

Southampton City Planning & Sustainability  
 Planning and Rights of Way Panel meeting 31 August 2010  
 Planning Application Report of the Planning and Development Manager

<b>Application address:</b> Southampton General Hospital, Tremona Road (Coxford Ward).			
<b>Proposed development:</b> Construction of a Helicopter Landing Pad on the upper deck of the multi-storey car park and reconfiguration of car parking spaces.			
Application number	10/00881/FUL	Application type	Full
Case officer	Andy Amery	Public speaking time	5 minutes

<b>Applicant:</b> Mr Gary Spring Southampton University Hospitals NHS Trust	<b>Agent:</b> Mr Mark Burman
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<b>Recommendation Summary</b>	<b>Conditionally Approve</b>
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**Reason for Granting Permission**

The development is acceptable taking into account the policies and proposals of the Development Plan as set out below. The provision of a facility for the air ambulance and other similar airborne emergency vehicles within the allocated campus of Southampton General and Princess Anne Hospitals is fully in accordance with Policy CS10 of the Core Strategy and Policy HC1 of the City of Southampton Local Plan Review which promotes and safeguards the Hospital site for the development of Healthcare and support facilities. Other material considerations such as noise disturbance, air quality and impact on ecology do not have sufficient weight to justify a refusal of the application. Issues of public safety with regard to aircraft flights are a matter of regulatory control outside the planning system. The loss net loss of 8 parking spaces from the car-park is compensated for by other planned development on the site. In accordance with Section 38 (6) of the Planning & Compulsory Purchase Act 2004 Planning Permission should therefore be granted.

“Saved” Policies – SDP1, SDP5, SDP7, SDP9, SDP10, SDP12, SDP15, SDP16 and HC1 of the City of Southampton Local Plan Review - Adopted March 2006 as supported by the adopted LDF Core Strategy (2010) policies CS10, CS13 and CS22, and the Council’s current adopted Supplementary Planning Guidance. National Planning Guidance contained within PPS1 (Delivering Sustainable Development), PPG13 (Transport) and PPG24 (Planning & Noise) are also relevant to the determination of this planning application.

<b>Appendix attached</b>			
1	Development Plan Policies	2	Technical Report

**Recommendation in Full**

Conditionally Approve

## **1. The site and its context**

1.1 The General Hospital is located 4km to the north west of the City centre in the Coxford area of the city. The Southampton University Hospitals Trust, who own and operate the site, provides health care facilities to over half a million people on an annual basis and employ 7,500 members of staff. It is a site of regional and national importance for healthcare, research and teaching.

1.2 The site is tightly constrained being surrounded by residential roads on all sides. The limited site area combined with the continual need to provide new and improved healthcare facilities served by appropriate transport options means that development proposals have to be carefully managed. The Trust has therefore developed a Vision document and an Estates Strategy to guide new development up to 2020.

## **2. Proposal**

2.1 The proposal seeks to provide an on-site landing facility for the air ambulance to ensure delays in transferring patients to the emergency department are minimised. The current arrangements are for the air ambulance to land at playing fields approximately 2km to the north west of the Hospital site and transfer to ambulance. The facility would also be available for other airborne emergency vehicles such as the Coastguard air-sea rescue helicopter.

2.2 The landing facility would be located on the top deck of the multi-storey car-park in the north west corner of the Hospital Campus close to the section of Tremona Road which runs alongside the cemetery.

2.3 It is a temporary deck to be provided as an interim measure until such time as a permanent facility can be provided as an integral part of the long term development proposals for the East Wing Annexe as has been previously reported to Panel when considering the application for the new Children's Hospital.

2.4 The landing deck measures 28m by 28m and stands 2.99m above the upper deck of the car park. The raised nature of the deck allows sufficient clearance for cars to continue to park beneath the landing deck, however, the structural supports will result in the net loss of 8 car parking spaces from this car park (361 existing to 353 proposed).

2.5 The deck will be linked to a new ramp which will connect the landing area to the internal road system close to the entrance to the Accident and Emergency department. The route of the ramp over sails an existing landscaping strip, some of which, including a Silver Birch tree will need to be removed.

2.6 Security controls are integral to the design to prevent unauthorised access to the landing area.

2.7 Whilst the majority of flights are intended to take place during daylight

hours there will be potential use in the evening and overnight. In such circumstances lighting will be required for safety purposes.

2.8 The technical report relating to the design and operation of the heli-pad is attached as **Annexe 2** to this report. The Trust has made arrangements for an appropriately qualified advisor to attend Panel and answer any technical questions relating to the proposals.

### **3.0 Relevant Planning Policy**

3.1 The Development Plan for Southampton currently comprises the “saved” policies of the City of Southampton Local Plan Review (March 2006) and the City of Southampton Core Strategy (January 2010). The most relevant policies to these proposals are set out at **Appendix 1**.

### **4.0 Relevant Planning History**

None

### **5.0 Consultation Responses and Notification Representations**

5.1 Following the receipt of the planning application a publicity exercise in line with department procedures was undertaken which included notifying **362** adjoining and nearby landowners, placing a press advertisement and erecting of site notices.

5.2 At the time of writing the report **6** representations have been received from surrounding residents objecting to the scheme and **2** representations have been received from Hampshire County Council’s and Isle of Wight Council’s Health Overview and Scrutiny Committees strongly supporting the proposals.

### **5.3 Objections**

**Noise Disturbance:** The use of the heli-pad will introduce an additional noise source that will be audible by local residents. The technical report includes an assessment of the noise impact (paragraphs 6.1 and 6.2) and refers to guidance in PPG24 in particular paragraphs 15, 16, 17 and 18. This document identifies the difficulty of categorising noise from such facilities due to the intermittent nature of the operation. Given the anticipated number of flights, which equates to less than one during any 24hour period it is not considered the proposals represent a significant or continual noise source that would cause harm to the amenities of surrounding occupiers. Whilst a condition limiting the number of flights would be difficult to enforce a restriction limiting the use of the heli-pad to the air ambulance and other emergency helicopters in case of emergency would limit the level of activity to those directly associated with emergency situations.

**Odour and Air Quality:** The proposals and use of the site by the air ambulance and similar emergency vehicles are not considered likely to have an impact on air quality or generate significant odour problems. The Helicopter Advisor will be able to respond to any technical questions on this issue.

**Downdrafts from Rotor Blades and Potential Damage to Houses:** The technical report at section 6.3 deals with this issue in some detail. The report highlights some impact in the immediate vicinity of the helipad in terms of the structural design of buildings. However, it is clearly set out within the report that 'provided light cladding and loose objects are not permitted within 30m of the edges of the helipad, no structural damage should be caused by helicopter downwash'. The nearest residential properties are double this distance. The area affected by downwash will therefore be limited to areas within the site and a short length of Tremona Road on the bend in the road opposite the entrance to the cemetery.

**Loss of Car-parking:** 8 parking spaces would be lost as a result of providing the heli-pad structure on the top deck of the car park.

The hospital continues to work closely with the Council to ensure the development of an effective transport strategy. The management of on-site parking including the continual review of parking demands at the site alongside the promotion of cycle facilities, car sharing, use of public transport and park and ride facilities are paramount to the effective operation of the site.

In the immediate future the Hospital Trust have a current planning application due for decision in October 2010 to provide an additional 114 parking spaces within the site (10/00921/FUL).

Discussions on other transport initiatives take place on a monthly basis.

The loss of the 8 spaces as a result of this application will be fully addressed through the management of the transport strategy and in itself will not be likely to result in additional congestion or street-parking in the vicinity of the Hospital.

**Loss of Property Value:** This is not a planning issue nor is there any evidence supplied to indicate that the provision of an air ambulance facility within an existing Hospital Campus would have an affect on property value.

### **Impact on Wildlife and Domestic Animals**

The infrequent flights in and out of the Hospital site by Helicopters are unlikely to have any significant impact on habitats or wildlife. The Council's ecologist has verbally indicated that there are no objections to the proposals on these grounds.

**SCC Highways** - No objections to the loss of 8 spaces from the car park. Transport and Parking issues at the site are subject to an ongoing review of the Hospital's Transport Strategy. The loss of the 8 spaces will not unduly add to parking problems on the site or in the surrounding area particularly given current proposals to provide additional on-site parking (application 10/00881/FUL).

**BAA** – The proposals do not conflict with aerodrome safeguarding criteria and no objections are raised subject to the imposition of a condition relating to the use of Cranes.

At the time of writing comments are still awaited from the council's Noise and Pollution officer.

## **6.0 Planning Consideration Key Issues**

6.1 The key issues for consideration in the determination of this planning application are:

- i. The principle of development;
- ii. Impact due to noise disturbance.
- iii. Safety;
- iv. Highways and Parking;

### **6.2 Principle of Development**

6.2.1 The application seeks to provide the facility with the intention of saving lives by reducing the time patients are transported to hospital. The provision of an on-site facility for the air ambulance and other emergency aircraft will reduce time delays currently experienced in transporting emergency cases to the Accident and Emergency department

6.2.2 Such a facility is in compliance with the requirements of saved policy HC1 of the City of Southampton Local Plan and Policy CS 10 of the Core Strategy.

### **6.3 Residential Amenity due to noise disturbance**

6.3.1 PPG24 identifies aircraft flights as noise generating uses. Policy SDP 16 is also relevant and seeks to prevent development where excessive noise would be introduced into noise sensitive locations such as a residential area. In this instance, the predicted number of flights, based on current use of the air ambulance and other emergency aircraft, are on average less than one per day over a full year. It is not considered that this level of activity will cause significant disturbance.

### **6.4 Public Safety**

6.4.1 The technical report identifies that aircraft operations must fully comply with strict regulations to ensure any danger to public safety is minimised.

### **6.5 Highways and Parking**

6.5.1 The loss of 8 parking spaces will have little impact on the operations of the hospital or on-road parking in the vicinity of the site. The continuing development and delivery of a comprehensive transport strategy as part of the 2020 masterplan will ensure that the transport needs of the hospital respond to the healthcare demands of the site.

## **7.0 Summary**

7.1 This application will provide an on-site facility which will improve patient care at the hospital by minimising the current delays in getting patients to hospital in emergency situations. Whilst there will be an impact on the amenity of surrounding occupiers, in particular by way of noise, the limited use of the facility will ensure that this is not continual disturbance to the level which would be considered to cause harm.

## **8.0 Conclusion**

8.1 Planning permission should be granted for the facility subject to conditions relating to lighting, landscaping and restricting the use of the facility to the air ambulance and other similar aircraft movements directly related to patient care.

### **Local Government (Access to Information) Act 1985**

#### **Documents used in the preparation of this report Background Papers**

1(a), 1(b), 1(c), 2(c), 2(d), 2(e), 4(s), 6(a), 6(c), 6(d), 6(h), 6(g), 6(k), 7(a), 7(m), 7(v), 8(a), 9(a), 9(b) and PPS3 (2010)

### **AA for 31.08.10 PROW Panel**

#### **CONDITIONS for 10/00881/FUL**

##### **01. APPROVAL CONDITION – Full Permission Timing Condition – Physical Works**

The development works hereby permitted shall begin not later than three years from the date on which this planning permission was granted.

Reason:

To comply with Section 91 of the Town and Country Planning Act 1990 (as amended).

##### **02. APPROVAL CONDITION – Restriction on Aircraft flights – Performance Condition**

The heli-pad shall only be used by the air ambulance and other emergency aircraft associated with the transfer of patients and emergency healthcare provision at the Hospital site.

Reason:

To ensure the use of the facility is limited to purposes directly related to the emergency care of patients in order to minimise disturbance of local residents.

##### **03. APPROVAL CONDITION – Restriction on lighting – Performance Condition**

Unless otherwise agreed in writing the lighting of the helipad shall comprise 38 Omni directional 15 watt green lights flush fitted to the landing deck and 12 neon 50 watt floodlights set at deck level and directed to throw light across the deck. The lighting shall only be turned on when during the period a landing is imminent and only remain on until the helicopter leaves having discharged the patient.

Reason:

In the interests of the amenities of adjacent occupiers

#### 04. APPROVAL CONDITION – Landscaping – Performance Condition

Additional landscaping shall be provided on the site in accordance with the Southampton University Hospitals Trust Landscape Strategy within the first planting season following completion of the development.

Reason:

To compensate for the loss of part of the landscaping strip in the interests of the visual amenities of the site.

#### Notes to Applicant

Your attention is drawn to the performance conditions above which relate to the development approved in perpetuity. Such conditions are designed to run for the whole life of the development and are therefore not suitable to be sought for discharge. If you are in any doubt please contact the Council's Development Control Service.

Given the nature of the proposed development it is possible that a crane may be required during its construction. The applicant's attention is therefore drawn to the requirement within British Standard Code of Practice for the safe use of cranes, and for crane operators to consult the aerodrome before erecting a crane in close proximity to an aerodrome. This is explained further in Advice Note 4 'Cranes and other construction issues' available at [www.caa.co.uk/srg/aerodrome](http://www.caa.co.uk/srg/aerodrome)

**POLICY CONTEXT**

Core Strategy - (January 2010)

City of Southampton Local Plan Review – (March 2006)

SDP1	Quality of Development
SDP5	Parking
SDP7	Urban Design Context
SDP9	Scale, Massing & Appearance
SDP10	Safety & Security
SDP11	Accessibility & Movement
SDP12	Landscape & Biodiversity
SDP15	Air Quality
SDP16	Noise

**Other Relevant Guidance**

PPS1	Delivering Sustainable Development (2004)
PPG13	Transport (2001)
PPG24	Planning & Noise (2004)



Technical Report

**SOUTHAMPTON GENERAL HOSPITAL**

**North East Car Park 'Raised' Level Helipad Report**

Report prepared for Southampton University Hospital NHS Trust by: Peter Rover, Helicopter  
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June 2010 Southampton University Hospital NHS Trust Project Southampton General Hospital  
North East Car Park Helipad Feasibility Report June 2010

## 1 Introduction

- 1.1 SUHT commissioned this report to update and supersede two previous reports (October 2008 and June 2009) on the provision of a helipad to be located now on the upper level of the North East car park.
- 1.2 At present, helicopters do not have direct access to the hospital but use Council playing fields at Lord's Hill about 2nm north west of the hospital (OS Grid Reference SU 380 158). This necessitates intermediate transfer by road ambulance which is far from ideal, especially for critically ill patients.
- 1.3 This report examines the requirements for a surface level or raised helipad, compliant with international and national Civil Aviation Regulations to be located over the top level of the North East car park, aiming to facilitate expeditious transfer of patients arriving by helicopter to the ITU.
- 1.4 The design requirements of the helipad itself and associated clear areas and suitable obstacle environment in compliance with best international practice are detailed in: -
- a. International Civil Aviation Organisation (ICAO) publications, 'Annex 14' -Aerodromes, Volume II – Heliports (3<sup>rd</sup> Edition) and;
  - b. The ICAO Heliport Manual - Doc 9261-AN/903, as amended.
- These are used as definitive reference material. These publications from herein after in this report will simply be referred to generically as 'Annex 14'. The guidance in HBN 15-03 has also been taken into consideration in this report. A full list of reference documents containing relevant legislation and regulations is included at Appendix D.
- 1.5 Civil Helicopter Operators intending to make use of the hospital helipad must be Air Operator Certificate (AOC) holders authorised for commercial air transport (CAT) operations. They are regulated by the UK Civil Aviation Authority (CAA) and must comply with operating and performance regulations as detailed in European Aviation Safety Agency (EASA) directives and European Union/ Joint Aviation Regulations (EU/JAR-OPS 3).
- 1.6 The Ministry of Defence (MOD) is responsible for the operation of military helicopters. It should be noted that a helipad, designed to comply with civil CAT requirements will also be suitable for military purposes.
- 1.7 It should be noted that from 2012 it is intended that UK military Search and Rescue (SAR) and civil Marine Coastguard Agency (MCA) helicopter operations will be undertaken jointly. The helicopter type used will be the Sikorsky S92 and the helicopters will be operated under civil regulations, regulated by the UK CAA. They will be crewed by both military and civil pilots holding full civil commercial pilots' licences.
- 1.8 The CAA does not licence hospital helipads as 'aerodromes' but effectively regulates their use through the civil helicopter operators who each require permission from the CAA to use such facilities when they are situated in 'congested' areas of cities, towns or settlements - as this hospital is.

## 2 Minimum Specified Site Requirements

- 2.1 The hospital is situated in an urban, "congested area". In UK aviation law terms a "congested" area in relation to a city, town or settlement, means any area that is substantially used for residential, industrial, commercial or recreational purposes. Because the hospital lies in such an area operators of civil helicopters, planning to land at, or close to the hospital, require permission from the CAA under Rule 5(2) (c) of the Rules of the Air Regulations. The CAA, ever conscious,

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- in the public interest of flight safety, prohibits use of such sites by single engined helicopters, unless there are adequate clear areas where a safe forced landing in the event of failure of the engine could be executed without endangering persons or property on the surface. This is not the case at the Southampton General Hospital; there are no open spaces at surface level anywhere within the hospital site that would be suitable for a helicopter to 'force land' other than on the intended helipad surface itself.
- 2.2 The CAA applies the site criteria specifications contained in 'Annex 14' and EU/JAR-OPS 3 when considering whether such permissions should be granted to helicopter operators, and then only for multi-engined machines with the required level of 'one engine inoperative' (OEI) performance. Certain civil operators who have been approved by the CAA to grant their own Rule 5 Permissions, including the Sussex and Hampshire Police Air Support Unit, Confederation of Helicopter Air Ambulances (CHAS) and Marine Coastguard Agency (MCA), must apply these same criteria and include all appropriate information in a Company Site Directory for any "congested" area site they intend to use. A copy of this Site Directory is lodged with the CAA for reference. If 'Annex 14' criteria cannot be met, or if the operator cannot assure adequate compensating helicopter performance, they will be unable to plan on using the proposed site.
- 2.3 The overriding consideration is that, in the event of an engine failure, a helicopter shall not endanger persons or property on the surface, or the occupants of the helicopter. Hospital sites designed and intended for regular use must be fully compliant with 'Annex 14' standards and recommended practices (SARPS) and enjoy no exemptions or easements because of their 'emergency' or 'life saving' purpose.**
- 2.4 The hospital management itself (NHS Trust) has a general duty of care to ensure that persons and property on the estate are not exposed to avoidable, unreasonable hazard. There is no requirement for the Trust to licence the heliport with the CAA. Helicopter operators, having satisfied themselves that the site is suitable for purpose, do however require the permission of the Trust, as the legal site keepers, to land and take off on hospital property.
- 2.5 By day, the responsibility for safe flying operations remains wholly with helicopter operators. Once the aircraft has landed on the helipad itself however, the responsibility for general safety is split between the helicopter operator and the 'site keeper'.
- 2.6 By night, national aviation law (Air Navigation Order) places a duty on "the person in charge of a site intended for the landing and taking off of helicopters to provide adequate lighting to ensure proper identification of the site and wind direction, and to enable the pilot to make a safe approach and landing and a safe takeoff and departure". By day and night the Trust must manage arrangements to ensure that the helicopter, whilst positioned on the helipad and the activities associated with it whilst it is on the helipad, cause no extraordinary danger to persons or property within the hospital grounds. If night operations are intended, helipad lighting and an illuminated windsleeve shall be provided using 'Annex 14' specifications and significant obstacles within the hospital grounds at, or above, the level of the helipad should be lit with low intensity, steady red obstruction lights.
- 2.7 Helicopter operations at this hospital will be predominantly undertaken by day; there will however be occasions when air ambulance, HEMS or SAR missions started during day light may extend into dusk or night time and so helipad lighting should be provided as part of the basic design to ensure operations can be safely completed after dark or in poor visibility conditions by day as well.
- 2.8 In general terms 'Annex 14' minimum required helipad dimensions are based on the Helicopter Type Manufacturer's certificated minimum size as described in the Helicopter Flight Manual (HFM). In cases where this may not have been detailed, 'Annex 14' prescribes a minimum effective size of 2 times the overall length (D) of the largest 'design' helicopter type for which use of the facility is intended.

2.9 Any shape may be used for the helipad provided that shape contains the minimum dimensions of length and width prescribed either in the HFM or 'Annex14'. In UK presently, all air ambulance, HEMS and police helicopter types are in the '3 tonne' class, all of which are authorised by their

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HFM's to use a helipad measuring 25m x 25m or less in some cases. MCA, SAR and military types range from 6.4 -14.5 tonnes (EH101) in weight and are larger than the current air ambulance and police helicopters so that a 28m x 28m minimum size is recommended which will cater for all types likely to use the facility during its life time. This larger area will also ensure there is always plenty of additional space around the helicopter for medical teams, equipment etc. to move or be moved without hazard from moving rotors.

2.10 The overall slope in any direction on the helipad should not exceed 3% and no part of it should have a slope exceeding 5%. The surface should be resistant to rotor downwash, free from irregularities and have a bearing strength sufficient to accommodate a rejected take off by helicopters intending to use it. It is recommended that the surface be slightly profiled to ensure fluids drain from the centre to at least two extremities of the helipad to avoid 'pooling' of fluids under the helicopter.

2.11 Tie down fittings should be provided in the helipad surface in accordance with CAP 437 – Guidance for the Operation of Helicopters Offshore - recommendations in case a helicopter is required to remain stationary on the helipad for any reason, such as technical unserviceability for example.

**Note – all CAA publications may be accessed from [www.caa.co.uk](http://www.caa.co.uk) (publications) free of charge.**

2.12 In addition to allowing for the design of the helipad itself, it is necessary to protect airspace around the helipad in accordance with 'Annex 14' and EU/JAR-OPS 3 and to keep areas free from obstacles so as to permit intended helicopter operations at the hospital to be conducted safely and to prevent the helipad from becoming unusable by the growth of obstacles around them. Ideally, helicopters should be able to approach to, or depart from the helipad in any direction taking full benefit from the wind direction at the time and without being impeded by obstacles. Civil helicopters are required by law (and for general safety considerations) to be able, in the event of failure of one of the engines, to either land on the surface available without hazard to persons or property or the occupants of the helicopter, or to continue to fly away safely from the site, using maximum regulated power on the remaining engine(s) whilst avoiding all obstacles under, and close to, the flight path by a vertical margin of not less than 35 feet (10.7m).

2.13 Although helicopters are capable of hovering, and of climbing and descending vertically with all engines operating normally, possible failure of one of the engines at any stage of flight must be taken into account. The variables of aircraft weight, altitude and temperature (WAT) must be considered by the operator and the helicopter weight reduced if necessary so that the helicopter is always capable of being landed safely within the helipad and obstacle dimensions available or, alternatively, is able to be flown away from the site using not more than maximum permitted power on the remaining engine(s) in the event of failure of one of the engines.

2.14 A helicopter's performance at a clear area surface level site is best maximised for takeoff by accelerating from a low hover, remaining close to the surface until it achieves its safe single engine climb speed (about 30 to 40Kt.) This is known as a "clear area" take off profile. It is similar to the way an aeroplane must use a runway to accelerate to safe flying speed before taking off. If an engine were to fail during the acceleration phase the take off can be aborted and a safe forced landing in the obstacle free area achieved. The amount of clear area required for a clear area take-off for typical air ambulance types of helicopter is in the order of 250 to 300 metres. At the Southampton General Hospital there is insufficient clear ground anywhere on the site to permit this type of take off.

2.15 The alternative authorised and more practical take off procedure for restricted area sites is known as a "helipad" or "vertical" profile. Using this profile, the pilot calculates his helicopter's maximum

permissible all up weight based on the WAT conditions. The pilot lifts the helicopter to the hover and climbs slowly either vertically, or up and rearwards until reaching a pre determined height known as the take off decision point (TDP) at which, if all is well, the transition into forward flight is initiated. Should an engine fail while the helicopter is climbing initially to TDP the pilot is able to

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land the helicopter back on the helipad area itself (hence the need for quite large dimensions, structural integrity and good visual cues). If an engine should fail after initiation of the transition into forward flight from TDP, the pilot is able to swap height for speed if necessary and continue to fly the helicopter away safely whilst avoiding all obstacles under and close to the flight path by a margin of not less than 35 feet. The 'Annex 14' specification is to provide obstacle limitation surface areas (OLS) in at least two flight path directions, separated by not less than 150 degrees. This will be possible by locating the helipad as a superstructure over the top level of the North East car park at the hospital. The helipad surface will be less than 3m above the car park surface to ensure it remains defined as a surface level helipad.

- 2.16 Use of "helipad" take-off and landing profiles to and from this helipad by multi-engine helicopters is the only feasible choice for safe surface level operations at the Southampton General Hospital. Although the necessary use of this type of profile may result in some loss of "payload" for some helicopter operators in 'hot, high' weather conditions, it should not result in any inability to undertake typical hospital missions. Similar constraints apply at many other hospitals without compromise to the mission capability.
- 2.17 Whilst use of the "vertical" or "helipad" profile minimises the amount of surface area affected, it is nevertheless necessary to protect obstacle limitation surfaces (OLS), in particular the take off and climb surfaces (TOCS) and approach surfaces (AS) to ensure safe obstacle clearance in the direction of operations. Ideally, a helicopter should be able to approach or depart in any direction unimpeded by obstacles, but this is often not possible. 'Annex 14' specifies that at least two such approach and departure areas be available, with flight paths separated by not less than 150\_ (to allow for the possible 'go around' in the event that the helicopter's attempted landing is baulked.). The diagrams on the next page illustrate the "helipad" profile described above and the dimensions of the TOCS/AS areas and protected gradients required, for a surface level 'helipad profile' or elevated site.



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**Figure 1 \_ Helipad takeoff and Landing Profile (Single engine failure after TDP case)** 35 feet  
Approx 310 metres Helipad profile

TOCS/AS obstacle accountable distance

**Figure 2 \_ Obstacle Limitation Surface Areas (OLS)** Side elevation TOCS = 8% gradient AS = 8% gradient Approx 310m

Width  
**Plan view** RD = Main Rotor Diameter 28m 10 x RD (night) 15% divergence (night) 10% divergence (day)  
7 x RD (day)

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- 2.18 On surface level sites the risk analysis for the expected low number of movements at infrequent intervals shows that the likelihood of an incident or accident occurring during flight operations is extremely remote. For this reason, provided the local fire brigade and/or hospital based services are able to access the site and apply fire fighting media to the surface of the helipad, it will only be necessary for the Trust to include the helipad in their own domestic fire fighting plan. The local fire brigade will only need to attend after an incident or accident and will not require to be in attendance for each landing or take-off. The road to the car park entrance on the north side provides ready access to externally based emergency services which must be able to position a fire fighting vehicle or vehicles where it will be possible to apply a suitable foam/water fire suppressant to any and all parts of the helipad.
- 2.19 Military helicopters are subject to fewer operating constraints than civil operators; they are 'mission' driven. A helipad 28 m or more in diameter and structurally capable of taking the dynamic load of the helicopter type, provided the surrounding obstacle environment is reasonable, will be acceptable for all military helicopters. The largest military helicopters such as the Chinook (CH47) and Merlin (EH101) would be able to land on the helipad but the 'downwash' effect associated with these very large machines would generate Force 11 strength gusts so any consideration of use by them should be restricted to extreme national emergency situations only and precautionary measures taken by the Trust to ensure no damage would be caused to vulnerable persons or vehicles by the helicopter down wash. In any case it is recommended that signs warning of helicopter operations be posted on the approach road to the hospital and the road in front of the main entrance.
- 2.20 The Royal Air Force (RAF) publishes a UK Hospital Landing Site Directory. When a new facility is put in place, if contacted, the appropriate unit based at RAF (Benson) will send a mobile air operations team (MAOT) team to survey it for inclusion in this publication. A plan of the hospital site with the position of the helipad and significant obstacles and their heights will then be prepared and published by them in the directory together with contact and administrative details and any warnings and advice on the best direction for approach and departure. This directory is used universally within the UK by military and civil operators alike.

### **3 'Design' Helicopter Type - Requirements**

- 3.1 The choice of helicopter types to be accommodated as directed by the Trust will be Air Ambulance, HEMS, Police, SAR and Military, and the largest of these expected to use the facility on a regular basis will dictate the size, structural integrity and equipment requirements for the helipad.
- 3.2 Most civil helicopter types used currently by police and civil air ambulance or Helicopter Emergency Services (HEMS) operators are less than 15 metres in overall length weighing 3 tonnes or less. These types, typically, are capable of carrying one stretcher patient only and operate by day only. As the role of air ambulance and HEMS develops in time it is likely, in my opinion, that larger helicopters capable of carrying up to 6 stretcher patients may also be required. These larger helicopters may supersede, but more probably supplement, the smaller types. In any case, planned use of this facility by SAR/MCA aircraft (AW 139 and S92) and possible use by military helicopter types in emergency situations should be catered for at Southampton.

### **4 Surface level and 'raised' Helipads – Requirements for Civil Helicopters**

- 4.1 An elevated helipad, for civil aviation purposes, is defined by regulators as being a "structure on land raised more than 3m above the surrounding surface". A helipad that is either on the surface itself or is 'raised' 3 metres or less above the surrounding surface is defined as a surface level helipad. It is intended to provide a helipad on the North East car park at Southampton that will be raised above the surface but by 3m. or less. The design will take into consideration an option of possible later relocation of the helipad structure to the roof of the East Annex; it will be fitted therefore with integral guttering, drainage and fluid

collection/disposal features that will be compatible with the requirements for an elevated helipad. In the event that later relocation on top

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of the East Annex does take place, integral rescue and fire fighting services would need to be added at that time.

- 4.2 Since there will be a drop of 3m or less from the helipad to the surrounding surface of the car park the helipad will be surrounded by safety netting not less than 1.5m wide. Details of the required specification are to be found in CAP 437.
- 4.3 The requirements for structural design and bearing strength are detailed in the ICAO Heliport Manual, Chapter 1. Applicable to elevated and raised helipads. The ultimate dynamic design load allowed for should be based on the heaviest helicopter for which this helipad will be designed (14.5 tonnes). Table 1-2 in the Heliport Manual puts this into the Helicopter load category 5 bracket. (Typical offshore helicopter platforms are designed to accommodate these loads.)
- 4.4 Because of the relatively confined nature of this helipad and its proximity to the public car park and the hazards associated with a possible fire and major fuel spillage in the unlikely event of a crash, the helipad will be provided with elevated helipad compatible, fire resistant guttering and drainage system around the helipad to prevent large amounts of aircraft fuel and fire fighting fluids from flowing over the edge of the helipad onto the car park surface. Access/egress routes (ramp and stairs) should also be protected from the possibility of potentially burning fluids affecting them. The system should drain all fluids, including possible burning fuel into a collector/seperator system through galvanised steel down pipes. A system to separate fuel and water within the system should be provided so that fuel or other carbon based contaminants are not permitted to drain into the domestic or foul water sewage systems. Dependant on the local Water Authority's view of liquid waste disposal, the drainage system and any associated containment tanks should be capable of holding all of the fluids likely to be deposited on the helipad; that is - water/AFFF, aircraft fuel (Jet A1) (up to 300 imp galls) and any precipitation that might be falling at the time and including some clean up time, say 2 mins., after the emergency is over. The collector tank for the contaminants should be located at low level to facilitate emptying into an authorised tanker for disposal off site. 9 cu/m is the recommended capacity to be provided.
- 4.5 There should be at least two access/egress points to the helipad, as near as diametrically opposite each other as possible, to allow safe evacuation from the helipad in case of a fire irrespective of wind direction. It is recommended that alternative stair egress from the helipad to the car park be secured by a locked cage to prevent access by unauthorised persons from the car park. The stairs should be designed to allow for emergency evacuation of stretcher patients and should be wide enough to accommodate a 'mattress' or stretcher.
- 4.6 Patients arriving by helicopter to the helipad will need trolley access from the helipad via a ramp to street level and thence to the intensive treatment unit. Ramps have been found to be quicker and more reliable than scissor lifts when moving patients to or from a raised helipad. The ramp gradient should not exceed 1:12.
- 4.7 It has been assumed, for the purposes of this report, that the helipad will be constructed as steel and aluminium superstructure 3 metres or less above the car park upper level surface.
- 4.8 The overall shape of the helipad is immaterial provided it is large enough to contain an operating square not less than 28m x 28m. The operational surface must be able to cope with dynamic loads for helicopter load category 5 and, must be free from any fixed obstacles on or around it higher than 250mm above the helipad surface.
- 4.9 On completion of the construction phase and before the helipad becomes operational it will be inspected for compliance with 'Annex 14' by the appointed Aviation Consultant. The principal helicopter operator will also need to attend for familiarisation with the facility. A Trust Helipad Manager should be appointed well before the helipad is completed so that he/she can compile a Helipad Operations Manual. An outline of the contents of such a

manual can be provided on request. After satisfactory inspection, the helicopter operators will need to undertake

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familiarisation and training flights to and from the helipad by day and night. This period should also be used to train and familiarise hospital RFFS and medical staff, which will be required to attend the helipad, with helipad safety and operating procedures.

4.10 Finally, unauthorised access to the helipad must be prevented and a communications system installed that will ensure comprehensive management of normal and emergency helipad operations at all levels within the hospital.

4.11 Note that HBN 15-03 contains guidance on domestic requirements associated with use of the helipad such as locker rooms, storage space etc.

## 5 Helipad Markings and Lighting

5.1 Appendix A is a diagram showing helipad markings and lighting of a hospital helipad. The specifications for a wind sleeve are contained in the ICAO Heliport Manual. The wind sleeve should be positioned well clear of the flight path and mounted at a height of about 5 metres above the helipad surface where a pilot can see it clearly from overhead and when approaching and

5.2 A 300 mm wide, white continuous line should mark the outer perimeter of the helipad. The touch down and lift off area should be a yellow non-slip painted circle 1000 mm in width with a diameter of not less than 9.5 metres. Centred within this circle there should be a red, non-slip painted "H" 3m high set within a white non-slip painted cross measuring 9m x 9m, aligned on an approximate (28) and the hospital northeast/southwest-operating axis. Maximum weight markings, 'D' value name should be included as indicated on the attached diagram at Appendix A (2).

departing. It should be positioned in the free airflow, clear of eddy effects from buildings or other obstacles. The paint type for the helipad markings should be non-slip and resistant to weathering as far as is possible. An aluminium 'pancake' may be left unpainted provided it is sand blasted and ridged to give it good non slip qualities, alternatively an epoxy resin finish can be applied to illuminate for use at night to enable a pilot to establish the wind direction from overhead before the surface; this is the type of finish applied to ship's flight decks. The windsleeve should be approaching to land.

Prevailing wind (SW)

5.3 Since night flying or flight in low light or poor visibility is to be taken into consideration the helipad should be lit with flush fitted, green omni directional lights emitting not more than 60 candelas at 10 degrees elevation. They should be situated just outside the perimeter markers and evenly spaced at not more than 3 metres apart with a light at each corner if the shape of the helipad is square. Since the lights will indicate to the pilot at night the extent of the usable helipad surface they should not be placed on the safety netting support structure. The CAA in conjunction with the offshore helicopter operators is currently in the process of developing a specification for LED strip lighting which is intended to illuminate the H and TLOF circle. Until such time as this is finalised or as an acceptable alternative, XENON flood lights (4 off) should be affixed to the safety netting supports or deck edge to illuminate the surface texture of the helipad. This is the current preferred and recommended fit.

## 6 Environmental Considerations

### 6.1 Noise and Nuisance

Noise and nuisance are minimised by locating the helipad where it will cause minimum disruption to hospital users and local residents. Flight paths will be planned to avoid unnecessarily low transits over sensitive areas. The duration of helicopter noise events is short and the frequency is expected to be low, probably in the order of two or three a week in the early stages of operations. The Office of the Deputy Prime Minister Planning Policy Guidance Note 24 (PPG 24) addresses helicopters and heliports (helipads) in

paragraphs 15, 16, 17 and 18. It urges caution in applying noise exposure categories; the absolute levels should be balanced by the infrequent occurrence of such noise and the positive benefit afforded patients and to the community at large (prospective patients themselves perhaps) by being able to transport persons in urgent need of

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medical treatment to or from the hospital quickly and safely. The public can, and do, appreciate the usefulness of a hospital helipad in life critical situations rather more easily than helipads used purely for personal convenience or commercial purposes. The careful location and construction of the helipad itself and sound insulation of buildings in the immediate vicinity of the helipad should ensure freedom from excessive noise and the effects of any vibration for the hospital residents and any residents nearby.

6.2 A formal noise analysis for hospital helipads, in my experience, is likely to be inconclusive or probably of limited assistance to planning committees because the frequency of movements is too irregular and too few to draw any truly objective conclusions. Inevitably, the effects are likely to be judged more or less subjectively on perception of annoyance by those immediately under the flight paths in the immediate vicinity of the hospital so that a decision to grant approval may not be unanimous. (No planning committee has yet refused a planning application for a hospital helipad). All that can be said definitively is that the civil helicopter types to be used are all noise certificated by ICAO regulation and that construction of the facility and surrounding buildings will take into account the need for sound insulation in accordance with normal government planning guidance on noise contours. It will help matters by limiting air ambulance flights normally to social, day light hours only, but night time flights should not be prohibited should the need arise in the interests of saving life. A copy of the Noise Certificate for the EC 135 helicopter (type used by many Air Ambulance and Police units) is attached at Appendix C for information. This shows the maximum peak noise levels measured in decibels sound exposure level (SEL) permitted in compliance with ICAO Annex 16 – Volume I Chapter 11 – Helicopters not exceeding 2730kg. Larger civil and military helicopter types will make more noise; the S 92 and A 139 for example, will also have a noise certificates restricting noise output to not more than 98EPNdB. (Helicopters over 2730kg noise outputs are measured in EPNdB rather than dB SEL). A noise certificate is part of the aircraft Certificate of Airworthiness and has been a mandatory regulatory requirement since 1985 for all civil aircraft.

### 6.3 'Downwash'

Helicopter downwash can be quantified and compared with generally high, gusty wind conditions; the heavier the helicopter, the stronger the effect. Provided other elements of the car park and nearby building are designed to withstand gusty conditions up to Beaufort scale 9/10, no extra measures will be required to protect them from regular planned helicopter operations. It should be noted that the largest helicopter types, as previously discussed may generate up to Force 11 gust conditions.

In addition to the mass downwash effect, vortices are generated at the blade tips. These are intense and erratic in nature and disperse less predictably than the mass downwash. It is particularly important to ensure facings and fittings on and around the helipad and on the buildings nearby are securely fixed against the effect of these vortices.

Dr. John Leverton's research paper for Westland Helicopters presented in 1973 and still current estimates that downwash velocities extend to a distance of about 2 to 3 rotor diameters (approx. 30m) from the helicopter when, owing to natural dissipation, the velocities rapidly decrease and disperse over a wide area. Graphs illustrating typical velocities and comparing them to the Beaufort wind scale and their dissipation rate are shown on the next pages.

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The US Department of Commerce published an analysis of rotorwash (downwash) effects in helicopter mishaps in 1991. A graph from the document showing peak velocities generated by a 4.3Tonne helicopter type is shown on the next page for information. This is useful because it quantifies the effects and also shows how quickly downwash dissipates with height/distance away from the helicopter generating it.

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Note: A 4.5 Tonne helicopter in a low hover would produce a wind effect of 55 kt. at a distance of 40 feet from the helipad centre; this reduces to 15kt when the helicopter is in the hover at 8 feet above the helipad.

On the next page I also show an extract from the New Zealand Forest Research Institute showing the velocities measured at different heights and helicopter forward speeds for a similar weight helicopter (4-5 Tonnes). This research was done with fire fighting in mind, but clearly shows what

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wind speeds are generated by a typical helicopter of the size that may be expected at a helipad during its lifetime, and how the effect dissipates. Present generation air ambulance, police and HEMS types are in the 3 tonne bracket whilst RAF and RN Sea King and Merlin types weigh up to 14.5 tonnes and will therefore generate correspondingly larger downwash velocities, (see Figure 25).

The duration of downwash peak values affecting the fabric of building are restricted to short time intervals, in the region of 30 seconds or so during the final stages of an approach to land and on take-off and departure. The vertical profiles flown, in order to ensure the aircraft is able to force land in the event of an engine failure, mean that the final part of the approach to land and the initial take-off and departure are restricted to the helipad surface itself so that the effects felt elsewhere will be much less significant.

Provided light cladding and loose objects are not permitted closer than 30m from the edges of the helipad, no structural damage should be caused by helicopter downwash. Typical of air ambulance/HEMS Maximum sizes expected.

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In the hover in very light winds at a height of 40m (130 feet), the downwash velocity for a 4.5 tonne helicopter has been measured at 45-48km/hr (28-30mph); as speed over the ground

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Increases, the effects rapidly diminish. These findings correlate closely with the velocities shown in the graph on the preceding page.

The conclusion to be drawn from these diagrams is that the effects of downwash from a helicopter on persons or property underneath the flight path will be no more than the effects normally experienced on a gusty, windy day. It should also be noted that the approach and departure profiles for elevated helipad operations are designed so that at the most critical stages, if the helicopter should suffer an engine failure, it will be able to land back on the helipad. This entails a steeper than usual approach to a Landing Decision Point (LDP) about 100 feet above helipad level and also an 'up and backwards' take-off flight path to Take-off Decision Point (TDP) about 100 feet above the helipad. Thus any significant effects of downwash will be confined almost entirely to the helipad surface itself.

The rotor tips create vortices which are erratic in their velocity and direction depending on the weight of the helicopter, speed of rotation of the rotor tips and the ambient wind velocity. The effect combined with downwash has been known to cause light or insecure cladding and other light objects and/or structures to become detached at distances up to 30 metres from the rotors. External cladding in the vicinity of helipads should be robust enough to withstand these effects or else removed all together.

#### 6.4 Safety, Fumes and Vibration

Environmental questions most frequently asked about hospital helipads include whether the helicopter operation will be safe and what the effect of vibration and fumes, as well as noise, which has already been discussed in this report, will have on hospital personnel and patients near to the helipad and whether the life style of local residents will be significantly compromised by the operation of helicopters.

Aviation safety is assured by the regulatory requirements for airworthiness of the helicopters as well as the demanding maintenance schedules and qualification and periodic training for flight and ground crews. Conceivably, a possible, catastrophic crash resulting in fire on the helipad is the worst case scenario that has to be planned for. The concept of operations and design and construction of the helipad, is intended to confine the effect of any fire to the helipad surface only without hazard to the surrounding car park or buildings nearby. The possibility of a crash involving fire on the helipad is considered extremely remote. Liaison by the hospital fire fighting management with the local fire brigade and periodic simulated 'crash on the helipad' exercises will provide adequate precautionary protection. Local fire brigade attendance/assistance should be planned for after an accident on the helipad in order to provide, in particular, specialist salvage of modern, lightweight materials which are used in the construction of new generation helicopters and which may prove harmful to humans after exposure to intense fire. Access to the helipad by the local fire brigade will be by the main road to the North East car park.

Sometimes concerns are expressed about fumes possibly entering air conditioning systems causing unpleasant smells. This can be avoided by careful positioning of air intakes with regard to proximity to the helipad and prevailing wind direction. Design of exhausts in any case should cater for high winds and prevent ingestion from outside by means of over pressuring and fitment of cowlings, so no extra precautions need be considered because of helicopters using the helipad since the downwash effects are similar to high, gusty wind conditions.

The following Table 1, courtesy Dr. John Leverton, shows the composition of exhaust products from typical turbine engines as found in modern helicopter air ambulance types. Engine technology has improved markedly since this table was compiled so that helicopter engine exhaust emissions are now even cleaner, so that harmful discomfort from fumes may be discounted. Engines are mounted at high level on the helicopter with the exhaust pipes directed upwards, away from the helicopter and surface below so

that only occasional harmless whiffs of kerosene should be experienced by people close to open windows in the near proximity of the helipad.

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An analytical study on vibration effects was undertaken for the Portsmouth QA elevated helipad project which concluded that there would be no significant effects on the Pathology Lab immediately below the helipad. Vibration experienced is exacerbated by reverberation due to the pressure waves emitted by the helicopter reflecting off surrounding vertical surfaces. On this raised facility set above the car park this effect should be minimal and will be short lived.

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## 7 Conclusions and Recommendations

- 7.1 The hospital is in a “congested” area. Helicopter operators require to be in possession of permission from the CAA in accordance with Rule 5(2) (c) of the Rules of the Air Regulations to land and takeoff at the site. This requirement ensures that the site is suitable for purpose without the need for the CAA to licence the facility.
- 7.2 No CAA aerodrome licence is required; nevertheless, the helipad must conform to ICAO ‘Annex 14’ specifications, and the types of civil helicopter intended must have the necessary performance capability in compliance with EU/JAR-OPS 3 for the necessary Rule 5 Permission to be granted to civil helicopter operators by the CAA intending to use the site. It has been found that elevated hospital helipads designed to civil requirements are more than adequate for use by all but the very largest of military helicopters (Chinook, Merlin and CH53 (USAF ‘Jolly Green Giant’).
- 7.3 The Trust brief is that the helipad be designed to accommodate Air Ambulance, HEMS, Police, SAR, MCA and Military types. A 28m x 28m operating area will be needed to accommodate these requirements. There must be at least two directions of approach and takeoff separated by 150\_ or more. The obstacle surface areas shown in figures 1 and 2 should not be compromised to allow safe single engine performance in the event of a helicopter suffering an engine failure at the most critical time.
- 7.4 Night and low light or poor visibility operations require ‘Annex 14’ lighting requirements to be put in place. ICAO lighting specifications now require green omni directional perimeter lighting. Current, ongoing trials of helipad centre surface luminance by the CAA and offshore helicopter operators should result in the fullness of time with an approved specification for LED lighting for the H and TLOF circle, but Xenon flood lights at, or close to the helipad surface, are an acceptable alternative and are in any case my preference and recommended for this helipad.
- 7.5 The provision of H2 RFFS scales including the attendance of 3 trained fire fighters for all helicopter operations is mandatory for an elevated helipad intended for the operation of larger helicopter types as this one is.
- 7.6 On this site due to its urban, congested nature the preferred location for the helipad is above the top level of the 2 storey North East car park.
- 7.7 In order to ensure best access for patients on trolleys, normal access to the helipad should be by ramp down to street level. No obstacles other than essential aviation fittings should be mounted on the helipad surface and these must not exceed 250mm.
- 7.8 Detrimental environmental effects will be minimised by locating the helipad above the car park as planned. Movements are not expected to be high and avoidance of routine use of the helipad during unsocial hours except in emergencies should ensure complete public acceptability.

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Southampton University Hospital NHS Trust Project Southampton General Hospital North East  
Car Park Helipad Feasibility Report June 2010 **Appendix A - Helipad Marking and Lighting 28**  
9.5m+ x 1000mm 28m 28M 3M

FATO Perimeter lights – green as per ICAO specification. Flood lights to be Xenon x 4 set normal to preferred flight paths

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**Appendix B (1) – Noise Certificate**

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**Appendix B (2)**

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## **Appendix C (1) Aerial Photograph showing intended location of Helipad**

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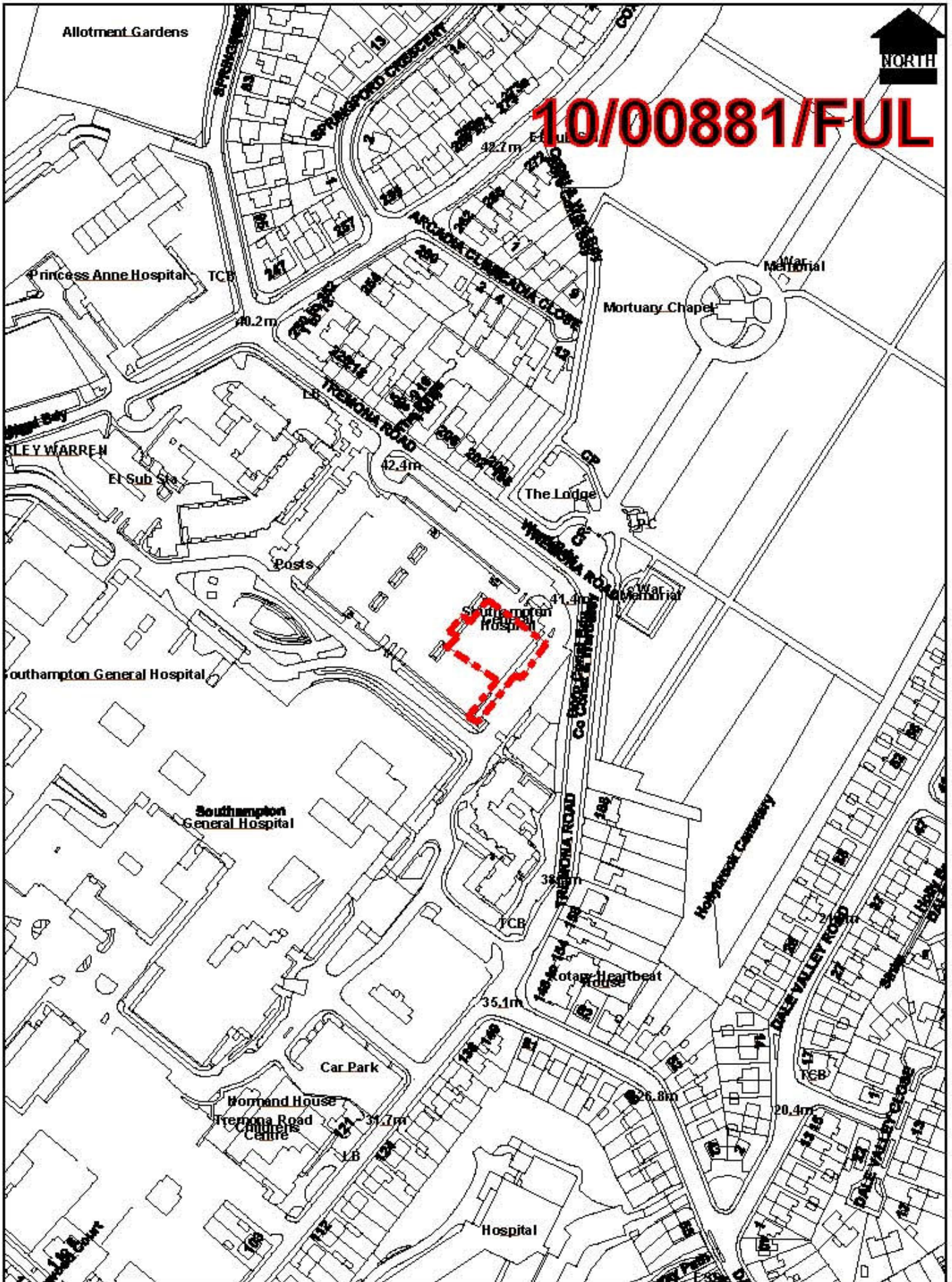


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