# VITAL ENERGI SOLUTIONS LIMITED

## On behalf of: Nottingham University Hospital NHS Trust

## DESIGN AND ACCESS STATEMENT

## Issue No: 2  25/04/2022

# Design and Access Statement
# Nottingham City Campus



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## 1. Introduction

Nottingham University Hospital NHS Trust has an obligation to meet Government climate change targets and legislation. The Health Board has engaged Vital Energi to carry out the comprehensive replacement of their Energy Generation facility at Nottingham City Campus, which will significantly reduce the Health Board's energy costs and, carbon and particulate emissions, as well as ensuring resilient energy supplies are maintained at the hospital for the next 15 years.

Nottingham City Hospital is a large hospital located in Nottingham, England. In 2006, it merged with the Queen's Medical Centre to form the Nottingham University Hospitals NHS Trust.

The City Hospital is the older and smaller of Nottingham's two hospitals, opened in 1903, but tracing its foundation to 1782 in the development of St Mary's, St. Nicholas, St. Peters & Union Workhouse, the Bagthorpe Isolation Hospital and the Bagthorpe Workhouse and Infirmary. It began its life as a workhouse infirmary.

Occupying a 90-acre (360,000 m2) site on the ring road to the North of the city centre. It is composed of many buildings, most of which are joined together by long corridors. Buildings include a leisure club, a Maggies Centre for people with cancer, and the Trent Cardiac Centre.

The main elements of the proposed works are as follows:

- Installation of 3 No 200kW thermal Air Sourced Heat pumps, inclusive of
    - 3No Compressor modules
    - 6No Collector modules
- 1 No 4000L Hot water buffer vessels.
- GRP enclosure to house electrical switchgear
- Electrical transformer and enclosure.
- Security fencing for screening and security purposes.
- Mechanical pipework connection to Urology & Maternity Buildings.



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## 2. Scope of Works

**Air Source Heat Pump**

The proposed development includes the installation of 3x200kw Air Source Heat Pumps with auxiliary plant to be mounted externally, at ground level between Maternity & Urology buildings

The collector, compressor enclosure and buffer vessel shall all be installed on a concrete civil base, surrounded by fenced screening.

**Pipework Routing**

It is proposed the LTHW flow and return pipework from the heat pump unit shall exit the fenced compound, dropping down into the existing service ducts between the Maternity & Urology buildings.

The new Air Source Heat Pump pipework will directly interface with existing pipework within the existing Maternity & Urology plantrooms.

**Electrical Cable Routing**

New power supplies are to be provided from the existing HV switchboard located in substation 12, to power the two new heat pumps. It is envisaged that the cables will be installed below ground from substation 12 to the transform/LV switch gear serving the heat pumps and ancillary equipment. The power cables will exit the ground local to the compound and then run within the compound on a new 1000mm ladder rack. Local containment will be installed adjacent the heat pumps between the compressors and their collectors.



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## 2. Site Appraisal

The site is set towards the northwest of the Nottingham City Campus boundary. The City Campus is surrounded by residential/small commercial premises. To the north is Wyton Close with mainly residential housing. To the west, leading onto Hucknall road (A611) with further residential housing and open sports fields.

As can be seen in fig 1 the immediate surroundings of the site are predominantly hospital building leading onto residential premises.
As can be seen in fig 2 the proposed site is.

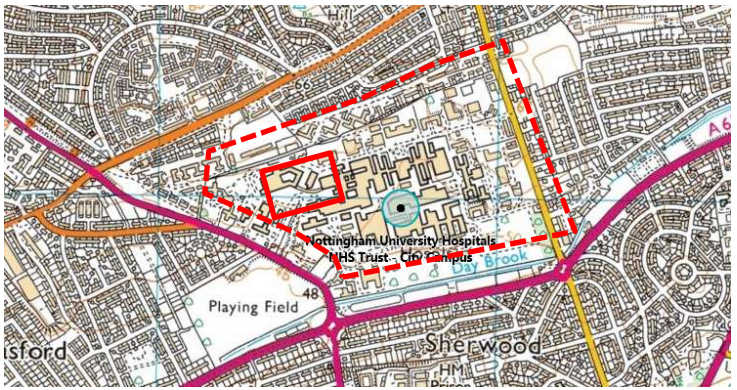


Figure 1 showing the City Campus boundary and outline of the area shown in figure 2

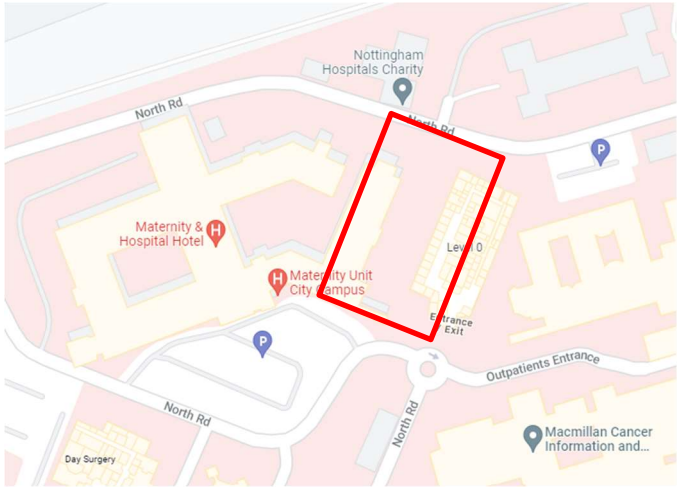


Figure 2 showing the site is in the Northwest of the City Campus.



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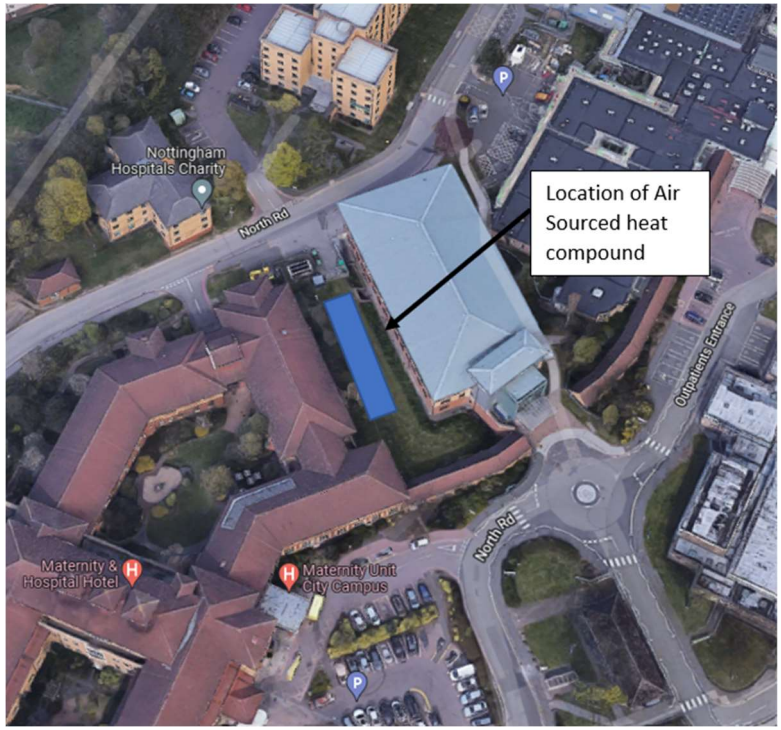


Site location



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**Landscaping Context**

The setting of the site in the wider landscape context is one of a mainly grassed, shrubbery/planted area.

The proposed site is located between the Maternity and Urology building; there are a small number of trees and hedge planting to the Northwest of the boundary of construction. Topographically the site falls around 2.2m from Northwest to Southeast.

**Surrounding Area and Buildings**

The nearest sensitive noise receptors shall be within the hospital boundary, hospital wards to the north (4mtrs to the nearest wards) and south (approx. 6m to the nearest office accommodation).

Once beyond the surrounding hospital boundary the nearest dwellings are to the north Wyton Close (approx. 100m to the nearest dwelling).

There are no statutory or non-statutory archaeological designations within the boundary of the site. There are no landscapes or ecological designations covering the site.

As can be seen in fig 3 the site is not located with a flood zone.

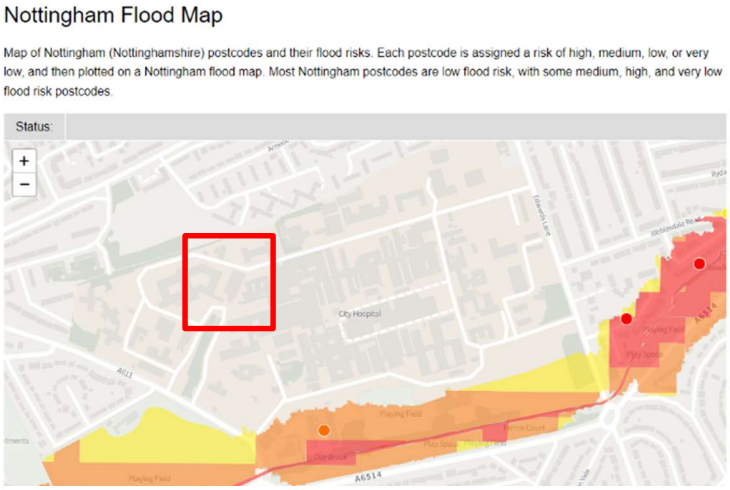


Figure 3 Flood Zone



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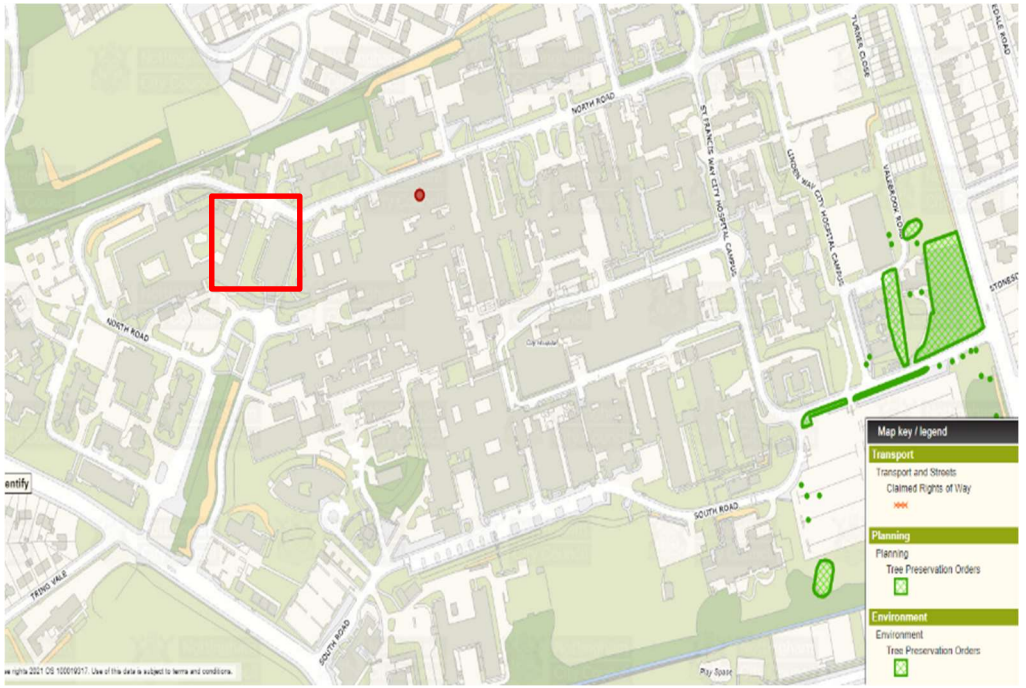
As can be seen in fig 4 there are no public rights of way affecting the site and proposed development area.

North Road runs adjacent to the proposed development with no footpath. The road is used for public accessing the hospital, service vehicles, ambulance, and bus routes.

Site Access- site entry and public access around the proposed development area are to be well maintained, during and after development.

Construction and general vehicle deliveries shall be directed onto the service road and hard standing within the construction area, ensuring that North Road is always kept clear of site traffic.



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## 3. Design Development.

**Opportunities**

- Funding provided as part of the Government incentive to the public sector to improve energy efficiency, reduce carbon emissions and lower energy bills.
- Installation of low-carbon technology to reduce the dependency on carbon generating equipment, (such as site gas fired steam rising equipment)
- Modification of the existing heating systems and reduction in operating temperatures within the connecting Maternity & Urology Building, to ensure maximum benefit from the low-carbon technology.

**Constraints**

Consideration has been given to the general low level of noise produced by the plant and how this may affect hospital services/wards and local residences. The design of the plant has been selected to ensure that it falls within NHS HTM guidelines and planning constraints.

The air sourced heat pump and ancillary equipment shall be screened to ensure security whilst improving the aesthetics to the surrounding buildings and view from the internal North Road.

The proposed development will require the removal of 6No trees and shrubbery along the length of the Maternity building.
Each tree is not connected to a TPO and is less that 8cm in diameter over bark less, with a height of approximately 6m.
As part of the Trust standard practices, our proposal shall include their replacement, planting 3 new trees for everyone removed throughout the estate of Nottingham City Hospital.



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## 4. Environmental Considerations.

**Carbon Reduction**

This project off-sets the demand on the Natural Gas firing plant, which significantly reduces the Carbon footprint onsite. The Scheme further reduces the site carbon footprint through the remedial works to be carries out with Maternity & Urology buildings to reduce the operating temperatures of the heating systems, thus increasing the plant efficiencies.

**Pollution**

Noise

Given the location of the air sourced heat pumps every effort will be made to select low noise plant options. Where required noise attention mitigation measure will be put in place both during the construction and operational phases significantly reducing any potential effects on the surrounding area.

Where noise may be a concern specifically with the installation of the 3 off packaged air sourced heat pumps has been considered and addressed. The use of low-speed fans on the compressor modules will reduce any noise they generate. The air sourced heat pumps will be rated at 38 dBa at 1metre.

Emissions to air

No emissions will be introduced as part of this scheme.

Emissions to water

No process water emissions will be introduced as part of this scheme.

Light pollution

To reduce light pollution and running costs, lighting to the site is to be kept to a minimum, there will be a limited amount of lighting installed to the compound to allow staff to safely move around the site after dark. Full lighting will only operate when personnel are on site.



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## 5. Amount of Development

Throughout the design process there has been an extensive design development with the prime consideration to ensure the technical solution can operate effectively whilst minimising the visual impact of the compound. In achieving this following has been considered.

- Rationalisation of process equipment and minimisation of unused volumes and floor areas within the building.

We have summarised below the different constituent halls and rooms

The amount of developed proposed is determined by the requirements to provide the necessary operational equipment ensuring it can be contained within the site compound.

For aesthetical and security reasons the perimeter site fencing surrounding the following equipment shall be at a height of 3.5mtrs.

| | Air sourced heat pumps | | Buffer Vessels | GRP Enclosure | Transformer |
|---|---|---|---|---|---|
| | Compressor modules | Collector module | | | |
| Area ($m^2$) | 6No 7.97 | 3No 9.24 | 1No 4000Ltr Vessel | 12.5 | 11.6 |
| Dimensions LxWxH (m) | 6No 5.5x1.45x2.3 | 3No 4.2x2.2x1.48 | Diameter 1400mm x 4010mm | 7.0x3.0x3.0 | |



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## 5. Layout

Overall, the design has considered the location of equipment in relation to the existing ground conditions and accessibility to plant for future maintenance.

Other layout considerations:

- The equipment layout has been heavily influenced by the requirements of the plant within.
- Location of air sourced heat pump compound was influenced by the need to have interconnecting services between the two building (maternity & Urology Building).
- It was considered more aesthetically pleasing to locate the air sourced heat pump compound between the two buildings, using the existing structures to reduce the overall impression and height of the proposed development.
- Figure 6: Indicate the plan view of the Air sourced heat pump compound

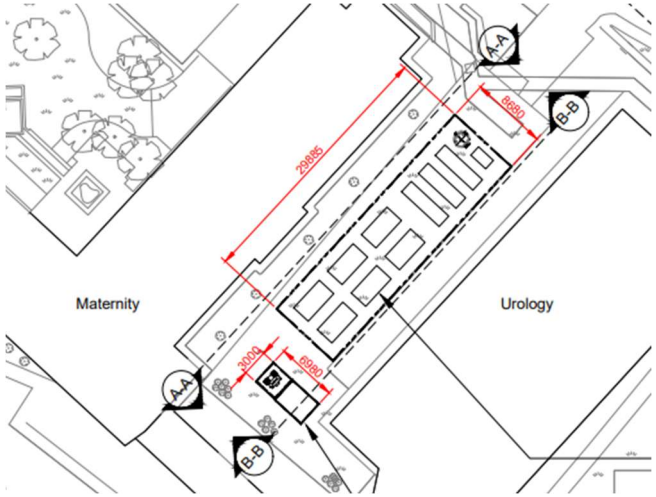


Figure 5 Air sourced heat pump compound



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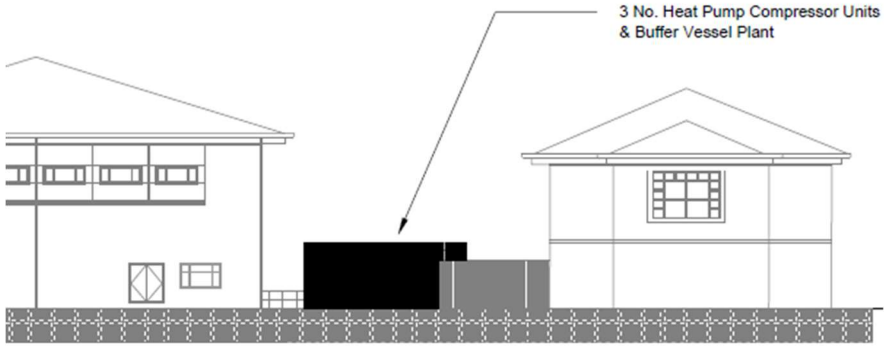
## 6. Scale & Appearance

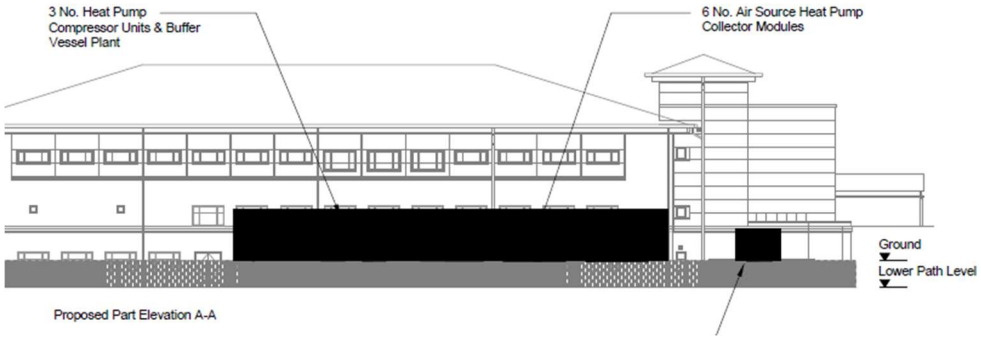
**Compound Footprints and Heights**

The scale of the compound is determined by the requirement to contain all the plant and ancillary equipment necessary to provide the Maternity & Urology buildings with a Low-carbon energy solution.

The overall size of the Air sourced heat pump compound is 30m long and 9m wide, with a smaller transformer compound measuring 7m long and 3m wide. The height of the security fencing is 3.5m, with the tallest piece of equipment being 4m.




Front Elevation (North Road)




Side Elevation



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**Appearance**

This is a new build construction that will not be seen from the site boundary, it is sited amongst buildings surrounded by 3.5m high security fencing.

The scale of the compound has been reduced as much as possible given the process and plant within. The atheistic impact has also been reduced by the construction between the existing Maternity & Urology buildings.

**Materials**

The choice of materials is determined by the functional and economic requirements of the air sourced heat pumps and ancillary equipment, to ensure the equipment is screened from view the proposal shall be to install a timber fence at a height of 3.5m around the perimeter of the site, inclusive of access doors for general maintenance.



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## 7. Access

**Access**

There will be sufficient space and access within the enclosure to maintain and remove equipment in the event of routine or reactive maintenance. The equipment will not require human intervention in normal operation, thus would be considered as an unoccupied space.

Deliveries should not have any effect on public highways as all offloading will be on the hospital property. During the main plant deliveries, a traffic plan will be required to control access around the hospital site.

**Car parking**
The parking of service and maintenance vehicles shall use the existing lay-by/parking bay, constructed off North Road/edge of Urology building.

**Security**
The Energy Centre will incorporate adequate security features to ensure it deters potential intruders.

3.5m high timber fencing shall be installed around the perimeter of the proposed compound, access door/gates shall be securely locked with Trust approved high security padlocks.



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## 8. Conclusion.

The proposed installation of the air sourced heat pumps gives the opportunity for cutting edge technology to off-set the use of gas fired steam raising equipment and reduction in carbon emissions from the site.

The compound has been designed around the minimum footprint possible and is economic in its land-take and use of materials. Consideration will also be given to how the equipment will be disposed of when the plant is eventually decommissioned.

The scheme will feature an expansion of the district heating network within the boundary of the hospital, connecting to Maternity and Urology building supplying low grade hot water for heating and domestic hot water purposes.

## ANNEXE A – Planning Drawings

| | |
|---|---|
| VI22 NCH PLA 001B Rev P1 | Nottingham City Hospital CEF PSDS3 - Air Sourced Heat Pump Location Plan |
| VI22 NCH PLA 002A Rev P1 | Nottingham City Hospital CEF PSDS3 – Existing area between Maternity & Urology |
| VI22 NCH PLA 002B Rev P1 | Nottingham City Hospital CEF PSDS3 - Air Sourced Heat Pump Plan |
| VI22 NCH PLA 006 Rev P2 | Nottingham City Hospital CEF PSDS3 – Elevation A-A |
| VI22 NCH PLA 007 Rev P2 | Nottingham City Hospital CEF PSDS3 – Elevation B-B |
| VI22 NCH PLA 008 Rev P1 | Nottingham City Hospital CEF PSDS3 – Elevation C-C |
| VI22 NCH PLA 009 Rev P1 | Nottingham City Hospital CEF PSDS3 – Proposed Air sourced heat pump layout |
| VI22 NCH PLA 010 Rev P1 | Nottingham City Hospital CEF PSDS3 – Proposed Air sourced heat pump section |

Attached via the online application tool.



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