, Chapter 5.

5.6 Colours (Mandatory).

Markings placed to aid pilots must be uniform in configuration and colour for maximum effectiveness shall use colours as specified within ICAO Annex 14, Volume I, Aerodromes.

a. The following marking patterns for Rotary-wing runways will be marked with white retro-reflective paint.

- Designation Marking
- Identifier Marking
- Centreline Marking

b. Taxiway markings on heliports shall be yellow.

5.7 Retro-reflectivity (Permissive).

It is desirable that markings intended to be viewed during darkness or poor visibility conditions with the aid of a light be made retro-reflective to increase conspicuity.

5.8 Marking Precedence (Mandatory).

Where runways intersect, preference in location of the marking will be given to the more important runway, or that equipped for the lowest visibility **minima.**

5.9 Borders for Increased Conspicuity (Permissive).

To provide maximum contrast with the pavement surface, markings may be bordered with a black 100 mm to 150 mm (4 inch to 6 inch) non-reflective borders.

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Chapter 6
Heliport Lighting

6.1 Introduction.

The following light systems are installed to augment the heliport markings for VMC conditions. The criteria are presented for each system as to configuration, construction recommendations and desired luminous feature.

6.2. Heliport Runway Edge Lights.

a. **Configuration**. The line of edge lights, aviation white, must be located on each side of a heliport runway, and not less than 1.5 meters (5 feet), nor more than 3 meters (10 feet) from the paved edge of the runway. The lights will be of the elevated type and will be uniformly spaced at 30 meters (100 feet).

b. **Luminous Features**. Heliport Runway Edge Light fittings shall be omnidirectional. The preferred minimum vertical intensity at maximum stage of brilliance shall be as follows:

ELEVATION ANGLE	INTENSITY (CANDELAS)
2 TO 10 DEGREES	25 MINIMUM
10 TO 15 DEGREES	10 MINIMUM

There shall be a minimum of three progressive stages of brilliancy from and including that stage of lighting required for night operations under good visibility up to full intensity.

6.3 Runway Threshold Lights.

a. **Configuration**. The line of in-pavement threshold lights must be bidirectional, 180 degrees aviation green and 180 degrees aviation red, located not less than 1.5 meters (5 feet) or more than 4.5 meters (15 feet) from the runway ends, with the lights spaced approximately 5 meters (17 feet) on centres. The outermost light of each group will be located in line with the corresponding row of runway edge lights. Each group of threshold lights will contain a minimum of six lights. When the line of runway edge lights are located at the maximum distance of 3 meters (10 feet) from the pavement edge of the runway, an additional in-pavement light will be installed in each group for a total of 7 lights in each group. The threshold lights should be controlled with the runway edge light circuit.

b. **Luminous Features.** Heliport Runway Threshold Light fittings shall be Directional. The preferred minimum vertical and horizontal intensity at maximum stage of brilliance shall be as follows:

Horizontal Angle	Vertical Angle	Intensity (Candelas)	
		Green	Red
+1.5 to -1.5 degrees	3.5 to 5.5 degrees	300	
+3 to -3 degrees	1.5 to 7.5 degrees	180	
+5 to -5 degrees	0 to 9 degrees	90	10

There shall be a minimum of three progressive stages of brilliancy from and including that stage of lighting required for night operations under good visibility up to full intensity.

6.4 Taxiway Signs.

Taxiway guidance signs will be in accordance with ICAO Annex 14, Vol.1, Section 5.4. Additionally, where armament safe heading marker boards are used, they will be inscribed in the form shown in Annex J. The Boards should be located 15m (50ft) from the taxiway or parking area edge in accordance with the requirements for Illuminated Guidance Signs (IGS), but their precise locations will be determined operationally.

6.5 Taxiway Lights. (CAN)

Taxiway lights will be in accordance with ICAO Annex 14, Vol. 1, Section 5.3.17. Additionally:

a. The spacing for taxiway edge lighting shall be in accordance with Table 1. Further guidance is provided at Annex K.

b. Elevated taxiway edge lights should not be used where they will be subjected to damage from jet blast, the operation of arresting systems or where they would interfere with aircraft operations. (Elevated light units may be replaced by inset lights (semi or fully flush) to maintain aircraft luminous guidance.)

Table1. Spacing for Taxiway Edge Lighting

Taxiway	Spacing
Straights and curves down to 350m radius	60m (max.)
Curves with radius between 350m and 100m	R/7
Curves with radius between 100m and 28m	Close to but not greater than 14.5m
Curves with radius below 28m	R/2, minimum of 4 lights incl. tangent positions for 90 degree curves

(Where ‘R’ is the radius of the inner curved line joining the inside light positions

6.6 Apron Floodlighting.

Apron floodlighting will be in accordance with ICAO Annex 14 Vol. 1, Section 5.3.23. Additionally:

a. The siting of floodlighting pylons and towers is restricted according to their height and distance from the runway and shall be in compliance with the specified Obstacle Limitation Surfaces. The pylons and towers must not interfere with a pilot's view of the landing light pattern, nor with his or the Air Traffic Controllers view of aircraft taking off, taxiing or landing.

b. Consideration must also be given to the position and height of the pylons and/or towers to ensure that radio or radar navigation aids are not detrimentally affected.

6.7 Obstruction Lighting (Mandatory).

Obstruction lights shall be the same as paragraph 3.7 for Helipad Obstruction Lighting (Mandatory)

6.8 Light Screening (Permissive).

Light screening shall be the same as paragraph 3.9 Helipad Beacon Light Screening (permissive).

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Chapter 7
Heliport Special Considerations

7.1 Introduction.

The marking and lighting systems in this part of the agreement complement that which has been previously stated. When utilized they will enhance operational capabilities, increase safety and reduce pilot workload during approach and takeoff.

7.2 Wind Direction Indicator (Mandatory).

a. **Configuration.** A heliport runway should be equipped with at least one direction indicator located in a position in order to indicate the wind conditions over the final approach and take-off area. It shall be free from the effects of air flow disturbances caused by nearby objects or rotor wash. It shall be visible from a helicopter in flight, in a hover or on the movement area if applicable. Where a heliport runway is subjected to disturbed air flow, additional wind direction indicators located close to each threshold of the heliport runway should be provided.

b. **Construction**. A wind direction indicator shall be constructed in order to give a clear indication of the wind direction and a general indication of the wind speed. An indicator should be a truncated cone made of lightweight fabric. The approximate minimum dimensions are 2.4m (8 ft) long, 0.6m (2 ft) diameter (large end), and 0.3m (1 ft) diameter (small end). The colour selected should make it clearly visible and understandable from a height of at least 200m (650ft) above the helipad. When practical the preferred colours should be white or orange. Where necessary to provide adequate conspicuity against varied backgrounds, combined colours are permitted, such as orange and white, red and white or black and white.

c. **Illumination.** A wind direction indicator intended for use at night shall be illuminated.

7.3 Heliport Beacon (Permissive).

The heliport beacon shall be the same as paragraph 4.3 Helipad Beacon (permissive).

7.4 Visual Glide Slope Indicators, Heliport (Permissive).

The three recommended systems for heliports are the Chase Helicopter Approach Path Indicator (CHAPI), the Abbreviated Precision Approach Path Indicator (APAPI) or the Helicopter Approach Path Indicator (HAPI). A visual glide slope indicator should be provided for a heliport when:

a. **General.**

(1) Obstacle clearance, noise abatement or traffic control procedures require a particular approach slope angle be flown, or

(2) The environment of a helipad provides few visual cues, or

(3) The characteristics of a particular helicopter require a stabilized approach.

b. **Configuration.**

(1) The CHAPI system consists of 2 transition light units projecting red/green/white lights. They are located forward of the helipad on the extended centreline and at a distance determined in order to project an on glide path angle (usually 6 degrees) at the heliport hover-point prior to touchdown. The units are positioned at approximately 6.6m (20 ft) apart laterally (horizontally).

(2) The APAPI system consists of 2 light units positioned on the left side of the helipad, on the lateral centreline of the helipad at 90 degrees to the approach direction. The inner unit should be positioned at l0m (30 ft) from the heliport left edge, and the outer unit at a distance of 6m (20 ft) from the inner unit.

(3) The HAPI system consists of 1 light unit. It is located forward of the pad on the extended centreline.

c. **Construction.**

(1) The CHAPI system shall be constructed and mounted as low as possible, be sufficiently light in weight and be frangible so as not to constitute a hazard to helicopter operations.

(2) The APAPI system should be constructed and mounted as low as possible, usually plus or minus 30cm (1 ft), within the centre of the heliport elevation. The units should be light in weight and on frangible mounts.

(3) The HAPI system should be constructed and mounted as low as possible, be sufficiently light in weight and be frangible so as not to constitute a hazard to helicopter operations.

d. **Illumination.**

The CHAPI light units are similar to a PAPI unit, with the addition of a 2.0 degree wide green sector.

(1) The vertical colour sectors for the CHAPI system are:

Above course	7.5 degrees or more	W	W
Slightly high	6.5 to 7.5 degrees	W	G
On course	6.0 degrees	G	G
Slightly low	4.5 to 5.5 degrees	G	R
Below course	4.5 degrees or less	R	R

(2) The vertical colour sectors for APAPI are:

Above course	6.5 degrees or more	W	W
On course	6.0 degrees	W	R
Below course	5.5 degrees or less	R	R

(3) The vertical colour sectors for HAPI are:

Above course	6.75 degrees or more	G	(Flashing)
On course	6.0 to 6.75 degrees	G	
Slightly low	4.5 to 5.5 degrees	R	
Below course	4.5 degrees or less	R	(Flashing)

7.5 Approach Lights.

Approach light systems, when needed, will be installed in accordance with Annex F and Annex G for VFR operations or Annex I for IFR conditions.

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ANNEX A.
Safety Considerations

STANAG 3619 – HELIPAD AND HELIPORT MARKING AND LIGHTING

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U.S. Army Corps of Engineers, Transportation Systems Center,
ATTN: CENWO-ED-TX (Gregory), 1616 Capitol Ave, Omaha, NE, 68102-4901

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: John Gregory (USA), John.B.Gregory@usace.army.mil

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

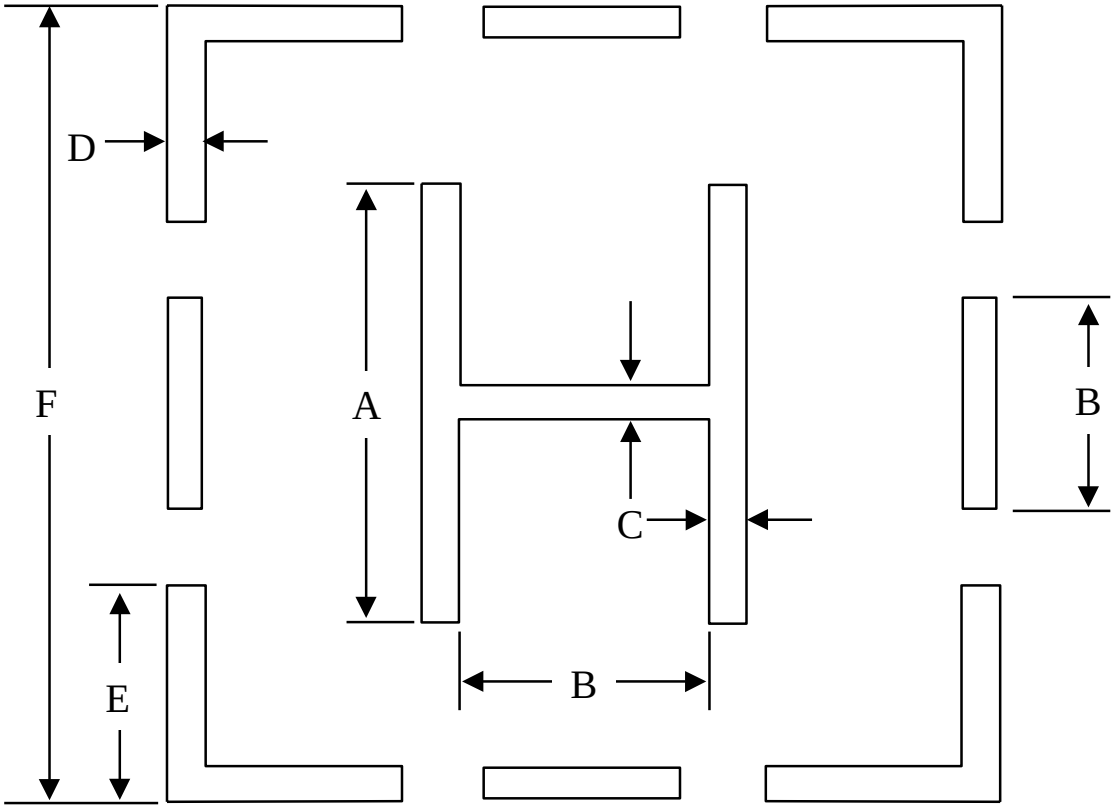
A. Suitability	Review STANAG 7210 (AEP-68) *Guidance in the Selection of STANAGs for Deployed Operations, to determin*e if the STANAG/AATMP is suitable for the type of operation required.
B. Currency	Ensure that STANAG/AATMP Edition and any Amendments are the most current as shown on the NSA website.
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 NSA 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 NSA 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
Helipad/Heliport lights may become dislodged or misaligned due to rotor downwash	Damage to the equipment, reduced system serviceability, non-compliance to STANAG, and/or Foreign Object Debris (FOD) may impede airfield operations	Securely anchor equipment using the correct mounting bolts and torque. Verify correct alignment of helipad/heliport lighting.
CHAPI or APAPI units may become misaligned due to airfield operations or ground movement	Incorrect glide slope indication may be provided to helicopters on approach	Regularly verify the accuracy of the CHAPI and APAPI glide slope settings using an alignment tool, comparison with electronic navigation aids, flight checks, or other suitable methods
Helipad/Heliport lights may become obscured by environmental conditions such as dust, dirt, snow, and frost.	The visibility of the marker or light may be diminished, reducing their effectiveness	Regularly inspect the markers or lights to ensure they are not obscured, dirty, or pitted.
Helipad/Heliport markings are faded because of sun exposure	Markings may not be visible at night leading to an increased possibility for an accident.	Periodically Inspect markings and reapply any faded markings.
Heliport/Helipad lights are not functioning – more than two lights in a row burned out	Increased possibility of an accident.	Inspect all lights (including floodlights) IAW national procedures and replace any that are not functioning.
Obstruction lights not operating	Increased possibility of an accident.	Inspect all obstruction lighting for proper location and operation per STANAG 3346.
LED Obstruction Lights.	Not visible when helicopter pilots use NVG.	Only approved LED compatible obstruction lights should be used.
Lighting maintenance personnel.	Light outages affecting safe aircraft take-off and landings and possible injury or death of maintenance personnel using improper procedures while performing lighting maintenance.	Only qualified electricians should perform lighting maintenance.

ANNEX B.
Standard Helipad Marking



DIMENSIONS

A = 0.6 F (MAXIMUM OF 20M)
B = 0.5 A

HELIPAD SIZE (F) M - (FT)	PATTERN LINE (C) M - (FT)	BORDER EDGE WIDTH (D) M - (FT)	CORNER EDGE LENGTH (E) M - (FT)
13.0 - 18.0(40 - 60)	1.0 - (3)	0.4 - (1.25)	1.5 - (4.5)
18.0 - 24.0(60 - 80)	1.3 - (4)	0.6 - (2)	2.2 - (7)
24.0 - 30.0(80 - 100)	1.5 - (4.5)	0.6 - (2)	3.0 - (10)
30.0 - 45.0(100 - 150)	2.0 - (6)	0.75 - (2.5)	3.5 - (12)

NOTE: A solid border edge marking may be used in lieu of the segmented marking.

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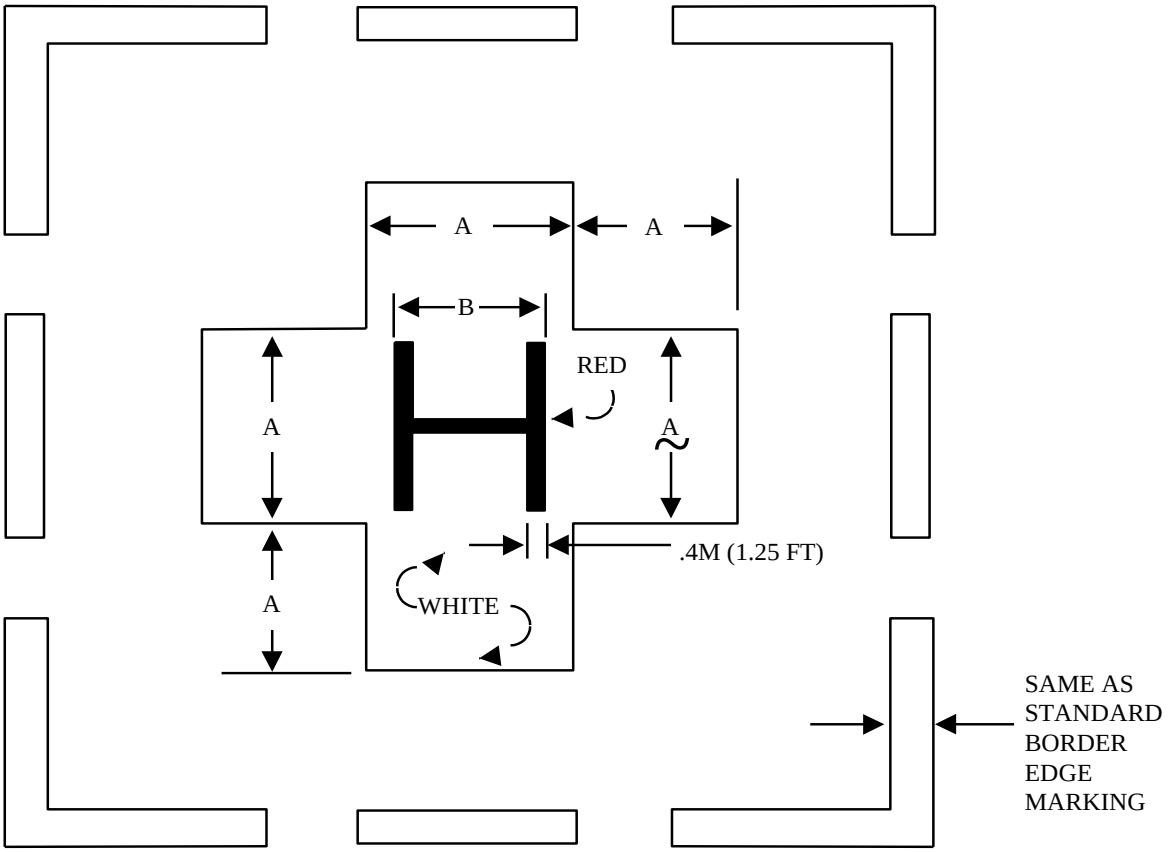
ANNEX C.
Hospital Helipad Marking



A = 3.0M (10 FT)

B= 1.8M (6.0 FT)

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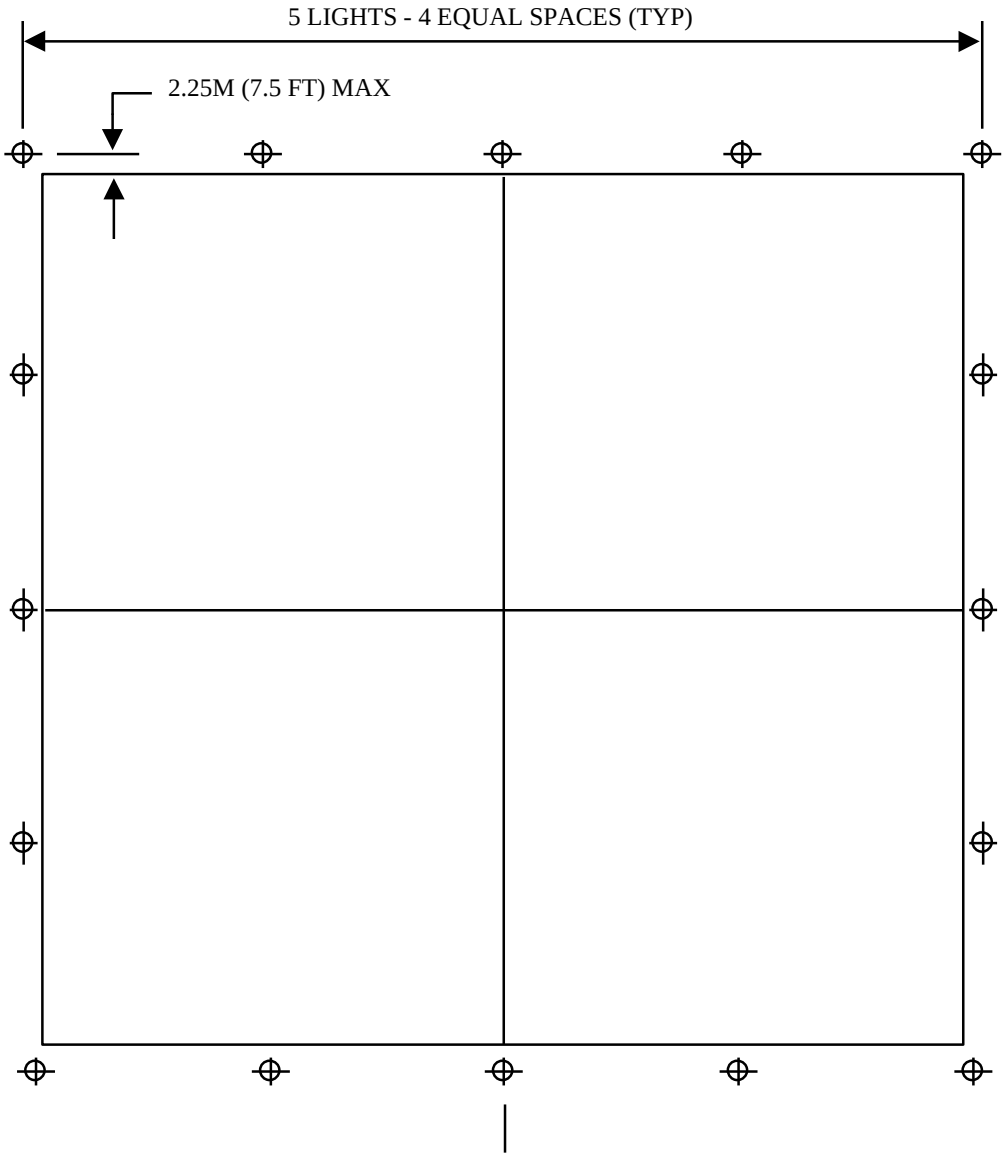
ANNEX D.
Standard Perimeter Lights



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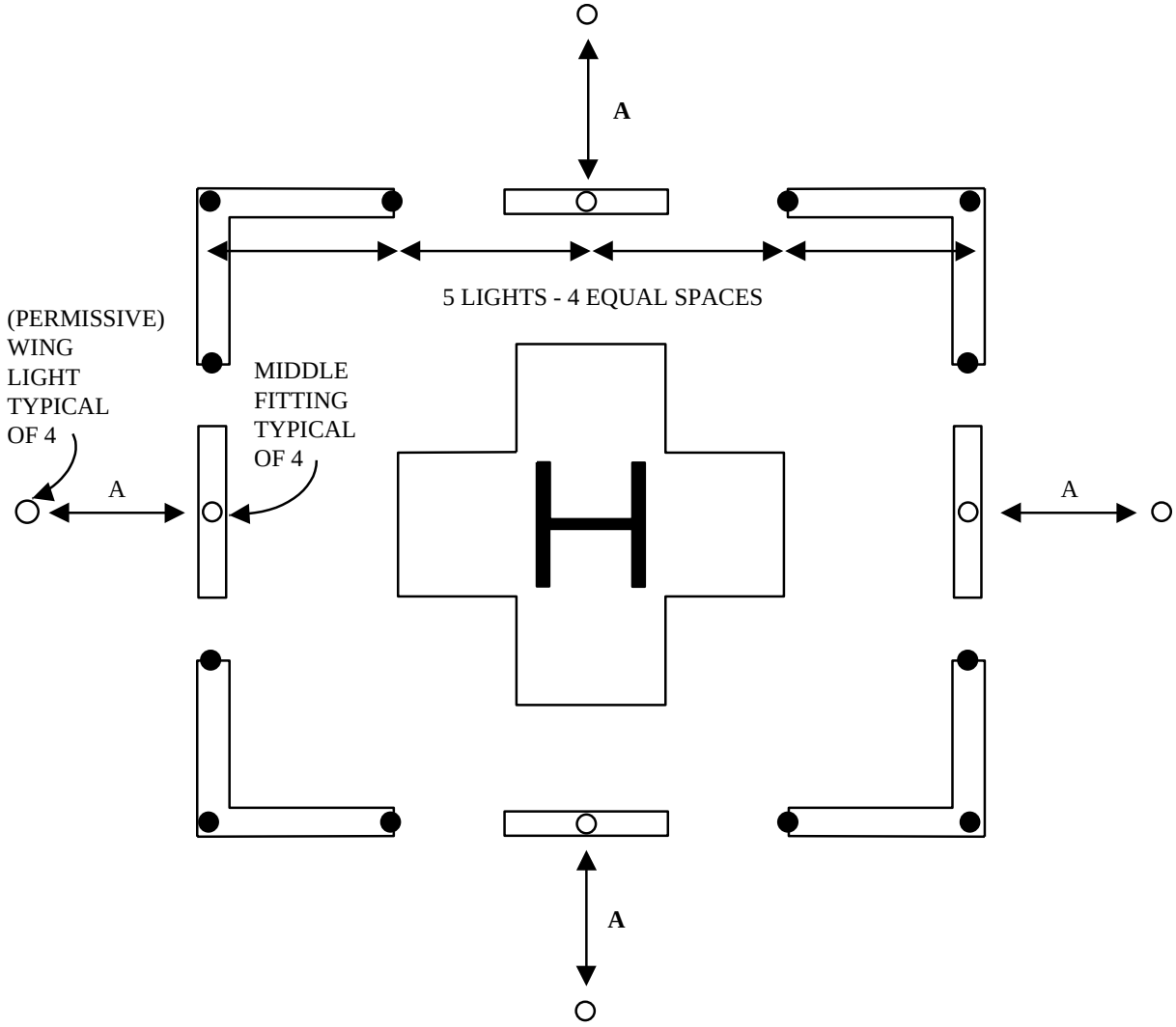
ANNEX E.
Hospital Perimeter Lights



○ WING LIGHTS/MIDDLE FITTINGS - GREEN
● PERIMETER LIGHTS - YELLOW
A = 7.5M (25 FT)

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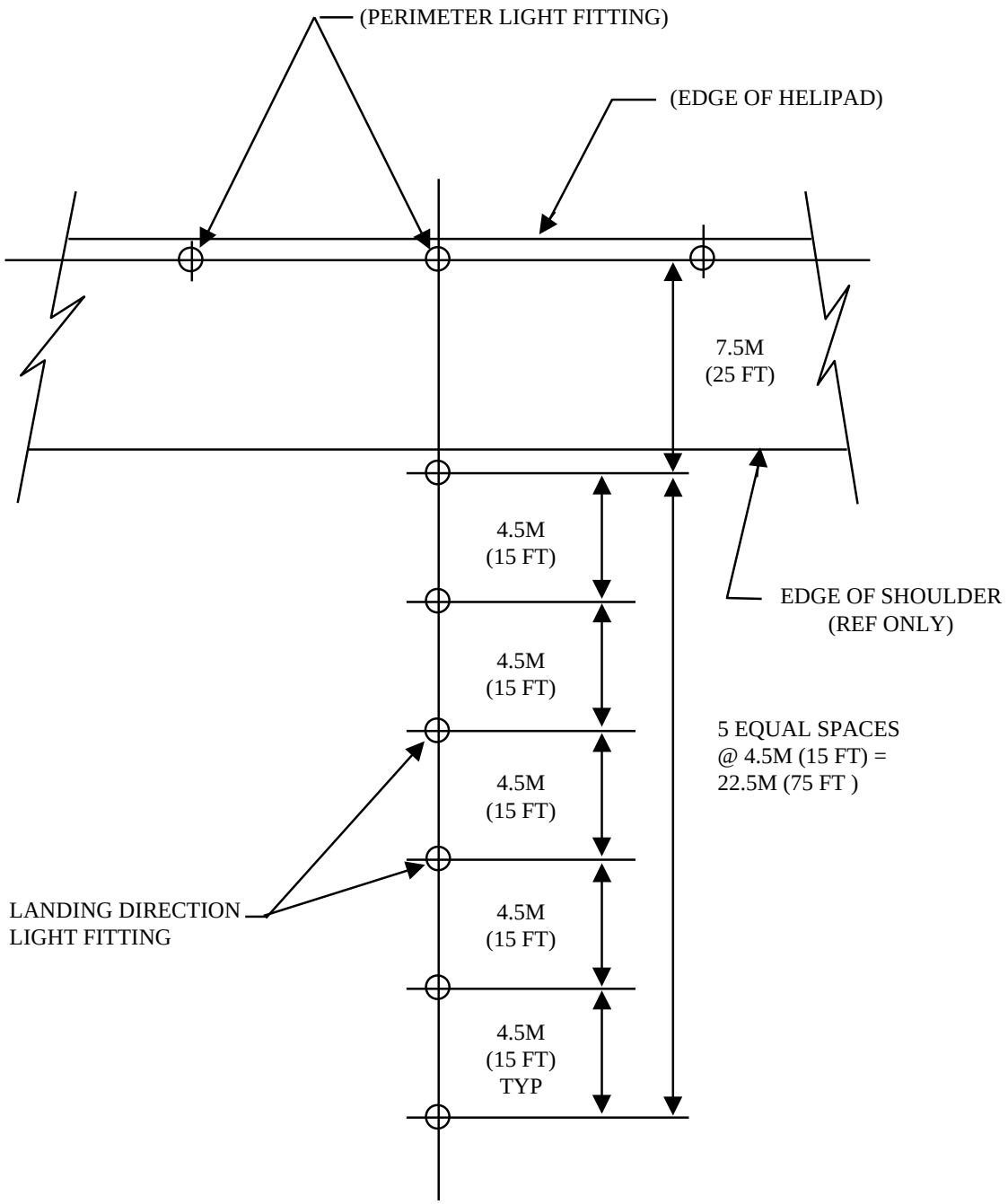
ANNEX F.
Landing Direction Lights



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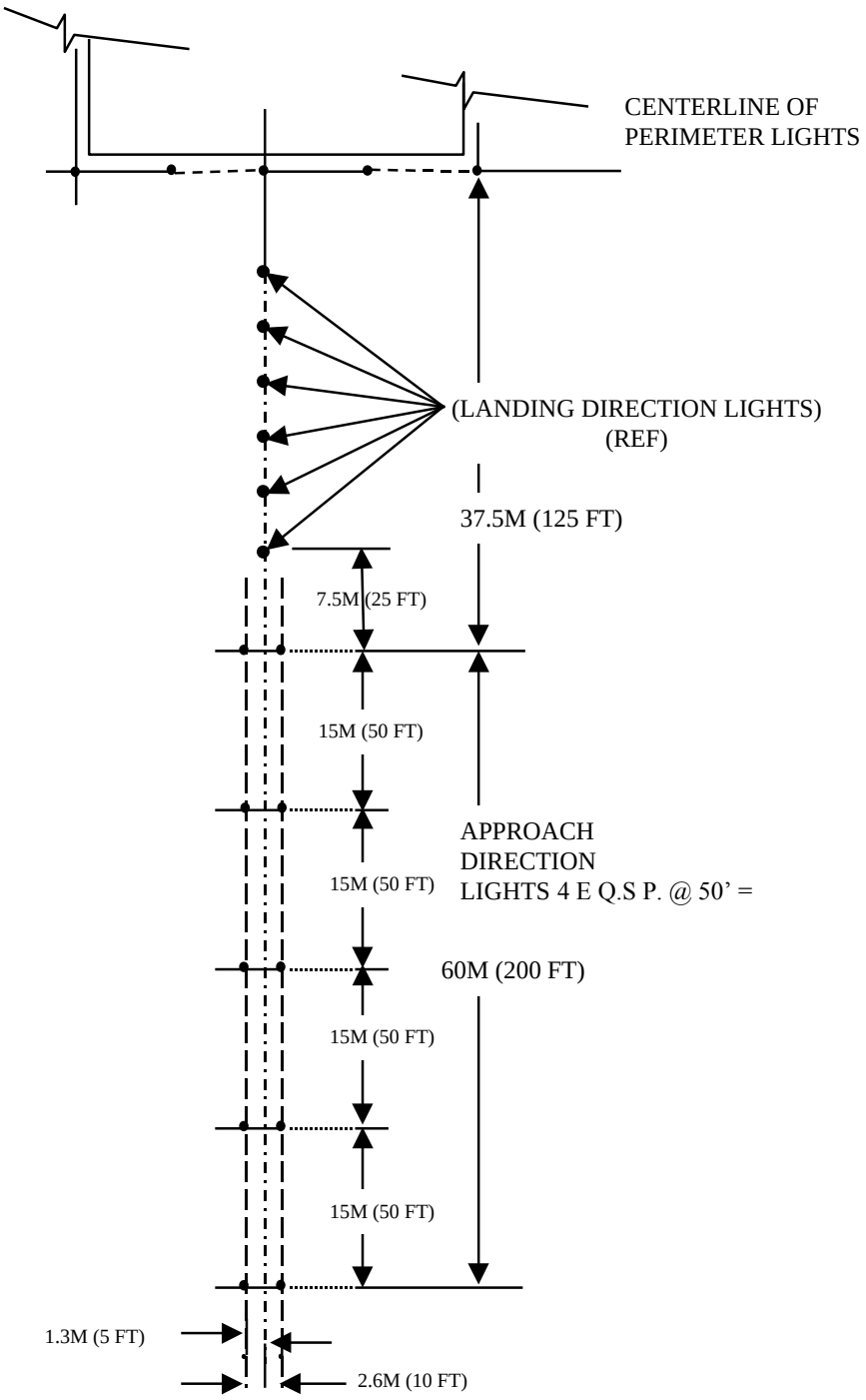
ANNEX G.
Approach Direction Lights



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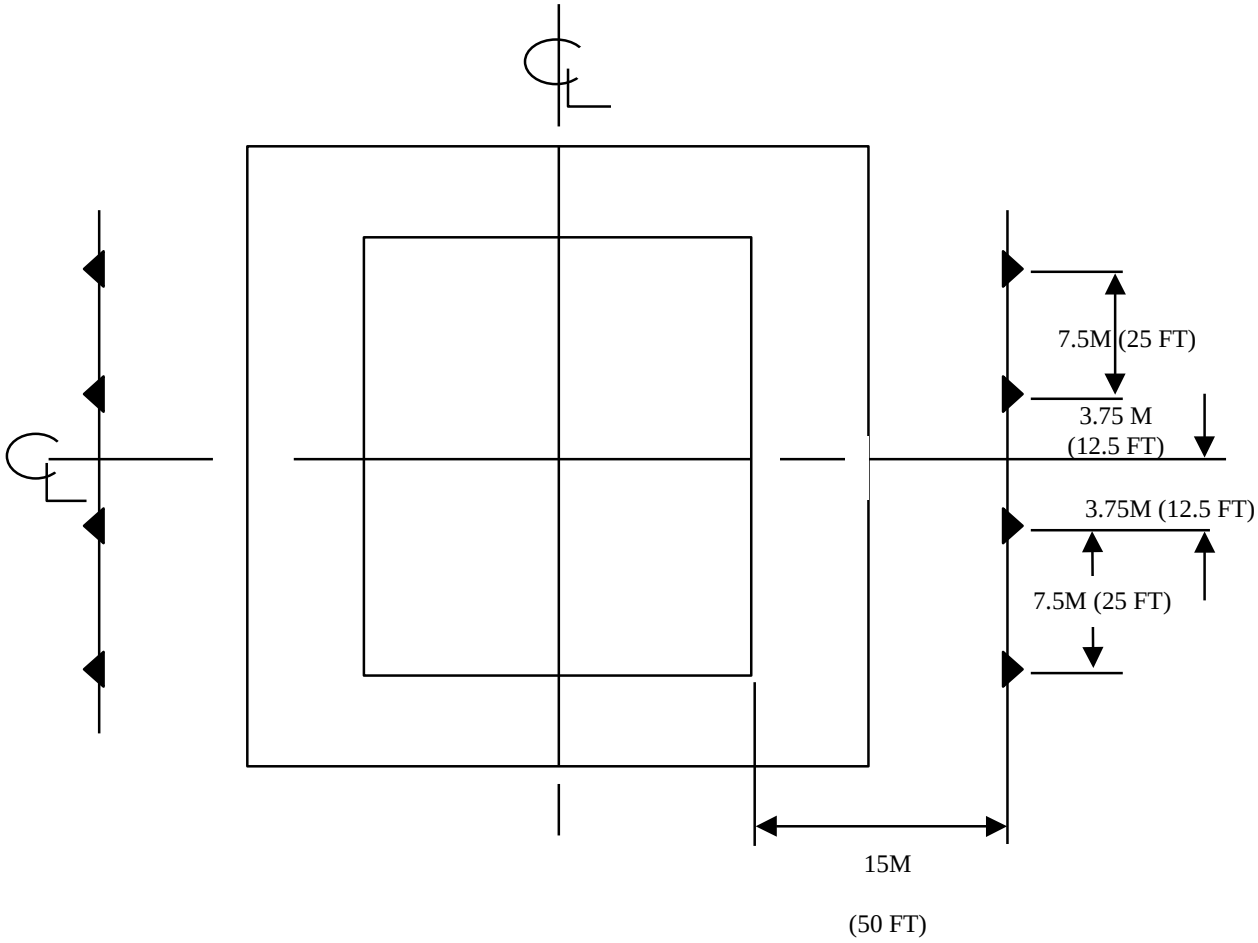
ANNEX H.
Floodlighting



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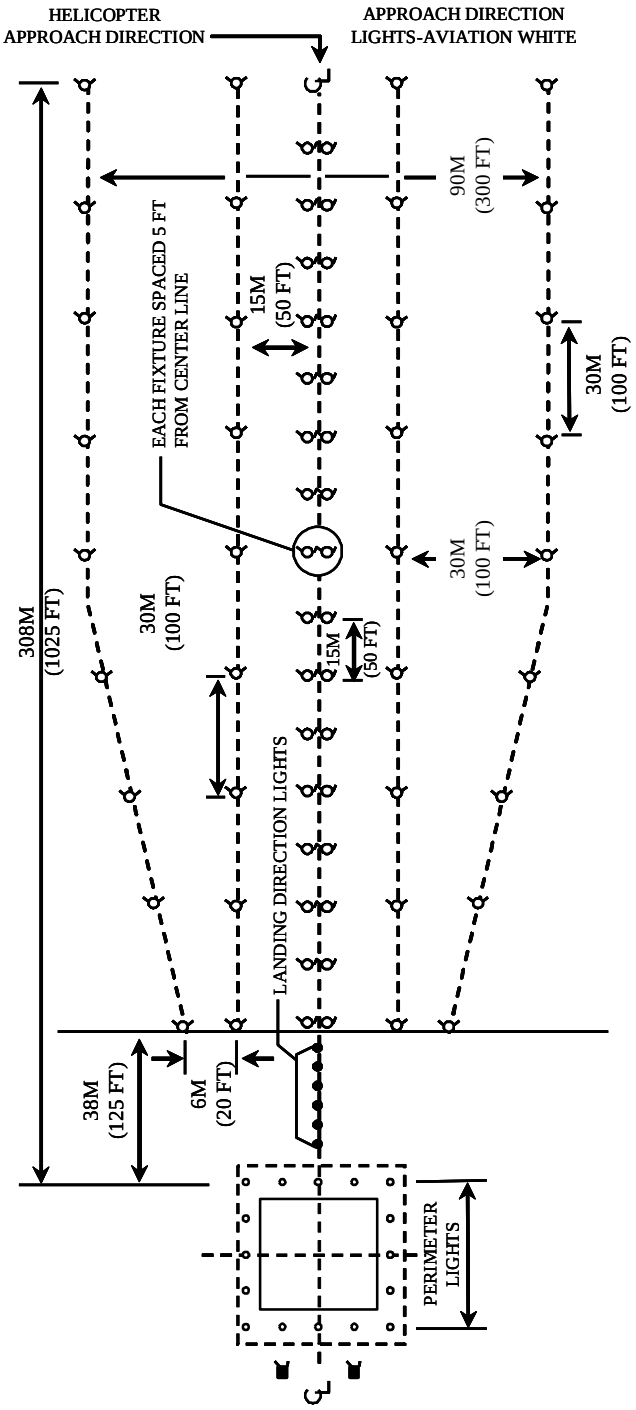
ANNEX I.
IMC Approach Configuration

IMC APPROACH CONFIGURATION



NOTES: (1) ○ Elevated or semi-flush omni-directional light fixture with luminous features.
(2) ● Normally elevated omni-directional light fixture with luminous features.
(3) ■ Visual approach slope indicator system
(4) ◊ Normally elevated uni-directional light fixtures.
(5) Elevated light fittings to be frangible with break-off point at top edge of base mounted plate.
(6) Light fixtures shall be mounted on a horizontal plane and shall not be greater than 18 inches above grade of the helipad. Where deviation of the horizontal plane is necessary, tolerance is to be +2% or -1% in the longitudinal slope. Where a slope is established for the landing direction lights, the same slope shall be continued for the approach direction lights.
(7) Glide slope and setting angles:

glide slope angle	setting angle
3 degrees	6 degrees
8 degrees	11 degrees
9 degrees	15 degrees

(8) If multiple glide slope angles are used, the mean value of 11 degree setting angle shall be used. Three or five progressive stages of brilliance are required for approach direction lights.
Intensities: A. Horizontal plane 20,000 CDS beam spread ± 7.5 °.
B. Horizontal plane 5,000 CDS beam spread ± 12.5 °.

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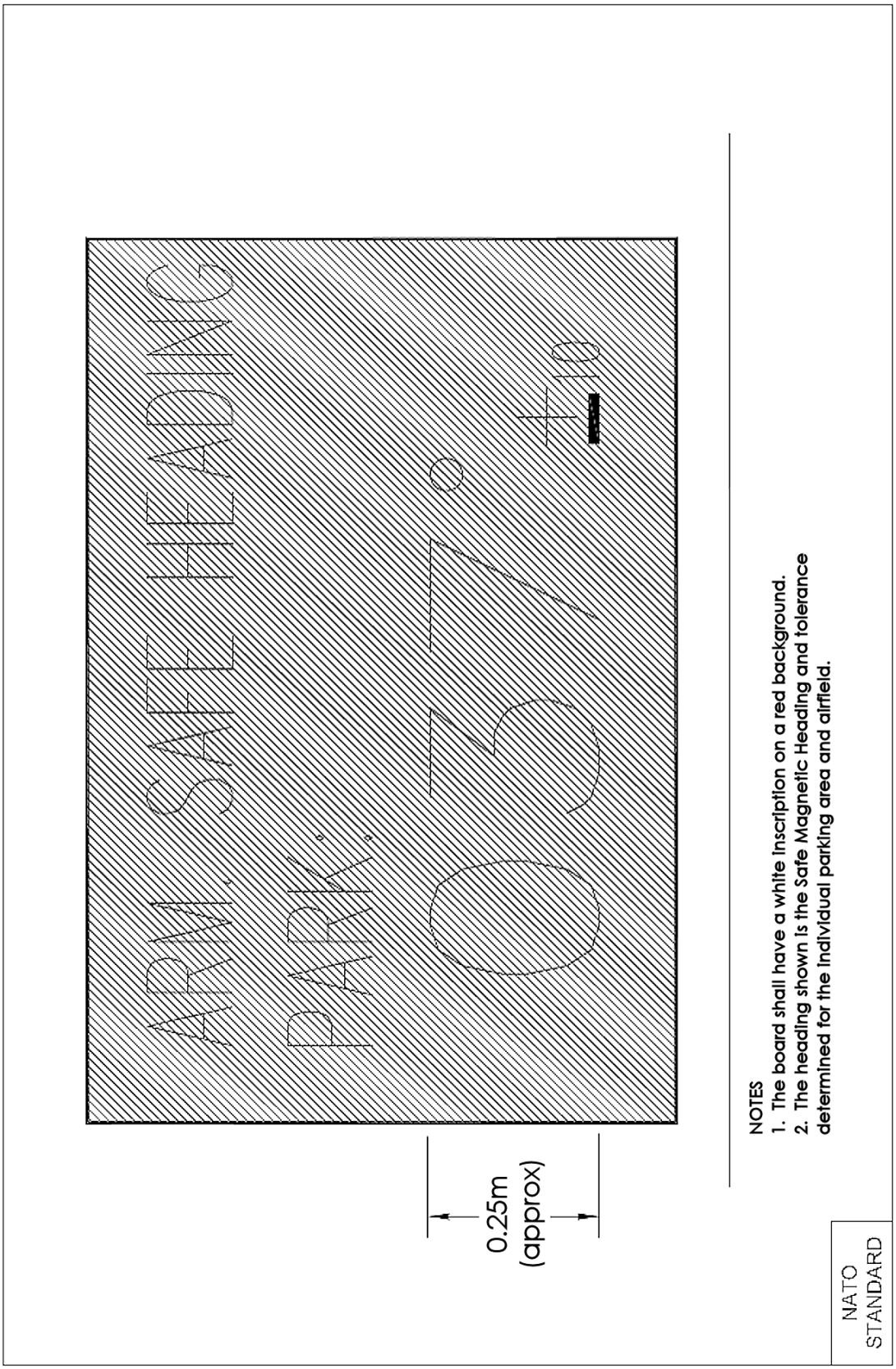
ANNEX J.
Armament Safe Marking Board



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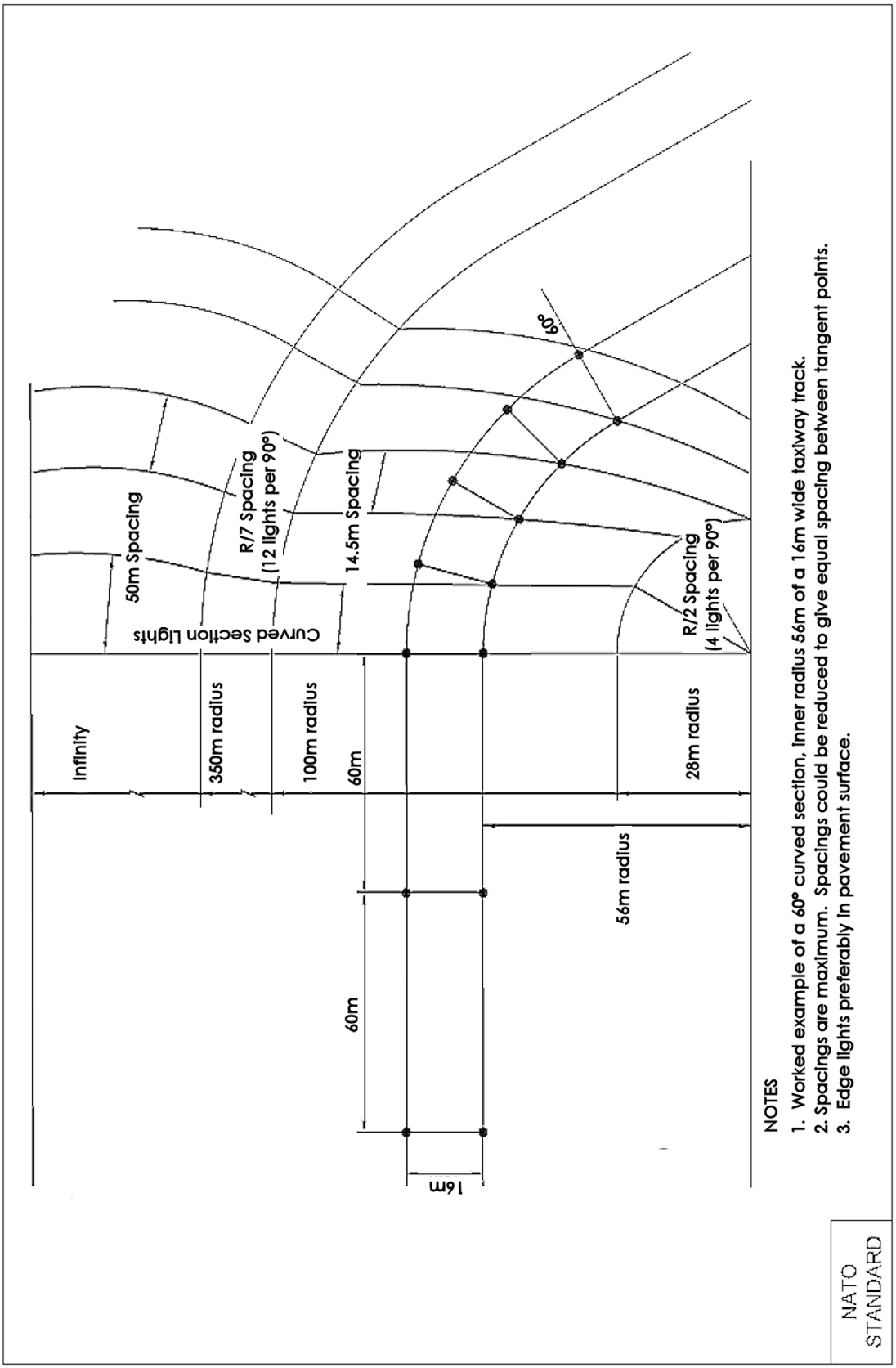
ANNEX K.
Typical Taxiway Edge Lighting Spacing



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