Policy Directive

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Medical Helipads - Guidelines

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Functional Sub group Corporate Administration - Asset Management

Summary States requirements for location, size and security of medical helipads.

Author Branch Asset and Contract Services

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Applies to Area Health Services/Chief Executive Governed Statutory Health Corporation, Board Governed Statutory Health Corporations, Affiliated Health Organisations - Non Declared, Divisions of General Practice, NSW Ambulance Service, Public Health Units

Distributed to Public Health System, Divisions of General Practice, Health Professional Associations and Related Organisations, NSW Ambulance Service, Public Health Units

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Director-General

This Policy Directive may be varied, withdrawn or replaced at any time. Compliance with this directive is **mandatory** for NSW Health and is a condition of subsidy for public health organisations.

NSW HEALTH DEPARTMENT

CIRCULAR

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GUIDELINES FOR MEDICAL HELIPADS

In 1993 the Department of Health implemented a policy circular (93/107) specifying the requirements of Guidelines for Medical Helipads.

Following concerns expressed by Helicopter pilots in NSW, the Guidelines detailed in Circular 93/107 have been updated to reflect the current requirements of helipads and the increase in helicopter sizes.

These Guidelines have been revised by the NSW Medical Retrieval Committee (MRC) and have received endorsement of the Civil Aviation Safety Authority. The recommendations of the Civil Aviation Safety Authority have been included in the new Guidelines.

The Civil Aviation Safety Authority has also advised that the new Medical Helipads Guidelines comply fully with the recommendation contained in the Civil Aviation Advisory Publications (CAAP) 92-2(i) Guidelines for the establishment and use of Helicopter Landing sites, dated January 1996.

IMPACT OF CHANGES

The impact of these new Guidelines has particular emphasis on the location and security of the helicopter, size of the landing and lift-off area of the helipad, safety distances, reduced noise and changes in lighting and helipad markings.

Location and Security

Whenever possible helipads are to be located on an elevated surface such as roof tops or high rise car parks. This provides better security for the aircraft, unrestricted approaches for landing and take-off and decreases the noise impact on nearby residences.

Safety Factors

The revised Guidelines emphasis better safety precautions by stipulating actual minimum safety distances people should be when the helicopter is taking off and landing. These distances should be sufficient to protect them from the effects of rotorwash or possible mishaps.

Increase in Size of the Helipad

The 1993 Guidelines erroneously indicated a minimum touch down level area of $9m_2$. The revised Guidelines corrects this error and provides for a Landing and Lift Off Area (LLA) with the dimensions of 9m X 9m ($81M_2$).

Landing and Take-off Area

Special mention is made to the Final Approach and Take-off Area (FATO) especially in situations where the hospital helipad is located in higher elevations (above 2,500' above sea level) or in areas of high

ambient temperatures(35 C and hotter)
Other minimal requirements in relation to Ground Effect Area (GEA) and the Landing Lift-off Area (LLA) have been revised.

Lighting

Additional lighting requirements have been included to better define the Landing and Lift -off and approach area. In general the edge of the FATO should be defined with omni directional YELLOW lights. Any flood lighting is to be positioned in such a way as to not cause glare to the pilots during manoeuvring. A BLUE high density strobe light is to be positioned on top of the wind indicator to assist the pilot to identify the helipad at night.

Planning Stages

Any decisions to include a helipad in new or existing hospitals are to be made in consultation with the Medical Retrieval Committee at the earliest stages of planning.

Development Application Approval

Where a landing site or major renovation to an existing landing site is proposed, a Development Application is to be lodged with the Local Council. That Council may also insist on an Environmental Impact Statement being prepared to accompany the Development Application.

Michael Reid
Director-General

GUIDELINES FOR MEDICAL HELIPADS

Guidelines for medical helipads have received endorsement from the Perinatal Emergency Transport Co-ordinating Committee to the NSW Perinatal Services Network and the Medical Retrieval Committee of the NSW Ambulance Service. The guidelines are intended for the use of those hospitals whose role warrants the provision of medical helipad facilities.

It is now considered essential that any new public hospital intended to provide critical care services have helicopter access; and that any major refurbishment of existing hospitals which offer critical care services should be preceded by a feasibility study on retrofitting a hospital landing area. While tertiary facilities (as referral centres) have the greatest need for helipads, any new secondary facilities which would be likely "exporters" of patients should also have helicopter access.

Decisions to include helipads in specific new hospitals or refurbishment projects are to be made in consultation with the Medical Retrieval Committee at the earliest stages of planning. Such consultations have now been successfully utilised by a number of hospitals in NSW to improve their facilities.

Medical helipads - two types defined

The Civil Aviation Safety Authority (CASA) now only provides guidelines for the establishment and use of helicopter landing sites and/or upgrading of helicopter landing sites throughout Australia. It is the responsibility of the pilot in command and the aircraft operating company to ensure that landing area is adequate for safe operations.

For all hospitals making use of medical helicopters, a medical helipad is required. This should preferably be a "hospital helipad", defined as *"a helicopter landing area within easy trolley access to and from the hospital's critical care areas"*. All tertiary hospital facilities should be equipped with a "hospital helipad".

At some locations, a "hospital helipad" may not be practical because, for instance, of existing construction or lack of space. In these cases, an "off site helipad" may be the only alternative. An "off-site helipad" is *'a helicopter landing area designated for medical helicopter use which requires the use of a vehicle to convey a patient between the landing area and hospital'*.

Hospital helipads - operational and clinical advantages to patients

Time saving:

Time saved by ready access between the hospital helipad and Emergency Unit, ICU or Paediatric Unit has been calculated to average 15-20 minutes over using a road ambulance between a nearby landing site and hospital.

Multiple handling:

Hospitals with helipads within trolley access generally are able to make a trolley available for the purpose. This minimises unnecessary handling. Every additional patient lift increases the risk of accidental disconnection or disruption of a vital monitor or line.

Patient tolerance:

Medical retrievals which involve multiple transfers between vehicles, increase movement and discomfort for patients, who may be particularly susceptible because of the severity or potential instability of their condition.

Travelling conditions:

Well planned hospital helipads are served by level or near-level smooth pathways leading from the helipad to the hospital building. Where a vehicle is used, the ambulance trolley will often traverse unprepared surfaces from the ambulance to the helicopter. Such surfaces are often uneven, boggy, poorly lit or sloping. Ambulance vehicles, even when very carefully driven over gutters or ridges in off-site locations such as sports ovals, can suffer gross movement of their stretchers. Deteriorations in patient condition have been observed in these situations.

Interruption of appropriate patient care:

The importance of maintaining appropriate clinical care and supervision throughout all phases of transport should be considered in hospital helipad planning. Having a helipad accessible by trolley not only saves time, it also reduces manpower requirements and avoids splitting the retrieval team where multiple patients are being transported.

Cost:

A well-planned hospital helipad can achieve long-term manpower savings which can be off-set against short-term development costs. A secure helipad (ie. an elevated helipad or one securely fenced) may require as little as one attendant to meet or despatch a helicopter -- the same person fulfilling the requirements for site security, fire guard, and porter.

Security:

On-site hospital helipads can be made more secure from the general public than can landing areas in a nearby park or sports ground. Control of the public for medical helicopter activities can often involve not only ambulance but police, council officers or local fire brigade. These are unnecessary for a well planned hospital helipad. Elevated or roof-top helipads are easily secured and have the added advantage of decreasing the noise impact of helicopter movements.

Definitions and other expressions

“Approach and departure path” means the track of a helicopter as it approaches or takes off and departs from the FATO of a HLS.

“Final approach and take off area” (FATO) in relation to a HLS, means an area over which the final phase of the approach to a hover or landing is completed and from which the take off manoeuvre is commenced.

“Final approach” means the reduction of height and airspeed to arrive over a predetermined point above the FATO of a HLS.

“Ground effect area” (GEA) in relation to a HLS, means an area that provides ground effect for a helicopter rotor system.

“Helicopter landing site” (HLS) means a place that may be used as an aerodrome for the purposes of landing or taking off of helicopters.

“Length” (L) in relation to a helicopter, means the total length of the helicopter, including its rotor(s) when they are turning.

“Landing and lift off area” (LLA) in relation to a HLS, means an area within the HLS on which helicopters land and lift off.

“Movement” means a landing or a lift off of a helicopter.

Roof-top or Elevated Helipads

Hospital helipads located on a rooftop or on an elevated structure eg., top level of a multi-storey carpark offer distinct advantages when compared with surface level sites:

- unobstructed approach/departure gradients are easier to achieve,
- elevated siting requires less ground in the vicinity of the HLS be quarantined from development in order to avoid future introduction of obstructions infringing the approach/departure flight paths,
- securing of an elevated site is more easily achieved with less personnel (a long term cost advantage),
- reduced noise impact at ground level as the approach/departure flight paths are raised by a height equal to the height of the elevated HLS.

Security considerations

Hospital helipads require (a) designated attendant(s) to meet or despatch a helicopter -- such attendant(s)

to be responsible for site security, ensuring non-participants are kept clear for their own safety, ensuring the site and the approach paths are free of obstacles, activating lights, standing “fireguard” (ie. ready to raise the alarm in the event of a mishap), and assisting with patient handling.

- the HLS must be kept clear of all:
  - persons, other than persons essential to the helicopter operation; and
  - objects and animals likely to be a hazard to manoeuvring the helicopter, other than objects essential to the helicopter operation; and
- no person outside the helicopter, other than a person essential to the operation is within 30 metres of the helicopter (45 metres of the centre of the HLS).

NOTE:

The 30 metre “buffer” from non-participants is an absolute minimum based upon design advice applicable to a cross-section of helicopters in use. Air Medical services tend to use larger, twin-engine helicopters which create much greater “rotor-wash” compared to smaller, single-engine utility helicopters.

In general, the “safety buffer” is considered to apply on the plane of the landing and lift-off area, ie. it is a horizontal buffer. The safety buffers’ primary purpose is protecting non-participants from fire or debris in the event of a landing mishap. A secondary purpose is protection of non-participants from the effects of rotorwash.

In some cases up, to 70 metres horizontal “buffer” may be required to ensure no injury or damage from rotorwash. Examples of strategies which may mitigate the effects of rotorwash include use of elevated helidecks, erection of physical barriers (subject to maintenance of the requisite obstacle-fee imaginary surfaces), or the delineation of areas which must be vacated during helicopter operations.

Hospital helipads - minimum requirements

General: Since a hospital HLS is intended to be used both day and night under prevailing wind conditions, it should satisfy the following guidelines:

- **The FATO**, at minimum, should have a circular area with a diameter of 37 metres, which is free of obstacles likely to interfere with the manoeuvring of the helicopter. High Density Altitude Operations - For hospital helipads located at higher elevations (above 2500' above sea level) or in areas of high ambient temperatures (35EC and hotter) consideration should be given to use of an elongated FATO to allow acceleration/deceleration in ground effect.

- **The GEA**, at minimum, should have a circular area with a diameter of 18.5 metres. Further, the GEA should be within the FATO with the overall slope not be exceed 7.5 degrees (1:8 vertical to horizontal).

- **The LLA**, should be a hardstand surface, with minimum dimensions of 9 metres X 9 metres, preferably concrete capable of bearing a minimum 14,600kg. Non concreted areas within 50m of touchdown area should be well grassed to avoid

dust. If the LLA is not within the FATO, an air taxying route 37 metres in width should be provided between the LLA and the FATO. If on a building, the entire GEA should also be capable of accepting the static and dynamic loads involved. Overall slope of the LLA, in any direction, should not exceed 5E.

C **The approach and departure path(s)** should extend outwards from the edge of the FATO as indicated Fig 1 and have an obstacle free gradient of 7.5 degrees (1:8 vertical to horizontal) measured from the edge of the FATO to a height of 500 feet above the LLA level. This path may be curved left or right to avoid obstacles or take advantage of a more advantageous approach or departure path. Two directions of approach/departure, preferably not less than 150 degrees apart are necessary to allow operations in different wind conditions. Where curved paths are proposed, specialist advice should be sought concerning the degree of curvature and the orientation of the final approach path. Environmental considerations are also a factor in selecting approach/departure

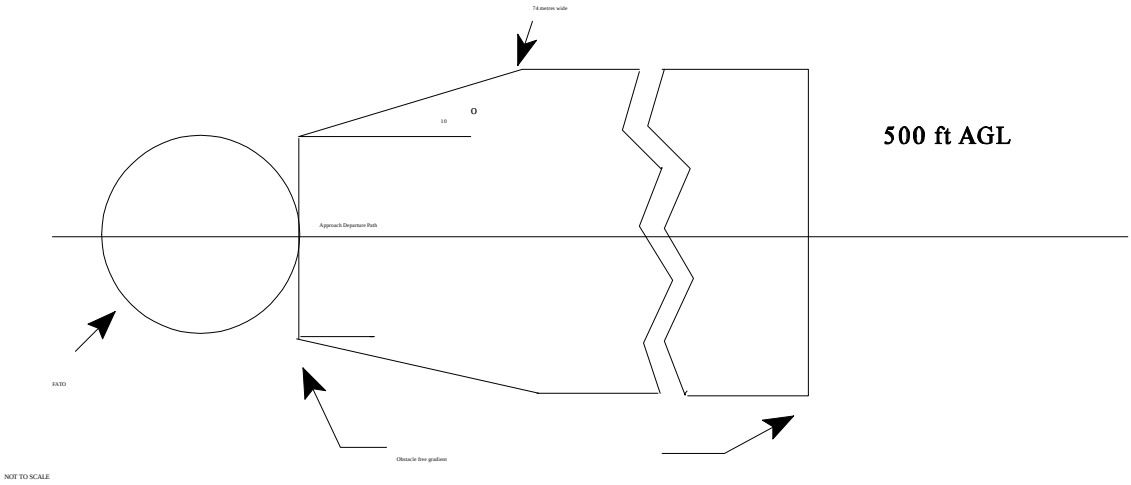

Figure 1

flight paths and this may require input from an acoustic consultant.

Night operations: For night operations, the following additional requirements apply:

C **Lighting** The edge of the FATO should be defined by omni directional Yellow lights which project no more than 25 centimetres above the level of the HLS and are spaced no more than eight metres apart. Where ground level lighting is not practicable, such as “off-site helipad”, then a combination of markings and floodlighting may be used.

Any floodlighting must be positioned so that it does not cause glare to pilots during manoeuvring. Purpose-built surface-floodlighting is available which provides surface texture without glare. Such fixtures must be positioned at the edge of the FATO so that they do not impinge the obstacle-free manoeuvring areas.

Alternative lighting solutions may involve electro-luminescent strips in lieu of perimeter lighting. Specialist advice should be sought in developing a lighting

solution suitable for a particular site.

- **Strobe** A blue high intensity strobe should be mounted on top of the wind indicator to assist the pilot to identify the HLS at night.

- **Wind velocity information** An accurate means of assessing the HLS wind direction and speed should be provided. This may be accomplished either by an illuminated wind director indicator (windsock) located in an unobstructed area visible to approaching/departing helicopter pilots (not to obstruct the approach departure paths), or by any other suitable means such as radio communication with a responsible person located on or in proximity to the HLS.

- **Approach guidance** When it is considered essential that an accurate approach path be achieved due to obstacles, the direction of approach should be indicated by at least two omni directional green lights, or by one white lead-in light positioned as indicated in Fig 2.

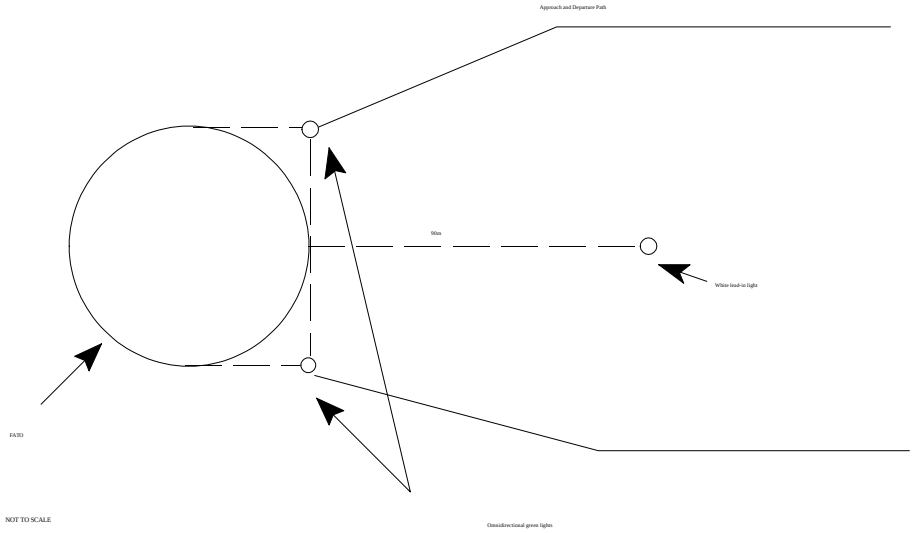

Figure 2

The use of two green lights should only apply where there is only one approach path or where the approach paths are, say, between 90E and 160E apart. In the ideal situation, 2 approach paths would be at or near 180E apart. Use of green approach lights would then mean that 4 green lights would be located at approx 90E spacing around the FATO. From the air, it would be impossible to tell from this configuration which 2 of 4 possible approach directions were the correct flight paths.

- Any **air taxying route**, as recommended for day operations, should, depending on the operational demands, be marked by either blue edge or green centre line lights spaced at 15 metre intervals, or be floodlit.

- **Obstruction lighting** may be necessary on the top of any obstacles which are close to the obstacle free plane of the approach and departure paths.

All lights except any air taxying route lights, should be visible from at least 5 km in clear conditions. Professional advice is required to ensure the adequacy of lighting requirements.

Building For a **hospital HLS** that is located on a building, the following additional guidelines are suggested:

- **Markings** The aiming point of the HLS should be the international hospital heliport logo ... ie. red cross on a white background. The size of this marking should be equal to that of the LLA and thereby indicate the undercarriage ground contact limit points on which the helicopter may be positioned without compromising clearance requirements. The clearance requirement is that the extremity of an operating helicopter is no closer than half a rotor diameter to a fixed obstacle.

- The **edge** of the FATO should be indicated by a 40 centimetre wide stripe painted on the HLS.

- A whole number (termed the **indicator number**) should be painted on the HLS with the helicopter's weight, expressed in Kg, calculated by multiplying the indicator number by 1000. The numbers should appear 1.5m high painted with 20cm wide strokes.

- **Drainage facilities** should be provided to prevent the collection, the spreading, or the falling of liquids onto other parts of the building.

  Note: Specialist design advice should be sought in respect of the design of elevated helidecks to facilitate drainage, the routing of drainage from helidecks and the use of fuel-water separators (if required). Proponents should also be aware of the availability of pre-fabricated helideck designs (eg. Triple-S Aluminium Helidecks) which incorporate passive fire-extinguishing capabilities.

- **Safety net** As a means of avoiding risk of death or injury to passengers, crew and other personnel, the outer edge of the HLS should be protected by a safety net, or similar device, that is at least 1.5 metres wide and does not project more than 25 centimetres above the HLS at its outer edge.

- **Access** The HLS should be sited with separate primary and emergency personnel access routes with both routes located as far apart as practicable. Safety rails/handrails, etc must not impinge the obstacle-free manoeuvring

planes.

- **Fire extinguishers** The HLS should be equipped with at least two carbon dioxide fire extinguishers each with a minimum capacity of 4.5kg; one extinguisher should be positioned at each of the primary and emergency personnel access routes.

- **A wind direction indicator** should be positioned on the HLS in an unobstructed area so that it is readily visible to helicopter pilots when approaching/departing the HLS.

Hospital helipads - other considerations

- **Planning requirements** Various legislative requirements relating to helicopter landing sites in NSW are complex and no single advice about hospital or medical helipads can be given. Proponents should note, however, that emergency service landing sites are excluded from the definition of 'designated development' in the Environmental Planning and Assessment Regulation (which otherwise includes most helicopter landing sites). Generally, hospital helipads are considered 'ancillary-uses' to hospital purposes and are thus not separate 'development'. The same cannot necessarily be said about off-site medical helipads. Helicopter landing sites are 'scheduled premises' under the Noise Control Act and thus may require a 'noise licence' and 'pollution control approval'. Specialist advice should be sought about the statutory requirements for any particular facility.

- The **planning and design** of a hospital helipad is a complex task and it is advisable to engage the services of a specialist consultant to ensure that the facility which results is safe after balancing the many requirements which are often conflicting.

- **Pathway to touchdown area**

Construction:	concrete or asphalt
Minimum width:	1.2m
Minimum slope:	1:10
Maximum camber:	nil

No steps

- **Single control point for lighting** (flood, strobe, wind indicator and edge lighting). Area flood-lighting to assist with patient loading/unloading should be on a separate switch. The desirability of flood-lighting is very subjective -- some pilots definitely want it on and others definitely want if off during take off and landing. This subjectivity cannot be accommodated if it is on the same switch as the other lights.

- Designated **flight paths** to and from the helipad should be developed in consultation with the medical helicopter operator(s) using the facility.

- A **noise abatement** procedure should be developed for the helipad.

- A **weather-proof sign** should be displayed so that it can be read by the pilot of a helicopter parked on the touchdown area. Details of the approach and departure paths (using bearings or geographical landmark references) and the noise abatement procedure should be given.

- **Turbulence** Helicopter landing sites should preferably be sited in areas free of turbulence. Turbulence can affect both ground level and elevated helipads.

  Surface level helipads sited immediately adjacent to large structures are susceptible to lee-side turbulence. Rooftop helidecks may be subject to "cliff-edge" turbulence. Expert advice on the effects of turbulence and how best to mitigate it should be sought in either case.

  Furthermore, elevated helidecks and their associated approach paths should be sited well clear of any air outlets or intake vents. Also, any flues venting hot gases should not be overflown at low level by helicopters on approach or departure.

- **GPS** The recent development of satellite-based navigation systems and of instrument flight capability which is not dependant upon ground-based radio-navigation aids has the potential to greatly reduce the impact of adverse weather on air medical operations. Siting of any hospital HLS should be done in consideration of the use of such instrument approach systems in future. This requires consideration of the approach/departure path obstacles and their impact on future instrument approach minimum altitudes and also the reservation of space to install instrument approach lighting arrays which may be required for precision instrument approach procedures.

Hospital helipads - preferred additional features

Pathway Covered from hospital to within 20m of helipad and lit with edge lighting.

Perimeter fencing 1 metre high fencing (child-safe) at least 8 metres out from edge of FATO if the ground is level to avoid infringing the obstacle free gradient of the approach and departure paths. The fence may be positioned closer to the edge of the FATO if the ground rises toward the GEA so that the fence is not infringing the approach/departure paths. It should be noted that this fencing is an aid to security of the helicopter when not operating, and does not define the public exclusion zone around the operating helicopter (see "Security Requirements").

Noise abatement Windows of occupied hospital buildings within 50m to be double glazed.

Pathway Pathway to tochdown area should have gradients as shallow as possible.

Access Any lifts between helipad and hospital entrance to be fitted with key control.

Lighting One floodlight to provide area lighting for the loading/unloading of the patient and which is switched on only after the helicopter has landed to avoid blinding the pilot during manoeuvering.

Access
- 24 hour availability.
- Shortest practical route to hospital.
- Not dependent on using a vehicle.
- Pathway should extend from touchdown area to hospital entrance.

MRI (magnetic resonance imaging) Particular care needs to be given to siting Hospital Helipads at facilities where MRI is installed as the strong magnetic fields (which exist whether the MRI is in use or not) may affect helicopter navigation systems. Specialist advice should be sought in these circumstances.

Re-fuelling facilities Hospital helipads intended to be used as a base of operations will require hangarage, re-fuelling and crew accommodation. The particular requirements of the air medical service provider must be carefully ascertained prior to commencing the design process. To minimise double-movements, it is desirable to locate the re-fuelling and hangar facilities immediately adjacent to the helipad which is used to pick-up or discharge patients. However, space must be available for parking which leaves the main helipad open for use by other, itinerant air medical helicopters.

Hospital HLS in country areas should have provision for the secure storage of fuel in drum stock near the HLS, unless arrangements can be made for mobile re-fuelling at the HLS by other means. Dangerous Goods Legislation governs the storage of more than 1000 litres of fuel at any site.

Off-site helipads - requirements

The closest site as determined by medical helicopter operators to meet operational, aviation safety, access and medical requirements, in consultation with local authorities. This may be a nearby sports ground, park, golf course, open area or airport.

Off-site helipads - other matters of consideration

Ground surface	-	should be flat, grassed and well drained
Security & safety	-	may require police attendance
Transport	-	will require ambulance vehicle transport
Lighting	-	may require portable lighting

Vehicle access - preferably a smooth surface, minimum slope

In the case of sporting areas, potential for disruption of sporting events. Wherever possible, upgrading to a “hospital helipad” should be the goal.

Helipad Lighting Equipment

Airport Lighting Specialists
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