James Paget University Hospital
James Paget University Hospital NHS Foundation Trust
March 2025

BIDWELLS

ENVIRONMENTAL IMPACT ASSESSMENT SCOPING REPORT

Quality Assurance

Site name:	James Paget University Hospital
Client name:	James Paget University Hospitals NHS Foundation Trust
Type of report:	EIA Scoping Report
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Date	March 2025
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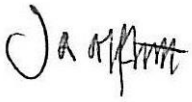
Signed	
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1.0 Introduction

Purpose of this Report

1.1 This EIA Scoping Report has been prepared by Bidwells LLP on behalf of the James Paget University Hospitals NHS Foundation Trust (hereafter 'the Applicants' or 'the Trust') to inform the formal scoping procedures with Great Yarmouth Borough Council (GYBC) ('the Council') in the preparation of an Environmental Impact Assessment (EIA) to accompany outline and full planning applications covering the existing hospital and land to the west of the existing hospital (hereafter 'the Site') for the development of a new hospital and other associated infrastructure hereafter 'the Proposed Development'. The overall Site extends to 28.6 hectares (ha). This includes 3.6 hectares of land to the south-west of Woodfarm Lane that could be used as a construction compound. It is proposed that two planning applications relating to the Proposed Development will be submitted in 2025, comprising the following:

- An outline planning application for the demolition of existing hospital buildings and development of the proposed new James Paget University Hospital along with associated ancillary uses and temporary construction compound, car parking including multi-storey car park (MSCP), energy centre, replacement helipad, associated highway and landscaping and utilities; and
- A full planning application for the construction of enabling works for the new James Paget University Hospital including site clearance and remediation, a MSCP, surface level car park accesses to Woodfarm Lane, associated utilities and associated infrastructure.

1.2 Section 4 of this report sets out the information for the Competent Authority, in this case GYBC, to confirm its formal Screening Opinion. The purpose of this is to confirm that the Proposed Development, as set out in Section 3 of this report, constitutes a project which has the potential to be considered under Schedule 2 (10) (b) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, and at this stage, likely significant environmental effects cannot be ruled out. As a result, it is the Applicant's intention to voluntarily submit an Environmental Statement (ES) for the Proposed Development.

1.3 We, therefore, now request that GYBC provide their formal EIA Scoping Opinion for the Proposed Development. This document sets out the suggested scope for the EIA and requests a formal Scoping Opinion from GYBC in accordance with Regulation 15. A plan showing the extent of the Site area under consideration, for the purposes of scoping, is attached in **Appendix 1**.

Background to the Project

1.4 In 2020, it was announced that the Trust would receive national funding through the Department of Health and Social Care to explore all options for the building of a new hospital as part of the Government's Health Infrastructure Plan. The James Paget University Hospital, at this time, was listed as one of 40 new hospitals to be built by 2030. In 2023, the Government confirmed that the Trust will receive full funding as part of the New Hospital Programme, to completely rebuild the hospital by 2030 following the identification of seven hospitals affected by the deterioration of reinforced autoclaved aerated concrete (RAAC) material. The James Paget was already identified as forming part of the New Hospital Programme in 2020, but the 2023 announcement by the Government required the James Paget (alongside other RAAC hospitals) to be prioritised to ensure patient and staff safety.

1.5 On 20th January 2025 the Government announced funding and a timetable for the New Hospital Programme. The James Paget University Hospital was included in 'wave 1' of construction expected to commence in 2027 to 2028.

1.6 The Site to the west is entirely deliverable, and capable of being delivered whilst the existing James Paget University Hospital remains operational. The extended hospital will deliver a key piece of essential infrastructure to support the ongoing and expanded provision of healthcare for the Borough and northern parts of East Suffolk.

Legislative Background

1.7 A Directive of the European Community on the *'assessment of the effects of certain public and private projects on the environment'* was adopted in 1985 (85/337/EEC). The EIA Directive has been amended several times since its approval in 1985. The most recent and far-reaching amendments were made through Directive 2014/52/EU ('the EIA Directive') which was approved in May 2014. In order to implement these Directives, the UK Government has made a series of Regulations. The relevant Regulations for projects that require planning permission are the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, (hereafter referred to as 'the EIA Regulations'), which came into force in May 2017.

1.8 The aim of the EIA Regulations is to ensure that major projects that are likely to have significant effects upon the environment are subject to EIA, and that minor projects and those outside sensitive areas which are extremely unlikely to have significant environmental effects, are not subject to these EIA regulations.

1.9 The EIA process is designed to draw together, in a systematic way, an assessment of the development's likely significant environmental effects (alongside economic and social factors). The process ensures that the importance of the predicted effects, and the scope for reducing them, are reported and understood by the public, statutory consultees, and the relevant Competent Authority before it makes its decision.

1.10 The output from the EIA process is reported within an ES submitted with the application. This allows environmental factors to be given due weight when assessing and determining planning applications.

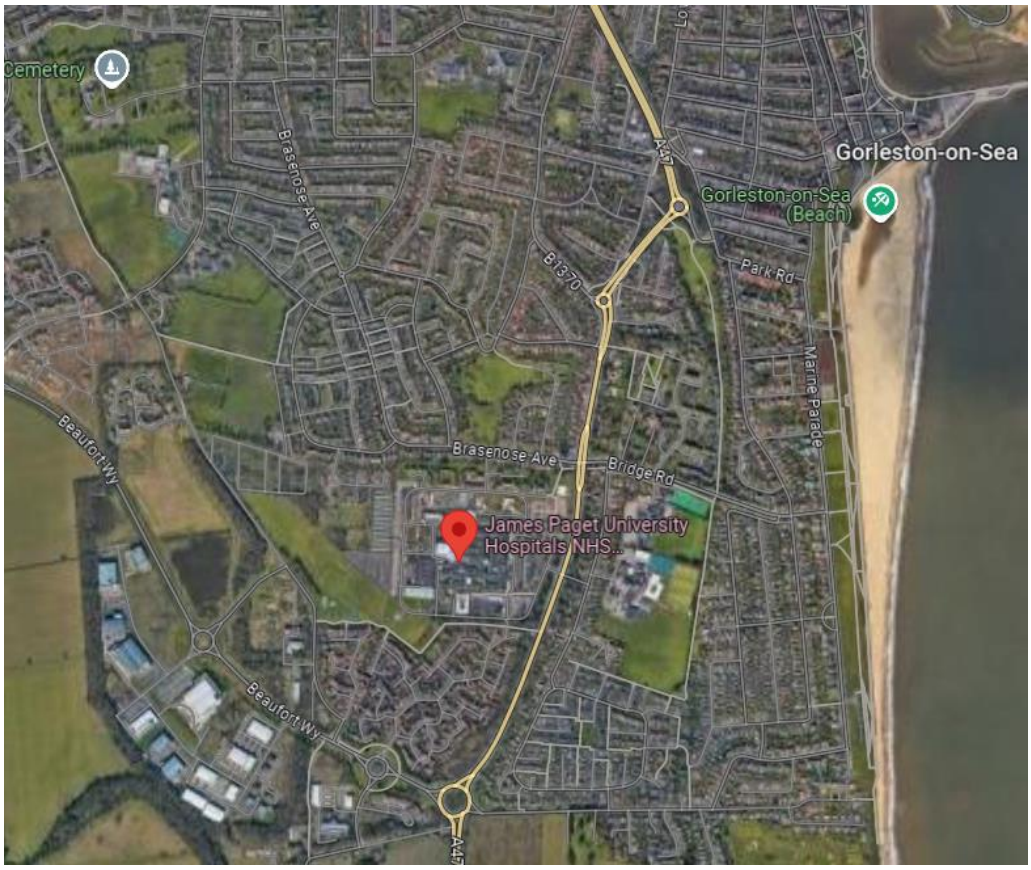
1.11 The content of the submitted request, informed by the information that is currently available, outlines the anticipated scope of the assessment process for each environmental topic area likely to give rise to significant environmental effects to the extent we consider they require assessment, the scope of which is outlined in sections 5 – 21 of this report.

2.0 Site Context

Site Location and Description

2.1 The existing James Paget University Hospital is located in Gorleston-on-Sea, approximately 4km south of Great Yarmouth on the east Norfolk Coast (see **Figure 2.1**) The current hospital is active, employing over 4,000 staff, both part and full time, making it the largest employer in the area.

Figure 2.1: Existing James Paget University Hospital



2.2 The Trust has approximately 550 inpatient beds providing a mix of critical, intensive and high dependency care, general surgery, maternity, paediatrics and neonatal care. It also includes escalation beds for use when experiencing high demand and need to deal with an increased number of patients needing care. The Hospital provides care to a population of 250,000 residents across Great Yarmouth, Lowestoft and Waveney, as well as supporting the wider population of East Anglia.

2.3 The Site is approximately 28.6ha in size, made up of the existing hospital site, the main build Site to the west, including the potential construction compound on the south-west side of Woodfarm Lane (see **Appendix 1**).

2.4 The built element on Site comprises the main hospital building covering ground and first floors and connected throughout by a central rectangle formed of a north, east, south and west corridor with

further east-west and north-south corridors spurring off from this. The main entrance to the hospital is via the main entrance on the east side of the building which leads directly into the emergency department. To the north-west and west of the hospital are a series of ancillary buildings connected to the main hospital including, but not limited to, an education and training centre, staff library, procurement, lecture theatre/boardroom and estates/facilities.

2.5 The hospital is located predominantly in a residential area with housing to the north along Brasenose Avenue, north-west along Edinburgh Avenue and Potters Field, along the A47 Lowestoft Road to the east and to the south along Jenner Road, Paget Crescent, Carrel Road and Woodfarm Lane. To the west of the hospital is a solar PV array and staff carking. Beyond that the land is a mix of grassland, scrub and mixed woodland, and allotments accessible off Woodfarm Lane. To the south-west of the hospital is a helipad and beyond that Beacon Park Playground, a children's playpark, skatepark and multi-use games area (MUGA). Part of the east and south extents of the Site are bounded by a deciduous woodland strip.

2.6 The Site comprises generally of flat, low-lying land, between 10.5m and 16m above sea level.

2.7 On the north-east corner of the hospital is Busy Bees at Great Yarmouth, a nursery and pre-school. To the east of the hospital, approximately 150m from the east perimeter are Ormiston Cliff Park Primary Academy (for children between four and 11 years) and Cliff Park Ormiston Academy (for children between 11 and 16 years).

2.8 Cliff Park Community Church is to the east of the hospital, approximately150m from the east perimeter.

Transport and Access

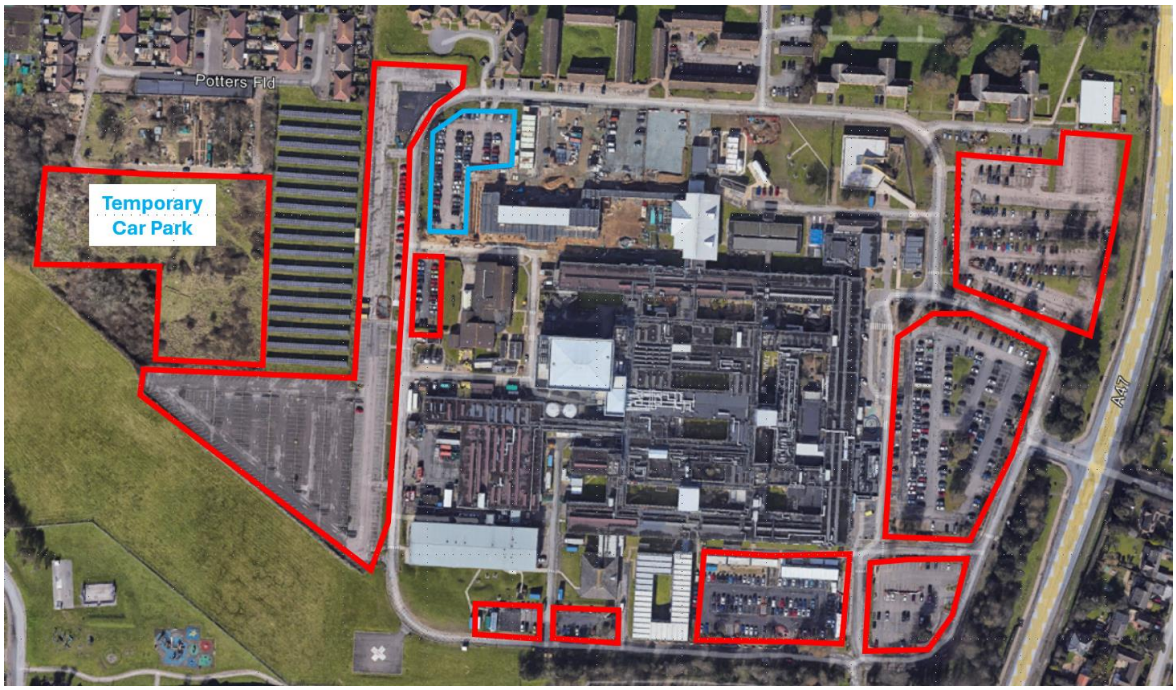
2.9 The existing hospital currently has three vehicular access points:

- The main access is via the A47 Lowestoft Road, featuring a signalised crossroad junction where the A47 Lowestoft Road intersects with Kennedy Avenue and the Hospital Access road. The A47 Lowestoft Road has two travel lanes in each direction. Northbound travellers can access the hospital from the nearside lane, which also allows forward movement. Southbound travellers have a ghost-island right-turn lane beyond the signal heads to facilitate entry into the hospital;
- A secondary access (generally for staff entering/egressing the Hospital) is located on Brasenose Avenue, consisting of a standard priority T-junction north of the hospital. From this junction, the hospital access road routes south through a 20mph zone to a priority T-junction with a stop sign. This junction provides access to the circulatory loop road around the hospital's perimeter; and
- The third access point, reserved exclusively for staff, is via Jenner Road. This is a continuation of a residential road, accessible through a 4-arm roundabout on Beaufort Way.

2.10 Vehicular parking facilities are provided throughout the existing hospital for staff and visitors, comprising 1,588 surface level spaces. Car parks A and B (to the east side of the hospital) are usually reserved for patients and visitors to the hospital, with overflow car parking in Car park F. The Trust has recently completed construction of a 376 space temporary car park to the west of the solar PV array to alleviate parking pressure at the hospital. The permission expires on 14 March 2031. As it is within the footprint of the proposed new hospital it will require clearance prior to

construction commencing. Public car parks are controlled by barriers and chip coin on entry provided. There is a free 10-minute drop off/collection zone for patients or visitors outside the main entrance. Staff parking is located on the north-west, west and south sides of the hospital (Car parks C, D, E, and G, with additional parking at the Renal unit and Burrage Centre.

Figure 2.2: Existing car parking arrangements at James Paget University Hospital



Note: Existing car parking shown in red. Blue line car parking has been taken out of use.

2.11 The hospital is accessible by bus, with a bus stop, Bus Shelter Stand A, between car parks A and B served by the 1/1A Coastal Clipper between Lowestoft and Martham, every 30 minutes/1 hour (1/1A respectively). There are additional stops on the northbound and southbound carriageways of the A47 Lowestoft Road, and two stops on Brasenose Avenue, with buses generally every 30 minutes.

2.12 There is good footway provision along the internal hospital road network connecting the car parks with the on-site facilities. These provide good linkage and enable safe and direct access to the hospital and connection to the local residential areas and other facilities surrounding the site. The footways within the vicinity of the Site benefit from dropped kerbs at junctions with minor side roads and from dropped kerbs and tactile paving at larger side road junctions.

2.13 There is a footway/cycleway along the frontage of the hospital site, adjacent to Yarmouth Road. There are footway and cycleway crossings in the local vicinity of the Site that include a subway under the A47 Lowestoft Road at the junction with Brasenose Avenue and Bridge Road. There is also provision for a for cycle parking distributed in various location on-site.

Flood Risk and Drainage

2.14 The Site is at a low or negligible risk of flooding from all sources. The Environment Agency (EA) Map for risk of flooding from surface water highlights one isolated area of risk in the middle of the Site. This does not appear to be part of a wider flood path originating outside of the Site and is likely to be due to a localised depression of the existing ground. This low point will be removed as part of the proposed level strategy.

2.15 No artificial sources of flooding have been identified within the vicinity of the Site including surface water or combined sewers, reservoirs (the EA Flood Risk from Reservoirs map shows that the Site does not fall within the maximum extent of flooding zone), canals, or culverts.

Geology, Hydrogeology and Soils

2.16 The Site is considered to be underlain by superficial deposits comprising Happisburgh Glacigenic Formation – Sand and Gravel. The superficial deposits are shown to be underlain by sand and gravel of the Crag Group. The groundwater table is anticipated to be present within the superficial geology at approximately 1 metre above ordnance datum (m AOD). Ground level is anticipated to be 9-16m AOD and, therefore, groundwater is anticipated at around 8-15m depth.

2.17 The Site is not within or in the proximity of a Source Protection Zone nor a drinking water protection area. Aquifer Designation Map classifies the area as “Secondary A” for superficial drift, and “Principal” for bedrock.

2.18 The Site is located within a Mineral Safeguarding area for Sand and Gravels.

Heritage Features

2.19 Within a 5km radius of the Site, there are eight scheduled monuments, including the town walls of Great Yarmouth and Burgh Castle Roman fort complex to the north-west. The Mill Hill bowl barrow is located 650m north-east of Caldecott Hall. There is one registered park and garden, Somerleyton Park, within this 5km radius.

2.20 Within a 3km radius, there are 46 listed buildings. These include seven Grade II* listed buildings, of which six are churches or church remains, with the closest situated 1.5km north-west of the Proposed Development. The majority of Grade II listed buildings are concentrated in Gorleston town centre, forming three distinct groups. One of these Grade II listed buildings is the Lighthouse (National Heritage List for England (NHLE) reference number 1245979). The remaining Grade II listed buildings are scattered throughout the surrounding countryside and include farmhouses, barns, and gentry houses.

2.21 Two conservation areas, Cliff Hill, Gorleston and Gorleston Town Centre, are also present within the 3km study area. There are no built heritage assets within the Proposed Development itself.

Environmental Designations and Ecological Features

2.22 There are two statutory designated sites within 2km of the Proposed Development. These are:

- Southern North Sea Special Area of Conservation (SAC), located 1.4km to the east of the Site; and
- Outer Thames Estuary Special Protection Area (SPA), also located 1.4km east to the east of the Site.

2.23 The Site comprises a variety of habitat types, including:

- Buildings and developed land;
- Grassland;
- Scrub;
- Introduced shrub;
- Bramble;
- Mixed woodland;
- Other broadleaved woodland;
- Lowland mixed deciduous woodland; and
- Native hedgerow.

Air Quality

2.24 GYBC has undertaken a review and assessment of air quality within their administrative area. At present there are no exceedances of any Air Quality Objectives (AQOs), and therefore no Air Quality Management Areas (AQMAs) have been designated. The Proposed Development is not located within close proximity to an AQMA.

3.0 Proposed Development

3.1 As set out in Chapter 1, the Proposed Development (**Figure 3.1**) includes the following components, but not limited to:

- A new James Paget University Hospital;
- Two multi-storey car parks up to 10 levels and additional surface level car parking. This delivers up to 2,000 parking spaces (an uplift of approximately 400 spaces compared to existing parking);
- New access junctions;
- Energy centre;
- Helipad; and
- Hard and soft landscaping.

Figure 3.1: Illustration of the Proposed Development

Planning Application

3.2 It is proposed that two planning applications relating to the Proposed Development will be submitted in 2025, comprising the following:

- *Outline planning application for demolition of existing hospital buildings and development of a new hospital (Use Class C2) and associated ancillary uses and temporary construction*

compound, multi-storey car park, car parking, energy centre, together with associated highway, engineering and landscaping works. All detailed matters reserved for future determination except for access points at the site boundary; and

- *Full planning application for construction of enabling works for the new James Paget University Hospital to include site clearance, multi-storey car park, surface level car park, accesses to Woodfarm Lane, and associated infrastructure.*

Hospital

3.3 The new hospital will be located to the west of the existing James Paget University Hospital. The new hospital provides an opportunity for a new state of the art facility for its catchment which includes the population of Great Yarmouth Borough and parts of Waveney and will transform healthcare for local people.

3.4 The new hospital will be up to approximately 50m in height, assuming a helipad on the roof of the new hospital. If the helipad is not required on the roof, the height of the new hospital will be 45m in height. This is up to ten storeys in height. The Trust anticipate a building of approximately 79,500 square metres of department area and approximately 630 beds. When plant and communications support spaces are included there will be up to 118,000 square metres of Gross External Area within the new hospital (Use Class C2). To allow for flexibility to respond to New Hospital Programme's evolving requirements this scoping allows for a building of up to 130,000sq.m in size.

3.5 The energy strategy and mechanical services strategy for the new hospital are currently being developed. One element of the energy strategy being explored is the provision of geothermal boreholes. The new hospital will include a service and facilities management yard.

3.6 The new hospital will include a permanent helipad. This is the reprovision of the existing helipad on the hospital site. The new permanent helipad would be located on a rooftop or at ground level within the site.

Car Parking Provision

3.7 Parking across the Site will be provided with two new multi storey car parks (up to 10 levels) and surface parking creating approximately 2,000 parking spaces in the new hospital, which will roughly be split between patients and visitors and staff only parking.

Net Zero Target

3.8 The NHS has set a goal to become net zero carbon by 2040, with an interim target of reducing its carbon footprint by 80% between 2028 and 2032. Additionally, it aims to achieve a 'plus' net zero carbon footprint by 2045, with an 80% reduction planned between 2036 and 2039. Despite the project's inception predating the latest NHS guidelines, measures will be implemented to enhance its carbon efficiency, particularly in terms of Embodied Carbon and Operational Energy & Carbon.

3.9 The path towards a Net Zero Carbon design will be established through the detailed design process.

Assessment Parameters

3.10 Given that one of the applications will be in outline, the EIA will be based on a series of parameters that define those elements of the outline scheme of most relevance for assessment purposes. The proposed assessment parameters are described below.

Land Use

3.11 The Land Use Parameter Plan will define the general description and broad location of the proposed land use components within the Site.

Building Heights

3.12 The Building Heights Parameter Plan will define the maximum building heights across the Proposed Development.

3.13 Buildings heights across the Site are likely to vary. The maximum development height of the new Hospital is approximately 50m if it accommodates a roof top helipad. The hospital accommodation will extend to a maximum of 45m. This is the equivalent of up to ten storeys - approximately 5m floor to floor heights. The proposed multi-story car parks built up to approximately 35m (10 storeys – approximately 3m floor to floor heights).

Access and Movement

3.14 The Access and Movement Parameter Plan will show the principal routes of movement for vehicular and non-vehicular traffic.

3.15 There will be two public vehicular access points into the Site. The existing Hospital access entering from/egressing onto the A47 Lowestoft Road to the east of the Site will be retained. A new main entrance for public access will be created at the junction of Woodfarm Lane and Hodds Lane to the west of the Site. There will be an egress onto Woodfarm Lane to the north to serve the multi-storey car park. There will be a new access to the south of the proposed entrance at the junction of Woodfarm Lane and Hodds Lane to serve the emergency department.

3.16 The existing staff access from Brasenose Avenue will be retained as a secondary entrance solely for staff use. The existing staff access via Jenner Road will be retained.

3.17 Ambulances will access the Site from the A47 Lowestoft Road and exit via the southern proposed egress on Woodfarm Lane.

Landscape and Open Space

3.18 The Landscape and Open Space Parameter Plan will define the parameters for key strategic areas of structural landscaping and ecological areas within the Site.

3.19 The Proposed Development will include extensive landscaping including new tree planting.

3.20 Along the south-eastern boundary of the existing hospital there is a band of Category A trees – trees of High Quality – which will be retained where possible.

Demolition and Site Clearance

3.21 The Demolition Plans will show buildings to be demolished and areas for site clearance. This includes demolition of the existing Hospital once the new hospital is operational.

3.22 Areas to be cleared include the existing staff surface car parks to the west (car park E and the temporary car park) and south-east of the hospital; the PV array to the west of the hospital; and the existing community playground to the south-west of the hospital, and the existing helipad and landing strip.

3.23 Buildings to be retained include the buildings that are separate from the main hospital but connected by corridors to the west and north of the main hospital building. They include the Education/Training centre, the Burrage Centre, the Renal Unit, Louise Hamilton Centre, the Dermatology building, MRI suite, and the recently constructed DAC, OEH/CDC and Concept Ward.

Utilities

3.24 The Utilities Plan will show all utilities that are proposed for the new hospital and where these connect to existing utilities outside the site boundary.

Construction

3.25 An indicative construction programme will be provided in the ES in the form of a likely worst-case in terms of local disturbance, particularly in regard to heavy goods vehicles (HGV) traffic.

4.0 EIA Methodology and Scope

Introduction

4.1 The Applicant has committed to undertaking an EIA of the Proposed Development. The Proposed Development exceeds the applicable screening threshold at Schedule 2,10(b) of the EIA Regulations. Due to the Site location, environmental sensitivities and the scale of development, it is considered at this stage that likely significant environmental effects cannot be ruled out. Therefore, an EIA will be undertaken, and an ES prepared to support the planning application will be provided voluntarily.

4.2 EIA is a systematic process through which the likely significant environmental effects of a Proposed Development can be identified, assessed and where possible, adverse impacts are reduced, and beneficial impacts enhanced. EIA ensures that information on the potential for significant environmental effects is available for decision-makers and the public to consider in the determination of an application.

Need for EIA - Screening

4.3 Certain types of development are required to be the subject of EIA ('EIA development'). Schedule 1 of the EIA Regulations lists the type and scale of development that automatically require EIA ('Schedule 1 development').

4.4 Schedule 2 of the EIA Regulations sets out the development types that may require EIA ('Schedule 2 development'). To qualify as a Schedule 2 development, it must be either located in a "Sensitive Area" as defined in Regulation 2(1) or exceed the applicable threshold in Schedule 2. Not all Schedule 2 development will require EIA and they consequently need to be screened on a case-by-case basis using the criteria set out in Schedule 3 of the Regulations.

4.5 The proposals which form the subject of this report are not of a type or scale described in Schedule 1 but are of a type that falls within Schedule 2(10) 'Infrastructure Projects'; specifically, 10(b) 'Urban Development Projects'. The scale of the Proposed Development exceeds the applicable thresholds. Consequently, the Proposed Development is Schedule 2 development. Schedule 3 of the Regulations sets out the screening criteria in relation to Schedule 2 developments, drawing attention to the character and complexity of effects resulting from the scheme, as well as a range of issues relating to the sensitivity of sites.

4.6 It is our view, based upon a review of the EIA Regulations, that the Proposed Development constitutes Schedule 2 development, and that the scale of the development proposed has the potential to give rise to likely significant environmental effects upon the receiving environment. In view of this, the Applicant volunteers this report to establish the scope of any forthcoming EIA process in connection with this project, and the content of the ES which will subsequently accompany the planning application for the development proposed.

4.7 Notwithstanding the above, we would request that GYBC, as the Competent Authority for the purposes of the Regulations, considers this section of the report and confirms that the proposals constitute EIA development, and that an EIA is required.

4.8 This document also sets out the suggested scope of the EIA and resulting ES. It informs a formal request for a Scoping Opinion from GYBC in line with Regulation 15 of the EIA Regulations.

4.9 In accordance with Regulation 15(2), this request includes:

- A plan sufficient to identify the land (**Appendix 1**);
- A brief description of the nature and purpose of the development, including its location and technical capacity: see Sections 2 and 3;
- An explanation of the likely significant effects of the development on the environment: see Sections 5-16; and
- Such other information or representations as the person making the request may wish to provide or make: see other sections of this EIA Scoping Report, notably this Section (4).

4.10 Guidance on the EIA Regulations is provided in the National Planning Practice Guidance (NPPG). The NPPG states that:

"Whilst every Environmental Statement should provide a full factual description of the development, the emphasis should be on the "main" or ***"significant"*** *environmental effects to which a development is likely to give rise. The Environmental Statement should be proportionate and not be any longer than is necessary to assess properly those effects.* ***Where, for example, only one environmental factor is likely to be significantly affected, the assessment should focus on that issue only. Impacts which have little or no significance for the particular development in question will need only very brief treatment to indicate that their possible relevance has been considered"*** *(emphasis added) (Paragraph: 035 Reference ID: 4-035-20170728).*

4.11 The proposed scope of the EIA is summarised in **Tables 4.1, 4.2 and 4.3**. Topics which will be detailed further in the following sections.

4.12 **Table 4.1** sets out the broad aspects of the environment required to be considered in Schedule 4 of the EIA Regulations, and identifies which topics are necessary to be considered in this EIA, with reasons provided. Topics listed in **Table 4.1** are those for which significant effects are considered likely or cannot be ruled out at this stage and have consequently been scoped into the EIA. Scoping has been based on the professional judgement of the EIA consultant team and the information currently available on the Proposed Development, the Site and the surrounding area.

4.13 **Table 4.2** summarises topics which are proposed to be scoped out of the EIA on the basis that they are unlikely to give rise to significant environmental effects, together with a justification. Some of these topics may still be covered by technical reports that will be submitted in any event, but not as part of the ES as environmental impacts are not considered likely or significant.

4.14 **Table 4.3** synthesises **Tables 4.1** and **4.2** and summarises the proposed scope of the EIA.

Table 4.1: Consideration of Broad Environmental Aspects - Scoped into the EIA

TOPIC	CONSIDERATION
Air and Climate	
Air Quality	During the construction of the Proposed Development, there is the potential for significant air quality impacts as a result of fugitive dust emissions from earthworks, construction, and trackout activities. During the operation of the Proposed Development, it is likely that the Proposed Development will result in additional vehicle movements, which have the potential to cause air quality impacts for the following sensitive receptors: • Edinburgh Avenue; • Brasenose Avenue; • Jenner Road; • Paget Crescent; • Salk Road; • Carrel Road; and • Kennedy Avenue. Based on these potential impacts, likely significant effects cannot be ruled out. Therefore, air quality will be scoped into the EIA.
Noise and Vibration	Potential impacts during the construction phase include: • Noise and vibration from on-site works; and • Noise from construction traffic on the A47 Lowestoft Road. Potential impacts during the operational phase include: • Noise from mobile and fixed plant at the Proposed Development; and • Road traffic noise increases from development-generated traffic. A baseline noise survey has been undertaken which indicates relatively low ambient and background noise levels in some areas (as low as 30 dB LA90,T at night). Any significant increase in noise levels could potentially have a noticeable impact on nearby receptors. Overall, noise could result in significant effects, and this has therefore been scoped into the EIA. Vibration effects are not expected to be significant and therefore have been scoped out of the EIA for construction and operation.
Climate Change	Given the scale and nature of the Proposed Development, there is a possibility of significant climate effects, therefore an assessment of climate change resilience and GHG emissions have been scoped into the EIA.
Microclimate - Daylight and sunlight	The Proposed Development has the potential to impact daylight and sunlight availability for surrounding properties, open amenity areas, and key spaces within the hospital itself. The Proposed Development could also impact the following sensitive receptors: • Adjacent residential properties;

TOPIC	CONSIDERATION
	• Schools; • Other buildings that rely on natural light for operation; • Surrounding open amenity spaces such as gardens and playgrounds; and • Key areas within the hospital requiring natural light, such as wards and other sensitive areas. There is the potential for significant daylight and sunlight effects due to the proposed height of the new hospital, and this has therefore been scoped into the EIA.
Population and Human Health	
Economy and Employment	The Proposed Development will generate employment opportunities once fully constructed and in operation. The Proposed Development will also contribute to the local economy from expenditure from operational workers in the local area. The above may be significant and therefore economy and employment will be scoped into the EIA.
Health	As mentioned in Section 14 of this report, consideration will be given to the potentially significant improvements in health because of the Proposed Development, including: • The net change in healthcare capacity for key services; • Identification of the key elements of the scheme that would result in significant improvements in patient outcomes; • Key elements of the scheme that would benefit employees; and • The opportunity for further medical research. Health has therefore been scoped into the EIA.
Material Assets	
Transport	Construction of the Proposed Development will generate an increase in HGV travelling to and from the Site. The increase in construction vehicles in the local area has the potential to negatively impact on driver severance, driver delay, pedestrian severance, pedestrian delay, pedestrian amenity, fear and intimidation, and accidents and safety in/along routes within the study area. Potentially significant operational effects will also be considered in terms of: • Changes in traffic flows; • Severance; • Driver delay; • Pedestrian delay; • Pedestrian amenity; • Fear and intimidation; and • Accidents and safety. Transport will, therefore, be scoped into the EIA for both construction and operational phases of the Proposed Development.

TOPIC	CONSIDERATION
Land, Soil and Water	
Water and Flood Risk	The Proposed Development could result in the following significant effects during the construction phase: • Alteration of the existing drainage regime, potentially increasing flood risk to the Site and adjacent areas; • Risk of flooding from various sources including surface water, watercourses, existing sewers, and groundwater, particularly in the isolated area of surface water flood risk identified in the middle of the Site; • Risk of service interruption to the Anglian Water foul water sewer during diversion works, potentially affecting developments south of the Site; and • Introduction of new receptors (construction workers, materials, and plant) to flood risk in areas where works are proposed. The Proposed Development could result in the following significant effects once operational: • Continued alteration of drainage patterns, potentially affecting flood risk on-site and in surrounding areas; • Increase in foul water treatment works demand, potentially straining existing wastewater treatment facilities; • Impact on the capacity of the existing foul and combined sewer network due to additional wastewater from the development; • Potential changes to groundwater patterns, although the impact is expected to be minimal given the anticipated depth of the groundwater table (8-15m below ground level); and • Alteration of surface water runoff patterns due to changes in Site topography and increased impermeable surfaces. Flood Risk and Drainage has therefore been scoped into the EIA.
Ground Conditions	The Proposed Development could result in the following significant effects during the construction phase: • Potential impact on human health receptors, including construction workers, on-site users, and neighbouring Site users, due to exposure to existing ground contamination or new sources of pollution introduced during construction activities; • Potential impact on controlled water receptors, including the underlying aquifers (Corton Formation - Secondary A Aquifer and Crag Group - Principal Aquifer), due to disturbance of historical contamination or introduction of new sources of pollution; • Potential disturbance and exacerbation of contamination from identified sources such as stockpiles containing various contaminants (particularly asbestos), areas of made ground, fly-tipped materials, and demolition waste; and • Potential impact on construction workers from unexploded ordnance (UXO), as the Site has been identified as having moderate to low UXO risk. The Proposed Development could result in the following significant effects once operational:

TOPIC	CONSIDERATION
	• There may be potential impacts on the health of maintenance workers, future Site users, and neighbouring Site users if any residual contamination remains after construction; and • Potential long-term impacts on controlled waters receptors if contamination pathways are not fully addressed during the construction phase. Ground conditions and contamination have therefore been scoped into the EIA.
Biodiversity	
Biodiversity	Based on the assessment outlined in Section 6 of this report, the Proposed Development may significantly affect on-site habitats, bats, mammals, birds, and reptiles. Given these potential impacts, biodiversity has been included in the scope of the EIA.
Cultural Heritage and the Landscape	
Landscape and Visual	The Proposed Development has the potential to have effects on the physical and perceptual aspects of the landscape, and on the general visual amenity of people who have (or will have) views of the development. For this reason, landscape and visual effects will be scoped into the EIA.
Built Heritage	The Proposed Development could result in the following significant effects during the construction and operational phases: • Potential temporary impacts on the setting of built heritage assets due to construction activities, including the establishment of worksites, storage areas, service diversions, increased traffic, road closures, and the generation of noise, odour, vibration, and dust; • Potential permanent impacts on the setting of built heritage assets due to changes in the built environment, particularly for assets where setting contributes to their heritage significance; • Effects on the setting of Burgh Castle Roman fort, vicus, pre-Conquest monastery and Norman motte and bailey castle (a scheduled monument), subject to detailed assessment; • Potential impacts on the setting of Mill Hill bowl barrow, another scheduled monument located 650m northeast of Caldecott Hall; • Effects on the setting of several Grade II* listed churches within the study area, particularly those closest to the Proposed Development; and • Potential impacts on the setting of the Grade II listed Lighthouse in Gorleston town centre. Built heritage has therefore been scoped into the EIA.
Material Assets	
Waste	The construction phase presents significant potential for waste generation, including: • Additional waste from excavation, demolition, and construction activities; • Possible contaminated land excavation, requiring disposal at approved facilities; and • Surplus materials due to overestimation of supply needs.

TOPIC	CONSIDERATION
	Furthermore, once operational, the Proposed Development is likely to generate substantial commercial waste. Given these considerations, waste management has been included in the scope of the EIA.

4.15 An EIA should only assess the likely significant environmental effects of a development. A number of topics are not considered to be significant. The topics to be scoped out of the EIA and the rationale for their exclusion is set out in **Table 4.2** below.

Table 4.2: Non-Significant Environmental Topics

TOPIC	CONSIDERATION
Air and Climate	
Microclimate	**Odour** With the implementation of a waste strategy for the operational phase of the Proposed Development, significant odour effects are not anticipated. **Wind** Given its maximum height of 8-10 storeys, the Proposed Development is unlikely to significantly alter the local wind environment. The scale of the structure is not expected to create substantial changes in wind patterns or velocities in the surrounding area. Odour and wind will therefore be scoped out of the EIA.
Cultural Heritage and the Landscape	
Archaeology	**Baseline Conditions** The archaeological baseline has been derived from information gathered during the preparation of two archaeological desk-based assessments (DBAs) for the Site (PCA Heritage 2023 and PCA Heritage 2023a) and two archaeological trial trench evaluations of the Site undertaken in 2024 (Pre-Construct Archaeology 2024 and Pre-Construct Archaeology 2024a). The information used for the DBAs was derived from a search of entries in the Norfolk Historic Environment Record (NHER) for an area within 1km of the Site. This information was supplemented by other archaeological, documentary and cartographic sources. A visit to Norfolk Record Office was undertaken and the Site and wider study areas were visited. There is no evidence for Palaeolithic activity within the Site and very little from within the 1km study area. Consequently, the Site may be considered to have a low potential for archaeological remains dating from this period, with any remains that do exist being of medium heritage value in recognition of their rarity. There is also little evidence for a sustained Mesolithic and Neolithic presence within the study area, with what evidence there is largely being based on isolated finds resulting from casual loss. In consideration of this lack of evidence, especially as it occurs within an area where considerable archaeological investigation has taken place, the Site is considered to have a low potential for archaeological remains dating from the

TOPIC	CONSIDERATION
	Mesolithic and Neolithic periods. Naturally, their scarcity would also make any such remains of at least medium heritage value. The discovery within the Site during archaeological trial trenching in 2024 (Pre-Construct Archaeology 2024a) of a ploughed-out barrow and an associated Bronze Age Beaker in a pit adds to mounting Bronze Age evidence from archaeological excavations within the study area as well as the detailed study of aerial photographs. This evidence suggests a sustained Bronze Age presence in the study area and points to a moderate to high potential for archaeological remains of Bronze Age date to be present within the Site. Any such remains are likely to be of medium heritage value. Widespread evidence of Iron Age activity within the 1km study area has been indicated by the study of aerial photographs. Various concentrations of settlement have been observed to the south-west, north and east of the Site. The evidence points to field systems and connecting trackways, although there is also cropmark evidence for what appear to be round houses. This collective body of evidence points to a moderate to high potential for archaeological remains of Iron Age date to be present within the Site. In recognition of their general abundance in the area and Norfolk in general, any such remains are likely to be of low heritage value. The clearest evidence for Roman activity within the surrounding area is Burgh Castle, a major Roman monument within Norfolk. To the south-east of Burgh Castle lies a buried landscape of co-axial field boundaries, trackways, enclosures and other features, all identified by the detailed study of aerial photographs and targeted archaeological fieldwork. Within the Site itself there appears to be one end of a major east-to-west aligned earthwork, possibly of Roman date although as yet unproven by excavation. This evidence points to a moderate to high potential for archaeological remains of Roman date to be present within the Site. In recognition of their general abundance in the area and Norfolk in general, such remains are likely to be of low heritage value. There is some limited archaeological evidence of early medieval activity within the study area, specifically the discovery by excavation of a small early Saxon settlement to the north-west of the Site. However, extensive archaeological work elsewhere within the study area has failed to identify any more by way of Saxon activity, with the remaining evidence being limited to finds deriving from casual loss. The Site may therefore be considered to have a low potential for archaeological remains dating from this period, with any remains that did exist being of medium heritage value in recognition of their rarity. The evidence suggests the Site lay within Gorleston Common throughout the medieval period. In consequence, it is thought there is a low potential for there to be medieval evidence on the Site, with any evidence which may come to light likely to be confined to isolated finds of low heritage value resulting from casual loss. Cartographic and photographic evidence indicates that the Site remained largely undeveloped farmland after Inclosure until the 1970s. The exceptions to this are the areas where the Inclosures of the late post-medieval period resulted in new field boundaries and where short-lived WWII activities were established and have been shown by archaeological evaluation to survive below ground on the Site. Overall, the potential for the Site to contain heritage assets of post-medieval and modern date is

TOPIC	CONSIDERATION
	considered to be moderate to high, with any remains that do survive being of local military and landscape interest only. It is proposed that potential effects on below-ground archaeological heritage assets on the Site are addressed by means of a planning condition which secures a programme of archaeological investigation. It is suggested that the programme of archaeological investigation is secured by a planning condition which states that '*No development shall be carried out on the land until the applicant or their agents or successor in title has secured the implementation of a programme of archaeological mitigation works in accordance with a Written Scheme of Investigation and timetable which have been submitted to and approved in writing by the Local Planning Authority'.* Norfolk County Council's Historic Environment Strategy and Advice Team confirmed on 19 July 2024 to confirm their acceptance of the study areas proposed and that although they believed there will be significant impact to below-ground heritage assets on the Site these might be adequately addressed by way of condition (see **Appendix 2**). Archaeology has therefore been scoped out of the EIA.
Population and Human Health	
Tourism & Retail	There are unlikely to be any tourism and retail effects as part of the Proposed Development. This has therefore been scoped out of the EIA.
Social infrastructure	The Proposed Development is not introducing a new resident population to the area that will require access to social infrastructure. Therefore, this has been scoped out of the EIA.
Biodiversity	
Arboriculture	Both the existing hospital and proposed hospital site have been the subject of an arboricultural survey. A comprehensive tree survey schedule can be found in **Appendix 3** with a corresponding Tree Asset plan in **Appendix 4.** The survey covered two areas of land to the west of the site on Woodfarm Lane and south of the Site on Sidegate Road; however, for the avoidance of doubt these parcels of land are not part of the Proposed Development. **Main Hospital Site** The existing hospital site contains several tree groups, predominantly consisting of planted mixed native species. These groups provide screening for adjacent properties and create green spaces within the Site. Due to their collective landscape value, these groups have been assigned a higher rating than they might receive as individual trees. Notable individual trees of high quality are located in the northern part of the Site, near Brasenose Avenue, which can be protected during demolition or construction. **Anticipated Impacts and Mitigation** Some tree loss and short-term reduction in local canopy cover are inevitable.

TOPIC	CONSIDERATION
	The existing and new hospital sites will mainly impact planted woodland and lower-category individual trees. These impacts can be mitigated through a detailed landscape plan with a 5-year maintenance schedule. Where partial removal of tree groups is necessary, an arboricultural method statement will be implemented to protect the roots and branches of retained trees. **Conclusion** A comprehensive arboricultural impact assessment and detailed method statement will be submitted as part of the planning application. These documents will thoroughly address the anticipated impacts on trees and outline specific protection and mitigation measures. While some tree loss is unavoidable, the overall arboricultural impacts are considered manageable and can be effectively mitigated through careful planning and implementation of protective measures. Given that these impacts are not expected to reach a level of significance that would necessitate inclusion in the EIA, arboriculture has been scoped out.
Material Assets	
Utilities	Provision of utilities will be addressed through appropriate technical reports, as needed, but are not considered a likely significant environmental effect. In addition to this, utility providers have a statutory duty to provide capacity in line with permitted demand. For these reasons, utilities will be scoped out of the EIA.
Major Accidents and Disasters	Regulation 4 (4) requires the identification, description and assessment of expected significant environmental effects arising from the vulnerability of the Proposed Development to relevant major accidents or disasters (MA&D). An assessment of potential MA&D that could affect the Proposed Development has been undertaken, ultimately concluding that MA&D can be scoped out of the EIA. This conclusion is based on a thorough evaluation of various MA&D categories and types, including natural hazards, technological or manmade hazards, and engineering accidents and failures. The assessment systematically examines each potential MA&D event type, considering its relevance to the Proposed Development's location, design, and operational characteristics. It finds that many of the identified risks are either not applicable to the Site or are sufficiently mitigated by existing regulations, design standards, or operational procedures. Where specific risks are identified, such as the potential for unexploded ordnance (UXO) or construction-related hazards, the assessment outlines that these will be managed through standard industry practices, regulatory compliance, and specific mitigation measures. It emphasises that the Proposed Development will be subject to relevant hazard identification studies, and any actions identified will be integrated into the final design to reduce risks to As Low As Reasonably Practicable (ALARP). The construction phase will be managed through the implementation of a construction phase plan required under the Construction Design Management (CDM) Regulations 2015 and a Code of Construction Practice (CoCP).

TOPIC	CONSIDERATION
	Furthermore, the assessment highlights that the design and implementation of the Proposed Development will be guided by industry standards and codes, many of which are mandatory. These standards ensure that risks to people and the environment are either eliminated or reduced to ALARP levels. It also notes that for many potential risks, the level of risk associated with the Proposed Development is no greater than that of the existing hospital or similar infrastructure in the locality. Please refer to **Appendix 6** for further assessment details.
The Inter-Relationship Between the Above Factors	
Secondary Effects	No significant effects have been identified but will be re-considered during the assessments.

Table 4.3: Scoping Matrix

	CONSTRUCTION		OPERATION	
	LIKELY TO BE SIGNIFICANT?	SCOPE IN/OUT	LIKELY TO BE SIGNIFICANT?	SCOPE IN/OUT
Population and Human Health				
Social Infrastructure	No	Out	No	Out
Economy and Employment	Yes	In	Yes	In
Human Health	No	Out	Yes	In
Tourism & Retail	No	Out	No	Out
Biodiversity				
Ecology	Yes	In	Yes	In
Arboriculture	No	Out	No	Out
Land, Soil and Water				
Contaminated Land	Yes	In	No	Out
Flood Risk and Surface Water Drainage	Yes	In	Yes	In
Air and Climate				
Air Quality	Yes	In	Yes	In
Noise	Yes	In	Yes	In
Vibration	No	Out	No	Out
Microclimate – daylight and sunlight	Yes	In	Yes	In
Climate Change	Yes	In	Yes	In
Material Assets				
Transport	Yes	In	Yes	In
Utilities	No	Out	No	Out

	CONSTRUCTION		OPERATION	
	LIKELY TO BE SIGNIFICANT?	SCOPE IN/OUT	LIKELY TO BE SIGNIFICANT?	SCOPE IN/OUT
Waste	Yes	In	Yes	In
Major Accidents and Disasters	No	Out	No	Out
Cultural Heritage and the Landscape				
Archaeology	No	Out	No	Out
Built Heritage	Yes	In	Yes	In
Landscape and Visual	Yes	In	Yes	In
The Interaction Between the Factors Referred to Above				
No significant interactions identified will be reconsidered in the EIA	No	Out	No	Out

4.16 For each of the environmental aspects to be scoped into the EIA, further detail relating to the scope of the assessment is provided in sections 5-21 of this report.

5.0 Air Quality

Introduction

5.1 This section of the EIA Scoping Report has been prepared by Create Consulting Engineers Ltd and sets out the technical details of the air quality assessment which will be reported in the ES.

Baseline Conditions

5.2 An air quality feasibility study was undertaken in March 2023. The feasibility study details the baseline conditions surrounding the Site and expectations in relation to air quality. The following were investigated:

- National and Local legislations and policies; and
- Baseline air quality conditions using GYBC 2023 Air Quality Annual Status Report and DEFRA background maps.

Legislation and Policy Context

National Planning Policy

The Environment Act 1995

5.3 The Environment Act 1995 placed a responsibility on the UK Government to prepare an Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland. The most recent version of the strategy sets out the current UK framework for air quality management and includes several AQOs for specific pollutants.

5.4 The 1995 Act also requires that Local Authorities “review and assess” air quality in their areas, following a prescribed timetable. The Review and Assessment process is intended to locate and spatially define areas where the UK AQOs are not being met. In such instances, the Local Authority is required to declare an AQMA, carry out a Further Assessment of air quality, and develop an Air Quality Action Plan (AQAP), which should include measures to improve air quality so that the objectives may be achieved in the future. The timetables and methodologies for carrying out Review and Assessment studies are prescribed in DEFRA’s Technical Guidance – Local Air Quality Management Technical Guidance (LAQM.TG22).

Air Quality Regulations 2016

5.5 Many of the objectives in the AQS have been made statutory in England with the Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002 for the purpose of Local Air Quality Management (LAQM).

5.6 These Regulations require that likely exceedances of the AQS objectives are assessed in relation to:

"the quality of air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present"

5.7 The Air Quality Standards (Amendment) Regulations 2016 amends the Air Quality Standards Regulations 2010 that transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in England. This Directive sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health.

Clean Air Strategy 2019

5.8 The UK government released its Clean Air Strategy as part of its 25 Year Environment Plan. The Strategy sets out the comprehensive action that is considered to be required from across all parts of government and society.

5.9 The primary focus of air quality management has primarily been related to NO_2 and its principal source in the UK, road traffic. The 2019 Strategy aims to broaden the focus to other areas, including actions on clean growth, emissions from domestic wood burning stoves, industry, and agriculture.

The Environment Act 2021

5.10 The Environment Act 1995 is being updated to include several changes that aim to improve air quality in England. These changes include a requirement for the Secretary of State to review the National Air Quality Strategy every five years, as well as a requirement for annual reports to be made to Parliament on the progress made towards achieving air quality objectives. Additionally, changes are being made to the way AQMAs are designated and managed.

5.11 **Table 5.1** shows the most recent Air Quality Objectives relevant to the Proposed Development.

Table 5.1: Air Quality Objectives (England)

POLLUTANT	AIR QUALITY OBJECTIVES		
	CONCENTRATION		MEASURED AS
Nitrogen Dioxide (NO_2)	200 µg/m^3		1-hour mean not to be exceeded more than 18 times per year
	40 µg/m^3		Annual mean
Particulate Matter (PM_{10})	50 µg/m^3		24-hour mean not to be exceeded more than 35 times per year
	40 µg/m^3		Annual mean
Particulate Matter ($PM_{2.5}$)	Interim target by 2028	12 µg/m^3	Annual mean
	Legally binding target by 2040	10 µg/m3	

National Planning Policy Framework 2023

5.12 In the National Planning Policy Framework (NPPF), paragraph 192 notes that Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or

national objectives for pollutants, considering the presence of AQMAs and Clean Air Zones (CAZs), and the cumulative impacts from individual sites in local areas.

"Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

5.13 The National Planning Practice Guidance (NPPG) (Reference ID: 32-008-20140306), states that air quality assessments and resulting mitigation measures must be location specific and proportionate to the nature/scale of development proposed and the level of concern about air quality.

Environmental Protection Act 1990

5.14 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

5.15 Enforcement of the Act, in regard to nuisance, is currently under the administration of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the Local Planning Authority (LPA) is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practice measures.

Local Planning Policy

GYBC Local Plan

5.16 The Adopted Local Plan sets out a spatial vision, a set of strategic objectives and policies for the future development in the administrative area. The following relevant policies have been identified:

"Policy CS9 – Encouraging well-designed, distinctive places"
High quality, distinctive places are an essential part in attracting and retaining residents, businesses, visitors and developers. As such, the Council will ensure that all new developments within the borough:
f) Seek to protect the amenity of existing and future residents, or people working in, or nearby, a proposed development, from factors such as noise, light and air pollution and ensure that new development does not unduly impact upon public safety.
h) Minimise greenhouse gas emissions and the risk of flooding, through the use of renewable and low carbon energy and efficient site layouts and building designs, in accordance with Policy CS12."

"Policy CS11 – Enhancing the natural environment"
The Council will work with other partner authorities and agencies to improve the borough's natural environment and avoid any harmful impacts of development on its biodiversity, geodiversity, landscape assets, priority habitats and species. This will be achieved by:

a) Conserving and enhancing designated nature conservation sites, including Sites of Special Scientific Interest (SSSIs), Special Protected Areas (SPAs), Marine SPAs, Special Areas of Conservation (SAC), RAMSAR sites, National Nature Reserves, Local Nature Reserves Norfolk County Wildlife Sites and Norfolk County Geodiversity Sites."

"Design and Amenity"
Development proposals will be supported where they protect or promote a high standard of amenity to ensure a suitable living environment in the locality. Planning permission will be granted only where development would not lead to an excessive or unacceptable impact on the amenities of the occupiers of existing and anticipated development in the locality, in terms including:
d. nuisance and disturbance from:

poor air quality (including odours and dust)
Where adverse impacts on amenity are an inevitable consequence of an otherwise desirable use and configuration, measures to mitigate unacceptable impacts will be expected to be incorporated in the development. On large scale and other developments where construction operations are likely to have a significant and long-term impact on local amenity, consideration will be given to conditions to mitigate this thorough a construction management plan covering such issues as hours of working, points of access and methods of construction."

Baseline Air Quality Conditions

5.17 As required by the Environment Act (1995), GYBC has undertaken a review and assessment of air quality within their administrative area. At present there are no exceedances of any Air Quality Objectives (AQOs), and therefore no Air Quality Management Areas (AQMAs) have been designated. The proposed development is not located within close proximity to an AQMA.

Air Quality Monitoring Data

5.18 Monitored data was taken from GYBC's 2023 Air Quality Annual Status Report (ASR). Concentrations measured in 2020 and 2021 should be perceived with caution due to the COVID-19 pandemic where lockdown would have disrupted usual traffic patterns in the UK. These concentrations are likely to be lower than expected in an ordinary year.

Automatic Monitoring Locations

5.19 GYBC undertook automatic monitoring at one site (CM2) in 2022, with results shown in **Table 5.2.** CM2 is located approximately 3.29km north of the Proposed Development.

Table 5.2: Automatic Monitoring Results

SITE ID	SITE NAME	NGR		SITE TYPE	AIR POLLUTANT	ANNUAL MEAN CONCENTRATIONS (µG/M^3)				
		X	Y			2018	2019	2020	2021	2022
CM2	Fenner Road	652983	305658	Urban Background	NO_2	15	15	13	12	13
					PM_{10}	20	21	20	22	20
					$PM_{2.5}$	***12***	***12***	*10*	***13***	***13***

NOTES:
Exceedances of the interim annual $PM_{2.5}$ AQO are highlighted in bold.
Exceedances of the legally binding 2040 annual $PM_{2.5}$ AQO are in italics.

5.20 As shown in **Table 5.2**, annual NO_2 and PM_{10} concentrations do not exceed their relevant AQOs in recent years. Annual $PM_{2.5}$ concentrations have exceeded the interim target of 12 µg/m^3, and the legally binding 2040 AQO of 10 µg/m^3 in recent years.

5.21 CM2 is located in an industrial area near the port where higher volumes of heavy-duty vehicles (HDV) are present. It is expected that pollutant concentrations would be lower at the Proposed Development during operation.

Non-Automatic Monitoring Data

5.22 **Table 5.3** shows monitoring results at the closest monitoring location to the Site. This monitoring location is approximately 3.29km north of the Proposed Development and has been adjusted to provide an average of the triplicate data.

Table 5.3: NO2 Diffusion Tube Results

SITE ID	SITE NAME	NGR		SITE TYPE	ANNUAL MEAN NO_2 CONCENTRATIONS (µG/M^3)				
		X	Y		2018	2019	2020	2021	2022
DT13a, DT13b, DT13c	Fenner Road	652983	305658	Urban Background	13.9	10.5	13.0	13.2	13.3

5.23 As shown in **Table 5.3,** monitored annual NO_2 concentrations have not exceeded the AQOs in recent years.

5.24 The monitoring location DT13 is co-located with CM2. It is expected that pollutant concentrations would be lower at the Proposed Development during operation.

DEFRA Mapped Background Concentrations

5.25 Predictions of background pollutant concentrations on a 1km-by-1km grid basis have been produced by DEFRA for the entire of the UK to assist Local Planning Authorities (LPAs) in their review and assessment of air quality.

5.26 The Proposed Development is located in grid square NGR: 652500, 302500. Data for this location was downloaded from the DEFRA website for the purpose of this assessment and is summarised in **Table 5.4**.

5.27 The background levels have been shown for 2022 (baseline year), 2024 (current year) and 2030 (the proposed opening year).

Table 5.4: DEFRA Predicted Background Concentrations

POLLUTANT	PREDICTED BACKGROUND CONCENTRATION (µG/M^3)		
	2022	2024	2030
NO_X	14.67	13.68	12.10
NO_2	11.02	10.34	9.23
PM_{10}	13.54	13.18	13.00
$PM_{2.5}$	8.75	8.46	8.32

5.28 As shown in **Table 5.4**, DEFRA predicted background concentrations are below their respective AQOs for all years depicted. All concentrations are predicted to reduce further in the proposed opening year.

5.29 The predicted background NO_2, PM_{10} and $PM_{2.5}$ concentrations are lower than monitored concentrations at CM2 and DT13. This could be due to the industrial activities taking place at these locations.

5.30 The DEFRA background concentrations likely represent the current air quality conditions at the vacant site accurately. However, these predicted concentrations will not be indicative of future air quality once the hospital development is operational, as the new facility will introduce additional sources of air pollution.

Potential Impacts

5.31 The proposed masterplan has been reviewed with the following findings, in conjunction with the baseline air quality conditions.

5.32 The Proposed Development currently includes over 2000 car parking spaces. Car parking is expected to encourage the use of private transport, which is expected to exceed 500 movements per day outside of an AQMA. In addition, the new building will require supplies and deliveries to run the hospital. At present, the number of deliveries is unknown, however are not anticipated to exceed 100 HGV movements per day, based on the current masterplans.

5.33 The existing hospital will be demolished on completion of the Proposed Development. The trips created by the existing hospital will contribute to the trips created by the Proposed Development. The movement of trips from the existing hospital to the Proposed Development will create a net change, however, this will also cause a change in traffic distribution across the Site and surrounding area. This will require a modelling assessment to understand the change and distribution in vehicular movements.

5.34 There will be the introduction of new bus stops surrounding the Proposed Development. Once the new hospital is operational, the existing bus stops surrounding the old hospital development will be closed. This is likely to change traffic patterns of bus movements around the Site, and therefore will require a modelling assessment.

5.35 There will be the introduction of several car parks across the Proposed Development. Two car parks are anticipated to be up to ten stories. As a result, this assessment has considered the implication of such parking.

5.36 Overall, it is expected that the Proposed Development would elevate baseline concentrations within the area. Based on this information, it is expected that the extension of the hospital has the potential to worsen current air quality within the area.

5.37 As noted in the baseline air quality conditions, it is expected that monitoring locations, CM2 and DT13, and DEFRA background concentrations are not representative of the Proposed Development during operation. These figures are lower than what would be expected once the new hospital building is in operation.

5.38 The building will be utilising an all-electric energy strategy comprising of heat pumps and/or deep geothermal bore holes to provide heating and hot water. There will be no combustible plant on-site or off-site used to power the hospital.

5.39 There will be a number of standby generators as part of the Proposed Development which will be diesel powered. These generators will only be used for an emergency (e.g. loss of power from the main power supply) and will be tested following the Trusts resting regime which is expected to take the following timetable:

- Weekly – Start the generators and run off-load for circa 5 minutes; and
- Monthly – on-load test for 1 hour.

5.40 Based on this information, there are no concerns for the production of pollutants as a result of the heating regime at the hospital. Testing of the back-up generators will be minimal at less than 50 hours per year and therefore should not cause concern for air quality.

5.41 If there is more than one standby generator that is being tested simultaneously, this will require investigation into the NO_X generation and the impact to the Site users and surrounding area.

5.42 The maintenance and testing of these standby generators will be provided at a later stage of the project. A view on air quality can be made based on the outcome provided by the chosen electrical engineering team.

Approach and Method

5.43 An Air Quality Assessment with dispersion modelling will be undertaken to determine baseline conditions, assess Site suitability for the proposed end use and consider potential impacts as a result of the Proposed Development.

5.44 Methodology to assess the air quality of the Proposed Development at JPUH will be split into construction and operational phases.

Construction Phase

5.45 There is the potential for fugitive dust emissions to occur as a result of construction activities. These will be assessed in accordance with the methodology outlined within the Institute of Air Quality Management's "*Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2)"*, 2024.

5.46 Activities on the construction Site have been divided into four types to reflect their different potential impacts. These are demolition, earthworks, construction and trackout.

5.47 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- The risk of health effects due to an increase in exposure to PM_{10}; and
- Harm to ecological receptors with account being taken of the sensitivity of the area that may experience these effects.

STEP 1

5.48 STEP 1 screens the requirement for a more detailed assessment. An assessment will normally be required where there is:

- a 'human receptor' within:
  - 250m of the boundary of the Site; or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the Site entrance(s).
- an 'ecological receptor' within:
  - 50m of the boundary of the Site; or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the Site entrance(s).

STEP 2

5.49 STEP 2 assesses the risk of potential dust impacts separately for demolition, earthworks, construction and trackout activities. Each activity is allocated to a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (STEP 2A); and
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (STEP 2B).

5.50 The two factors are combined in STEP 2C to determine the risk of dust impacts without mitigation applied.

5.51 STEP 2A defines the potential magnitude of dust emission through the demolition phase. The relevant criteria are summarised in **Table 5.5.**

Table 5.5: Potential Dust Emission Magnitude

MAGNITUDE	ACTIVITY	CRITERIA
Large	Demolition	• Total building volume >75,000m3; • Potentially dusty construction material (e.g. Concrete); • On-site crushing and screening; and • Demolition activities >12m above ground level.
	Earthworks	• Total Site area >110,000m2; • Potentially dusty soil type (e.g. Clay, which will be prone to suspension when dry due to small particle size); • >10 heavy earth moving vehicles active at any one time; and • Formation of bunds >6m in height.
	Construction	• Total building volume >75,000m3; • On-site concrete batching; and • Sandblasting.
	Trackout	• >50 (>3.5t) outward movements in any one day; • Potentially dusty surface material (e.g. High clay content); and • Unpaved road length >100 m.
Medium	Demolition	• Total building volume 12,000m3 – 75,000m3; • Potentially dusty construction material; and • Demolition activities 6-12m above ground level
	Earthworks	• Total Site area 18,000m2 – 110,000m2; • Moderately dusty soil type (e.g. Silt); and • 5-10 heavy earth moving vehicles active at any one time.
	Construction	• Total building volume 12,000m3 – 75,000m3; • Potentially dusty construction material (e.g. Concrete); and • On-site concrete batching.
	Trackout	• 20-50 (>3.5t) outward movements in any one day; • Moderately dusty surface material (e.g. High clay content); and • Unpaved road length 50m – 100m.

MAGNITUDE	ACTIVITY	CRITERIA
Small	Demolition	• Total volume of building to be demolished <12,000m3; • Construction material with low potential for dust release (e.g. metal, cladding, or timber); • Demolition activities <6m above ground; and • Demolition during wetter months.
	Earthworks	• Total Site area <18,000m2; • Soil type with large grain size (e.g. Sand); • <5 heavy earth moving vehicles active at any one time; and • Formation of bunds <3 m in height.
	Construction	• Total building volume <12,000 m3; and • Construction material with low potential for dust release (e.g. Metal cladding or timber).
	Trackout	• <20 HDV (>3.5t) outward movements in any one day; • Surface material with low potential for dust release; and • Unpaved road length <50m.

5.52 Step 2B defines the sensitivity of the area. The sensitivity of the area takes account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM_{10}, the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

5.53 This is provided in **Table 5.6.**

Table 5.6: Sensitivity of Different Types of Receptors and Examples

SENSITIVITY	DUST SOILING EFFECTS	HEALTH EFFECTS OF PM_{10}	ECOLOGICAL EFFECTS
High	• Users can reasonably expect enjoyment of a high level of amenity; or • The appearance, aesthetics or value of their property would be diminished by soiling; and • The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. • Indicative examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	• Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). • Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	• Locations with an international or national designation and the designated features may be affected by dust soiling; or • Locations where there is a community of a particularly dust sensitive species, such as vascular species included in the red data list for Great Britain. • Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	• Users would expect[a] to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or • The appearance, aesthetics or value of their property could be diminished by soiling; or • The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. • Indicative examples include parks and places of work.	• Locations where the people exposed are workers[d], and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). • Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by health and safety at work legislation.	• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • Locations with a national designation where the features may be affected by dust deposition. • Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

SENSITIVITY	DUST SOILING EFFECTS	HEALTH EFFECTS OF PM_{10}	ECOLOGICAL EFFECTS
Low	• The enjoyment of amenity would not reasonably be expected[a]; or • Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or • There is transient exposure, where the people or property would reasonably be expected[a] to be present only for limited periods of time as part of the normal pattern of use of the land. • Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks[b] and roads.	• Locations where human exposure is transient[e]. • Indicative examples include public footpaths, playing fields, parks and shopping streets.	• Locations with a local designation where the features may be affected by dust deposition. • Indicative example is a local nature reserve with dust sensitive features.

NOTES:

a. People's expectations will vary depending on the existing dust deposition in the area.

b. Car parks can have a range of sensitivities depending on the duration and frequency that people would be expected to park their cars there, and the level of amenity they could reasonably expect whilst doing so. Car parks associated with a workplace or residential parking might have a high level of sensitivity compared to car parks used less frequently and for shorter durations, such as those associated with shopping. Cases should be examined on their own merits.

c. This follows Defra guidance as set out in LAQM.TG(22).

d. The air quality objectives and limit values do not apply to people in the workplace, although, such people can be affected by exposure of PM_{10}. However, they are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children are not normally workers.

e. There are no standards that apply to short-term exposure, e.g. one or two hours, but there is still a risk of health impacts, albeit less certain.

Ecological Receptors: The advice of an ecologist should be sought to determine the need for an assessment of dust impacts on sensitive habitats and plants. A Habitat Regulation Assessment of the Site may be required as part of the planning process, if the Site lies close to an internationally designated site i.e. Special Conservation Areas (SACs), Special Protection Areas (SPAs) designated under the Habitats Directive (92/43/EEC) and RAMSAR sites

5.54 The guidance also provides the following additional factors to consider when determining the sensitivity of an area:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and the receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area, and if relevant the season during which the works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and
- Any known specific receptor sensitivities which go beyond the classifications given in this document.

5.55 The sensitivity of the area to dust soiling effects on people and property is shown in **Table 5.7.**

Table 5.7: Sensitivity of the Area to Dust Soiling Effects on People and Property

RECEPTOR SENSITIVITY	NUMBER OF RECEPTORS	DISTANCE FROM THE SOURCE (M)			
		>20	>50	>100	>350
High	>100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

5.56 **Table 5.8** outlines the sensitivity of the area to human health impacts.

Table 5.8: Sensitivity of the Area to Human Health Impacts

RECEPTOR SENSITIVITY	ANNUAL MEAN PM_{10} CONCENTRATION	NUMBER OF RECEPTORS	DISTANCE FROM THE SOURCE (M)			
			>20	>50	>100	>250
High	>32µg/m3	>100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32µg/m3	>100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low

RECEPTOR SENSITIVITY	ANNUAL MEAN PM_{10} CONCENTRATION	NUMBER OF RECEPTORS	DISTANCE FROM THE SOURCE (M)			
			>20	>50	>100	>250
High		1 - 10	High	Medium	Low	Low
	24 – 28µg/m^3	>100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	<24µg/m^3	>100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	>32µg/m^3	>10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 – 32µg/m^3	>10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24 – 28µg/m^3	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	<24µg/m^3	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

5.57 **Table 5.9** outlines the sensitivity of the area to ecological impacts.

Table 5.9: Sensitivity of the Area to Ecological Impacts

RECEPTOR SENSITIVITY	DISTANCE FROM THE SOURCE (M)	
	>20	>50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

5.58 STEP 2C combines the dust emission magnitude (STEP 2A) with the sensitivity of the area (STEP 2B) to determine the risk of unmitigated impacts. **Tables 5.10** to **5.13** provide a method of assigning the level of risk for each activity. This is used to determine the level of mitigation that must be applied. Where the risk category is 'negligible', no mitigation measures beyond those required by legislation will be required.

Table 5.10: Risk of Dust Impacts from Demolition

SENSITIVITY OF AREA	DUST EMISSION MAGNITUDE		
	LARGE	MEDIUM	SMALL
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Medium	Low	Negligible

Table 5.11: Risk of Dust Impacts from Earthworks

SENSITIVITY OF AREA	DUST EMISSION MAGNITUDE		
	LARGE	MEDIUM	SMALL
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 5.12: Risk of Dust Impacts from Construction

SENSITIVITY OF AREA	DUST EMISSION MAGNITUDE		
	LARGE	MEDIUM	SMALL
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 5.13: Risk of Dust Impacts from Trackout

SENSITIVITY OF AREA	DUST EMISSION MAGNITUDE		
	LARGE	MEDIUM	SMALL
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

STEP 3

5.59 The dust risk categories for each of the four activities determined in STEP 2C should be used to define the appropriate, site-specific, mitigation measures to be adopted. For those mitigation measures that are general, the highest risk category should be applied.

5.60 For those cases where the risk is assigned as 'negligible', no mitigation measures beyond those required by legislation are required, however, additional mitigation measures may be applied as part of good practice.

5.61 Where a local authority has issued guidance on measures to be adopted at demolition/construction sites, these should also be taken into account.

STEP 4

5.62 Once the appropriate dust mitigation measures have been identified in STEP 3, the final step is to determine whether there are significant effects arising from the construction phase of a proposed development.

5.63 For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

5.64 There may be cases where, for example, there is inadequate access to water for dust suppression to be effective, and even with other mitigation measures in place there may be a significant effect. Therefore, it is important to consider the specific characteristics of the Site and the surrounding area to ensure that the conclusion of no significant effect is robust.

Operational Phase

5.65 The Proposed Development has the potential to impact on existing air quality as a result of road traffic exhaust emissions such as NO_2, PM_{10} and $PM_{2.5}$, associated with vehicles travelling to and from the Site, as well as expose future site users to elevated pollutant levels. Potential impacts will be defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- Baseline Year (S1) – using the most up-to-date data available to determine the model aligns with the real world, known as the verification process;
- Future Year Without Development (S2) – predicted traffic flows in a future year should the proposals not proceed; and
- Future Year with Development (S3) – predicted traffic flows in a future year should the proposals be completed.

5.66 Receptors potentially sensitive to changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations will be identified within 200m of the affected highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB) on the likely limits of pollutant dispersion from road sources.

5.67 LAQM (TG22) provides the following examples of where annual mean AQOs should apply:

- Residential properties;
- Schools;
- Hospitals; and
- Care homes.

5.68 The sensitivity impact significance of each receptor will be defined in accordance with the criteria shown in **Table 5.14**. These are based upon the guidance provided with the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) document 'Land Use Planning and Development Control: Planning for Air Quality'.

Table 5.14: Operational Traffic Exhaust Emissions - Significance of Impact

LONG TERM AVERAGE CONCENTRATION	% CHANGE IN CONCENTRATION RELATIVE TO AQO			
	1	2-5	6-10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

5.69 The criteria shown in **Table 5.14** is adapted from the EPUK and IAQM guidance with sensitivity descriptors included to allow comparisons of various air quality impacts. It should be noted that changes of 0%, i.e. less than 0.5%, will be described as negligible in accordance with the EPUK and IAQM guidance.

5.70 Following the prediction of impacts at discrete receptor locations utilising the criteria in **Table 5.6**, the EPUK and IAQM document states that this framework is to be used as a starting point to make a judgement on significance of effect but other influences might need to be accounted for. Whilst impacts might be determined as 'slight', 'moderate' or 'substantial' at individual receptors, the overall effect might not necessarily be deemed as significant in some circumstances.

5.71 The following factors may provide some assistance in determining the overall significance of a development:

- Number of properties affected by significant air quality impacts and a judgement on the overall balance;
- Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective will be relevant;
- The percentage change in concentration relative to the objective and the descriptors of the impacts at the receptors;
- Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to substantial increase or decrease; and
- The extent to which an objective is exceeded e.g. an annual mean NO_2 concentration of 41 µg/m^3 should attract less significance than an annual mean of 51 µg/m^3.

5.72 These factors were considered, and an overall significance determined for the impact of operational phase road traffic emissions. It should be noted that the determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This will be considered throughout the assessment when defining predicted impacts.

Air Quality Modelling

5.73 It is proposed to undertake detailed dispersion modelling of road vehicle exhaust emissions from the local highway network using ADMS-Roads Extra in order to:

- Quantify annual mean nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}) and less than 2.5 µm ($PM_{2.5}$) concentrations across the Site;
- Identify areas of potential worst-case exposure; and
- Assess the requirement for mitigation within the scheme design.

5.74 ADMS-Roads Extra is a software package commonly used for the prediction of traffic related pollutant dispersion and results are accepted by DEFRA and the Environment Agency. Modelling will be undertaken using 1-year of meteorological data to predict concentrations of pollutants across the Site for the Proposed Development opening year. Results will be verified using local monitoring data for comparison with the AQOs and displayed graphically across the Site using contour plots for ease of understanding by non-technical stakeholders.

5.75 The results of the dispersion modelling assessment will be utilised to determine areas of potential AQO exceedances on the Site and inform any mitigation strategy necessary to limit future exposure.

5.76 During the operational phase of the Proposed Development there is also the potential for air quality impacts as a result of road vehicle exhaust emissions associated with traffic generated by the Site. It is proposed to assess these by calculating NO_2, PM_{10} and $PM_{2.5}$ levels at sensitive locations without and with the development using the ADMS-Roads Extra dispersion model.

5.77 Sensitive receptors that will be modelled include residential receptors in the adjacent and neighbouring community. The following areas will be considered in the assessment at a minimum:

- Edinburgh Avenue;
- Brasenose Avenue;
- Jenner Road;
- Paget Crescent;
- Salk Road;
- Carrel Road; and
- Kennedy Avenue.

5.78 The modelled results at each sensitive receptor location will be assessed in conjunction with DEFRA's Local Air Quality Management Technical Guidance (TG22) and '*Guidance* on *Land-use planning and development control'* by EPUK and IAQM.

Mitigation

5.79 Dependent on the outcomes of the assessment, there may be a requirement to produce a mitigation strategy in order to reduce potential impacts to an acceptable level. This would be based on best practice guidance. EPUK and IAQM Guidance recommends that good practice design and operational principles such as electric vehicle charging points, boiler emission standards and sustainable travel plans should be considered in all development proposals.

Consultation

5.80 No other consultations have been undertaken at this stage.

6.0 Biodiversity

Introduction

6.1 The Biodiversity ES chapter will describe the baseline environment of the Proposed Development and its surrounding area. It will then assess the magnitude of any potential impacts on biodiversity receptors that could arise during both the construction and operational stages of the Proposed Development and their significance.

6.2 A Preliminary Ecological Appraisal (PEA) (**Appendix 5**) was completed in February 2023 (Norfolk Wildlife Services, 2023) which also reports on a suite of baseline ecological surveys. A suite of baseline ecological surveys have been undertaken across the Site in 2023. Changes to the red line boundary will require an updated PEA to be undertaken to determine the requirement for further surveys and inform the production of the Environmental Statement.

Study Area

6.3 The proposed study areas for the biodiversity features potentially impacted by the Proposed Development are as follows (as presented in Norfolk Wildlife Services, 2023).

Desk Study

6.4 As part of the PEA, information has been obtained from Norfolk Biodiversity Information Service (NBIS). On 16th February 2023, a request was made for records of all statutory and non-statutory designated sites and protected/notable species within 2km of the Proposed Development. The requested information included:

- Statutory and non-statutory designated sites within and up to 2km from the Site;
- Protected or otherwise notable species records within and up to 2km from the Site;
- European Protected Species mitigation licences and great crested newt (Triturus cristatus) licence returns within 1km of the Site.

6.5 An updated request for biological records will be made in 2025 to reflect the change to the red line boundary to ensure the most current and relevant data is incorporated into the environmental assessment. An updated Desk Study of the new area will also be undertaken to inform the EIA process.

Field Survey

6.6 The following field surveys have been undertaken:

- Phase 1 Habitat (JNCC 2010) and UK Habitat Classification Survey within the Site – 17 February 2023;
- Preliminary bat roost assessment (PBRA) within the Site - April/May, June/July/August and Sept/Oct 2023;

- Bat transect surveys with the Site - April/May, June/July/August and Sept/Oct 2023;
- Bat automatic detector survey within the Site - April/May, June/July/August and Sept/Oct 2023; and
- Reptile survey within the Site.

Baseline Conditions

6.7 This section outlines the findings gathered to date and the scope of further field surveys required to establish the ecological baseline, across the full Site, in line with defined study areas presented above.

6.8 Baseline conditions were informed by surveys and assessments undertaken in 2023 but require updating to reflect the new red line boundary. To inform this EIA Scoping chapter, a high-level desk-based assessment was carried out using freely available software. This assessment provides an initial understanding of the potential environmental conditions within the expanded boundary, pending further site-specific surveys.

Designated Nature Conservation Sites

6.9 There are two statutory designated nature conservation sites within 2km of the Proposed Development:

- Southern North Sea Special Area of Conservation (SAC) – approximately 1.4km east of the Proposed Development and extends offshore.
- Outer Thames Estuary Special Protection/Area (SPA) – approximately 1.4Km east of the Proposed Development and extends offshore.

6.10 There are no non-statutory designated sites (i.e. County Wildlife Sites) within 2km of the Proposed Development.

Habitats

6.11 No Habitats of Principal Importance (HPI) are documented in the PEA Report either through on-site surveys or in the Desk Study.

6.12 The PEA report details the results of a Phase 1 Habitat and UK Habitat Classification survey. Habitats noted to be affected by the Proposed Development comprise the following, where judgments have been made on the scale of impact:

- Buildings;
- Developed land - sealed surface;
- Introduced shrub (0.09ha);
- Modified grassland (4.77ha);
- Other neutral grassland (1.09ha);
- Bramble scrub (0.09ha);

- Mixed scrub (0.7ha);
- Other woodland; broadleaved (0.02ha);
- Lowland mixed deciduous woodland (1.61ha); and
- Native hedgerow (0.26km).

6.13 A desk study was conducted across the amended red line boundary, and HPI features were documented. Approximately 0.75ha of deciduous woodland are present to the south-west of James Paget University Hospital. The remaining area adjacent to the woodland, as observed through aerial imagery, consists of shrubland, modified grassland, and bramble scrub habitats.

6.14 Land containing the James Paget University Hospital comprises primarily of buildings and areas of modified grassland.

Protected and Notable Species

6.15 The PEA Report has considered the potential presence of the following species/species groups:

- Badgers *Meles meles*;
- Bats;
- Other mammals;
- Birds;
- Reptiles; and
- Amphibians.

Badger

6.16 No records of badger were returned from NBIS as part of the PEA's Desk Study. The Phase 1 habitat survey was extended to include observations of badger evidence with none observed. No further consideration of this species is proposed.

6.17 Deciduous woodland, providing suitable habitat for badgers that offers both cover and an abundance of food sources such as invertebrates and small mammals is present within the amended red line boundary. Badger surveys are therefore recommended to assess the presence and activity of badgers within the Site. These surveys will help to identify any setts, foraging areas, or potential corridors, and ensure that appropriate mitigation measures are in place to protect badgers during the development process.

Bats

6.18 Numerous records of bats (brown long-eared *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, Daubenton's *Myotis daubentonii*, Nathusius' pipistrelle *Pipistellus nathusii*, noctule *Nyctalus noctula*, serotine *Eptesicus serotinus* and soprano pipistrelle *Pipistrellus pygmaeus*) were obtained from NBIS, the nearest approximately 0.8km north-east of the survey area between 1992 and 2019.

6.19 A bat activity survey method was deployed following Bat Conservation Trust guidelines (Collins, 2016) for a site rated as having low suitability habitat for bats. Walked transect and static detector surveys were completed by way of one survey of each type in April/May, June/July/August and September/October 2023.

6.20 Trees present within the Proposed Development boundary were all noted to be young (under 25 years old) and no potential bat roosting features were noted. The single garage building was determined to have no potential for roosting bats.

6.21 The PEA Report notes that automated detector surveys indicate that the Site has some 'likely foraging significance' for a small number of common pipistrelle; and, to a lesser extent, for a small number of Soprano pipistrelle. Noctule were noted to pass over the Site but were not considered to rely on them for foraging. A variety of less common species were tentatively identified but in low densities so that the Site was not considered to have foraging value.

6.22 Deciduous woodland and buildings within the amended red line boundary offer potential roosting sites in trees and structures. Woodland and scrub across the amended red line boundary also provides potential foraging and commuting opportunities for bats in the surrounding environment. Bat surveys are required to assess the presence, distribution, and activity of bats within the proposed development area. These surveys will help identify potential roosting sites, foraging areas, and commuting corridors, and ensure that any necessary mitigation measures are implemented to protect bats during the Proposed Development process.

Other Mammals

6.23 NBIS returned 42 records of hedgehog within 2km of the Proposed Development between 2002 and 2022. The PEA Report notes the Site had refuge and foraging potential for this species. The amended red line boundary has the potential to support priority mammals such as hedgehogs.

Birds

6.24 The PEA Report notes that there is suitable habitat for nesting of common and widespread species across the Proposed Development Site. These include species listed on the Red and/or Amber list of Birds of Conservation Concern such as house sparrow and starling.

6.25 Deciduous woodland in the south-west of the amended red line boundary offers a potentially suitable habitat for a variety of bird species, providing essential resources such as shelter, food, and nesting opportunities. Further surveys may be necessary to assess the potential impacts of the Proposed Development on bird populations.

Reptiles

6.26 NBIS returned three records of common lizard *Zootoca vivipara* from 2006, approximately 1.3km south-east of the survey area and two historic records of slow-worm *Anguis fragilis* from the 1980s, approximately 1.5km north-west of the survey area.

6.27 The PEA included an assessment of the features likely to support reptiles within the survey area. Surveys were targeted for reptile presence/absence. The survey method used was arrays of artificial refuges (1m x 0.5m size sheets of bitumastic roofing felt) dispersed in the grassland areas and then checked on seven different occasions under suitable weather conditions.

6.28 Across the Site, it was rated as having low but conceivable reptile potential in the PEA.

6.29 The survey refuges were placed on Site on 17 May 2023. One common lizard was recorded along the east boundary of the Site during the 24 July 2023 survey; all of the other surveys were negative.

6.30 The survey refuges were placed on Site on 17 May 2023. All surveys were negative.

6.31 Deciduous woodland and grassland across the amended red line boundary provides suitable habitats for a variety of reptile species, offering a mix of open, sunny areas for basking and sheltered spots for hiding and nesting. A reptile survey is required to determine the distribution and abundance of reptiles in these habitats, assess potential impacts from the Proposed Development and ensure the implementation of appropriate mitigation.

Amphibians

6.32 The absence of identifiable waterbodies within 250m of all portions of the Site points to an absence of amphibians including great crested newts.

6.33 Great crested newts are not considered to be a constraint to the Proposed Development, however a review of waterbodies within a 250m radius of the amended red line boundary will be undertaken as part of the updated PEA.

Potential Impacts

6.34 This section provides a description of potential impacts on biodiversity features during the construction and operational phases of the Proposed Development. **Table 6.1** lists the biodiversity features and presents the justification for scoping in or out of further assessment.

Table 6.1: Elements Scoped in or Out of Further Assessment

FEATURE	SCOPED IN / OUT	PHASE	JUSTIFICATION
Statutory designated sites	Out	n/a	No impacts to statutory designated sites are considered likely. The Proposed Development is separated from all statutory designated sites by urban development and there are no hydrological linkages. There is therefore considered to be no requirement for a Habitat Regulations Assessment (HRA) with respect to the Southern North Sea SAC, Outer Thames Estuary SPA or Breydon Water SPA/Ramsar.

FEATURE	SCOPED IN / OUT	PHASE	JUSTIFICATION
Non-statutory designated sites	Out	n/a	No impacts to non-statutory designated sites are considered likely. The Proposed Development is separated from all non-statutory designated sites by urban development and there are no hydrological linkages.
Habitats	In	Construction	There are potential impacts at a local scale on various on-site habitats (deciduous woodland as a priority habitat, native hedgerow, lowland mixed deciduous and other woodland, other neutral grassland etc.) depending on retention plans.
Badgers	Out	Construction	A badger survey of the amended red line boundary area is required.
Bats	In	Construction/Operation	The demolition of multiple buildings is expected to impact roosting bats. Also, there is potential for impacts on foraging / commuting bats through habitat loss during construction and lighting effects during operation.
Other mammals	In	Construction	Minor impacts are possible on hedgehog populations due to loss of foraging/refuge habitat.
Birds	In	Construction	There is potential for negative impacts to breeding populations of relatively common species from nesting habitat loss. Removing any trees/hedgerow/scrub within the main breeding season (March to August) could conceivably result in active nest disturbance and/or destruction.
Reptiles	In	Construction	The PEA considers there to be a small local common lizard population mainly confined to the grassland, scrub and solar array areas to the west of the existing hospital and there are potential impacts from both injury/loss and habitat loss in the construction phase.
Amphibians	Out	n/a	The PEA details the absence of identifiable waterbodies within 250m of all portions of the Site which points to an absence of amphibians including great crested newts.

6.35 **Table 6.1** is based on the ecology survey and assessment provided as part of the 2023 PEA and a high-level desk-based assessment undertaken in 2025. The conclusions presented in **Table 6.1** are subject to change following the completion of the updated PEA and any further survey requirements resulting from the amended red line boundary area.

Approach and Method

6.36 An assessment of potential impacts on biodiversity associated with Proposed Development will be undertaken with reference to methodology published by the Chartered Institute of Ecology and Environmental Management (CIEEM 2018) and the British Standard for Biodiversity (BS 420020:2013). The assessment process will include the following steps:

- Identification of important biodiversity features;
- Determining the geographic scale at which each feature is important; and
- Determining likely significant effects on each feature.

6.37 The scale at which features are important will be determined with reference to their nature conservation status (i.e. rarity or threat/pressure); their 'biodiversity conservation' importance (which related to the need to conserve representative areas of different habitats and the genetic diversity of species populations); and legal status. A review of the legislation, policy and the sensitivity of each biodiversity feature will be undertaken, and the scale of importance will be determined within a geographical context on the following basis:

- International;
- National (England);
- County (Norfolk);
- Local (Great Yarmouth Borough); and
- Negligible.

6.38 The CIEEM method proposes that a definition of regional importance may be used. However, this scale will not be used in this assessment, as there is no objective, unambiguous source of information for East Anglia as to what population status, level of rarity or threat/pressure would qualify for 'regional importance'.

6.39 **Table 6.2** is broadly based on criteria proposed by CIEEM and outlines the criteria to be taken into consideration for determining the importance of biodiversity features. The CIEEM method does not prescribe how to define different geographical levels of importance but provides general guidance. The table indicates how CIEEM guidance has been interpreted in the context of the proposed assessment.

Table 6.2: Description of Geographical Scales of Ecological Importance

IMPORTANCE	CRITERIA
International	All statutory sites designated or classified under international conventions or European legislation. Habitat types of international conservation importance listed on Annex I of the Habitats Directive. Any regularly occurring/large population of a species of international conservation importance listed on Annexes II, IV and V of the Habitats Directive and Annex I of the Birds Directive.

IMPORTANCE	CRITERIA
National (England)	Sites considered to be important in a national context and protected through national legislation. For example, a site which would meet the published selection criteria for national designation such as SSSI selection guidelines. Habitat types that are considered priorities for conservation in England. For example, Ancient Woodland, a large area of HPI. Any regularly occurring/large population of a nationally important species (e.g. England Red Data Book or species listed under the Wildlife and Countryside Act 1981). A large population of a species identified as Species of Principal Importance (SPI). A species population which would qualify for SSSI designation.
County (Norfolk)	Sites recognised by local authorities such as County Wildlife Sites (CWS) or Roadside Nature Reserves (RNR). County sites that the designating authority has determined meet the published ecological selection criteria for designation. A diverse hedgerow network comprising mostly 'Important' hedgerows. Degraded areas of HPI. Any regularly occurring populations of SPI, Red Listed under the Birds of Conservation Concern (BoCC) (Stanbury *et al.* 2021) or a species listed in a county/district Biodiversity Action Plan (BAP). A regularly occurring, locally significant population of a country/district important species.
Local (Great Yarmouth Borough)	Areas of habitat that appreciably enrich the local habitat resources (e.g. species-rich hedgerows, ponds). Sites that retain other elements of semi-natural vegetation that, due to their size quality or the wider distribution within the local area, are not considered for the above classifications. Populations/assemblages of species that appreciably enrich the biodiversity resource within the local context. Sites supporting populations of county/district important species that are not threatened or rare in the region or county and are not integral to maintaining those populations.
Negligible	Common and widespread species and habitats.

6.40 Effects on biodiversity will be assessed using professional judgement and in the absence of mitigation or compensation measures. The following factors will be considered, whether the effect is positive/negative, its magnitude, its spatial extent, its duration, its reversibility and the frequency and timing of the effect:

- Positive and negative - "Positive and negative impacts and effects should be determined according to whether the change is in accordance with nature conservation objectives and policy";
- Extent - "The extent is the spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions";
- Magnitude - "Magnitude refers to size, amount, intensity and volume";

- Duration - “Duration should be defined in relation to ecological characteristics as well as human timeframes”;
- Frequency and timing - “The number of times an activity occurs will influence the resulting effect”; and
- Reversibility - “An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversable effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.”

6.41 Effect significance will be assessed according to the CIEEM guidance which states that:

“Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of Ecological Impact Assessment (EcIA), ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ (explained in Chapter 4) or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local” (paragraph 5.25, page 24).

6.42 CIEEM recommends that when considering significant effect, the following should be taken account of:

- *“For designated sites – is the project and associated activities likely to undermine the site’s conservation objectives, or positively or negatively affect the conservation status of species or habitats for which the site is designated, or may it have positive or negative effects on the condition of the site or its interest/qualifying features?;*
- *For ecosystems – is the project likely to result in a change in ecosystem structure and function? (paragraph 5.30, page 24).”*

6.43 Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance:

- *“Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area;*
- *Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area* (paragraph 5.33, page 25).”

6.44 As part of the methodology, a cumulative effects assessment will be undertaken in accordance with CIEEM guidance.

Biodiversity Net Gain

6.45 The PEA presents a Biodiversity Net Gain (BNG) assessment through Biodiversity Metric 3.1 to calculate Biodiversity Units (BU). It states that a further 5.342 Area Habitat Biodiversity Units (AHBU) and 0.142 Hedgerow Biodiversity Units (HBU) will need to be created to achieve a

minimum 10% BNG. These values are in addition to the need to fully compensate the units lost by the Proposed Development.

6.46 The BNG assessment requires update to the newly released Statutory Metric.

Consultation

6.47 NBIS have been consulted regarding records of all statutory and non-statutory designated sites and protected/notable species within 2km of the Proposed Scheme requested. No further consultation has been made in respect of the Proposed Development.

Limitations and Assumptions

6.48 To ensure transparency within the EIA process, this EIA Scoping Report is based on the following assumptions:

- This EIA Scoping Report has been based on the findings of the PEA undertaken by Norfolk Wildlife Services and a high-level desk-based assessment undertaken in February 2025;
- The description of potential impacts on biodiversity features during the construction and operational phases of the Proposed Development is subject to change following the completion of the updated PEA and any further survey requirements of the amended red line boundary area;
- The original PEA has not made any recommendations for further ecological survey requirements to inform an EIA. Further consideration of the Proposed Development may however lead to recommendations for additional survey work to inform the baseline than is recommended in this EIA Scoping Report;
- The original PEA states that the solar panel array site was fenced off and inaccessible but was ‘convincingly surveyed by viewing it from the east boundary’;
- The original PEA also reports that the reptile survey was abandoned on 25 September 2023 (5th survey) after consistent and significant public interference with the survey refuges (i.e. moving and disappearance). This was not considered a significant limitation to the results presented; and
- The original PEA reports that the single building did not have roost suitability, although it is not clear whether an internal inspection of the building was carried out. The status of this building will be determined prior to the completion of the EIA.

7.0 Built Heritage

Introduction

7.1 There is potential for significant environmental effects on Built Heritage as a result of the Proposed Development.

7.2 The Built Heritage chapter of the ES will outline the likely effects to built heritage which will arise during the demolition, construction and operation phases of the Proposed Development. It will describe the policy context, the methodology, the baseline conditions, the likely sources of impact and the resultant effects (taking into consideration embedded mitigation), the need for any additional mitigation and enhancement, the significance of residual effects, and any cumulative effects.

Baseline Conditions

7.3 The baseline conditions comprise known built heritage assets surrounding the Site, where built heritage assets are taken to comprise scheduled monuments, listed buildings, conservation areas, registered parks and gardens and selected non-designated heritage assets. There are no built heritage assets within the Site itself.

7.4 The baseline is derived from information gathered during the preparation in March 2023 of two archaeological desk-based assessments for the Proposed Development (PCA Heritage 2023 and PCA Heritage 2023a). The information used was derived from an examination of the National Heritage List for England ('NHLE') for an area within 3km of the Site. The search area was widened to 5km in order to identify which scheduled monuments and registered park and gardens, if any, might be similarly affected. This information was supplemented by documentary and cartographic sources. A visit to Norfolk Record Office was undertaken and the Site and wider study areas were visited.

7.5 There are eight scheduled monuments within 5km of the Site. Five of these are located within the historic core of Great Yarmouth, including the town walls (NHLE 1003782) which help define it. None of the scheduled monuments within the historic core of Great Yarmouth are likely to be affected by the Proposed Development, subject to the results of detailed assessment.

7.6 Burgh Castle Roman fort, vicus, pre-Conquest monastery and Norman motte and bailey castle (NHLE 1013094) lies to the north-west of the Site. This is a major monument which includes the best preserved and most impressive standing Roman remains in Norfolk (Historic England's listing description). Subject to the results of detailed assessment, the setting of this heritage asset may be affected by the Proposed Development. Similarly, the setting of Mill Hill bowl barrow, 650m north-east of Caldecott Hall (NHLE 1017917), a bowl barrow which crowns a natural knoll on former heathland above Belton marshes and the estuary of the River Waveney, may be affected by the Proposed Development (again subject to the results of detailed assessment).

7.7 There is one registered park and garden within 5km of the Site, Somerleyton Park (NHLE 1000188). Subject to detailed assessment, it is thought that the distances and screening involved make it unlikely that the setting of the park will be affected by the Proposed Development.

7.8 There are 46 listed buildings within the 3km study area. Six of the seven Grade II* listed buildings are churches or the remains of churches, the closest of which will lie 1.5km to the north-west of the Proposed Development. Although it is unlikely that substantial harm will be caused to a church by changes to its setting arising from distant development, each church will be assessed for possible impacts to setting from the Proposed Development.

7.9 The majority of Grade II listed buildings within the 3km study area lie within Gorleston town centre, within which they form three groups. By virtue of the distances involved, it is unlikely their setting will be affected by the Proposed Development, with the exception of Lighthouse (NHLE 1245979) where a detailed settings assessment will be undertaken. The remaining Grade II listed buildings range between farmhouses, barns and gentry houses in the countryside around the Site. Whilst not all of these listed buildings will need assessing in greater detail, the impacts on the setting of some will need to be considered further, of which gentry houses are an example.

7.10 There are two conservation areas within 3km of the Site, Cliff Hill, Gorleston and Gorleston Town Centre. Neither is likely to be affected by the Proposed Development.

Potential Impacts

7.11 Both temporary and permanent impacts can occur to built heritage assets as a result of development. Examples of temporary impacts include the establishment and use of worksites during construction, the creation of storage areas, the diversion of services, increases in traffic volumes stemming from the generation of construction traffic, short-term closures of roads and public rights of way and the generation of noise, odour, vibration and dust during construction. In such cases, built heritage assets can be affected as a result of temporary changes to their settings, although only where setting contributes to the heritage significance of the asset.

7.12 Permanent construction phase effects can occur as a result of physical impacts on heritage assets within the Site, of which there are none (direct impacts) and via changes to the setting of heritage assets in the surrounding area (indirect impacts). Examples of permanent indirect impacts include the introduction during the construction phase of permanent changes to the built environment within the physical surroundings of heritage assets.

Approach and Method

7.13 The built heritage assessment will be undertaken within the context of the following legislative instruments and relevant planning policies:

- Ancient Monuments and Archaeological Areas Act 1979;
- Planning (Listed Buildings and Conservation Areas) Act 1990;
- National Planning Policy Framework (NPPF) 2012 (last updated 2023); and

- Great Yarmouth Local Plan (Core Strategy Adopted December 2015, Local Plan Part 2 Adopted December 2021).

7.14 The following guidance will be followed:

- Planning Practice Guidance (PPG) (2016) (last updated 2024);
- Chartered Institute for Archaeologists (2020), *Standard and Guidance for Historic Environment Desk-based Assessment*;
- Chartered Institute for Archaeologists (2020a), *Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment*;
- Highways England (2020), *Design Manual for Roads and Bridges: LA04 Environmental assessment and monitoring;*
- Historic England (2015), *Managing Significance in Decision-Taking in the Historic Environment, Historic Environment Good Practice Advice in Planning: 2*;
- Historic England (2017), *Conservation Principles for the Sustainable Management of the Historic Environment* (draft);
- Historic England (2017a), *The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning: 3*;
- Historic England (2019), *Statement of Heritage Significance: Analysing Significance in Heritage Assets*;
- Institute of Environmental Management and Assessment (2021), *Principles of Cultural Heritage Impact Assessment in the UK;* and
- Institute of Historic Building Conservation (2017), *Conservation Professional Practice Principles*.

7.15 Broadly, the following assessment methodology will be used:

- a gazetteer of built heritage assets will be compiled from the sources referred to above. The gazetteer will form the baseline;
- a site visit, supplemented by viewshed analysis using a Zone of Theoretical Visibility provided by the Applicant, will allow a broad determination of which built heritage assets can be scoped out of further assessment because of a lack of intervisibility. It is accepted that a lack of intervisibility will not automatically lead to the exclusion of a heritage asset from assessment but may do so if augmented by other factors such as distance from the Proposed Development. For scoped-out heritage assets, no further assessment will be undertaken;
- the heritage significance of scoped-in built heritage assets will be determined by considering their archaeological, architectural, artistic and/or historic interests. This heritage significance will be graded on a scale ranging from ‘negligible’ to ‘very high’;
- the predicted level of change to scoped-in heritage assets (in other words, the magnitude of impact) arising from the Proposed Development will be determined on a scale ranging from ‘no change’ to ‘major’. Impacts can be either beneficial or adverse. Selected Accurate Visual Representations as agreed with built heritage consultees will be used in impact assessments;
- the significance of effect arising from change to scoped-in built heritage assets will be determined by weighing the heritage significance of that asset against the predicted level of change. Effects can be beneficial or adverse and will be determined on a scale ranging from

'neutral' to 'very large'. Significant effects are those within the slight to moderate, moderate, large or very large categories. On this definition, effects that are neutral or slight are not significant and will not be considered further, although they would be subject to the same range of measures to address impacts as significant effects;

- impacts on built heritage assets arising from changes to their setting (indirect impacts) will be considered permanent demolition and construction phase effects, although any such effects are likely to continue throughout the operation phase;
- if significant effects are identified, measures to address those effects (in other words, additional mitigation) will be identified;
- significant residual effects after additional mitigation will be determined; and
- the effects on the built heritage baseline arising from cumulative development will be determined.

Consultation

7.16 The following consultees were contacted on 18 July 2024 to agree appropriate study areas:

- Historic England East of England Regional Office (for scheduled monuments and registered parks and gardens); and
- Great Yarmouth Borough Council's Conservation Office (for listed buildings and conservation areas);

7.17 Great Yarmouth Borough Council's Conservation Officer replied on 18 July 2024 to confirm that they agreed with the study areas proposed (these being 3km beyond the Site's boundaries for listed buildings and conservation areas and 5km beyond the Site's boundaries for scheduled monuments and registered parks and gardens).

8.0 Climate Change – Greenhouse Gas

Introduction

8.1 This Greenhouse Gas (GHG) scoping chapter has been prepared by WSP to assess the contribution of the Proposed Development to climate change through the release of GHG emissions. It sets out the proposed methodology for the GHG assessment and identifies which impacts shall be scoped in and which shall be scoped out of the EIA process.

8.2 The requirement to consider a project's GHG emissions results from the 2014 amendment to the EIA Directive (2014/52/EU). The Directive has been fully transposed into the UK law in the EIA Regulations. The Directive requires: '*A description of the likely significant effects of the project on climate (for example, the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change.*'

Baseline Conditions

8.3 The baseline is a reference point against which the impact of the Proposed Development can be compared. A baseline is often referred to as 'Business-as-Usual' (BAU) where assumptions are made on current or future GHG emissions.

8.4 In accordance with the process set out in the Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA) 2022, the GHG assessment will only consider where the Proposed Development results in additional or avoided emissions in comparison to the current baseline and its assumed evolution.

Existing Baseline

8.5 In the 'Do minimum' baseline scenario, GHG emissions are released constantly and widely as a result of human and natural activity including energy consumption (fuel, power), industrial processes, land use and land use change.

8.6 The existing baseline represents current GHG emissions from the assessment prior to construction and operation of the Proposed Development.

8.7 The Proposed Development is an existing hospital building along with ancillary buildings, playground and car park areas. Since the Proposed Development is not a greenfield development, the existing baseline will include operational emissions (from – inter alia – heating, cooling, lighting and electricity) for the existing buildings on-site along with the current end-users' traffic emissions arising from regional traffic flows. Operational energy data can be extracted from Display Energy Certificates (DEC) which are mandatory for all public-facing buildings in the UK including hospitals. To calculate the traffic emissions, the current travel data will need to encompass the distance covered, mode of travel, and number of trips. This will be based on the availability of data.

Future Baseline

8.8 The future baseline will include emissions from the construction and operation of the Proposed Development. The future baseline scenario for traffic emissions will be determined by using the projected traffic data with respect to changes in mode share, trip numbers and distance covered. In relation to embodied carbon emissions that occur in the operational phase (B1-B7) and buildings emissions from energy use, the amount of coal in the UK electricity mix has substantially decreased in recent years, with low and zero carbon technologies (including photovoltaic, wind and nuclear energy) being increasingly used to generate a larger portion of the UK's electricity. This has resulted in a reduction of carbon emissions generated from grid-supplied electricity. As the grid decarbonises, the lower amounts of emissions created through using on-site electricity will result in a lower carbon impact. This also aligns with NHS ambition to deliver the world's first net zero health service by achieving net zero by 2040 for emissions NHS directly control.

Receptors

8.9 The receptor considered for this assessment would be the Global Climate.

Potential Impacts

8.10 In accordance with guidance from the Institute of Environmental Management and Assessment (IEMA), the emissions sources for the Proposed Development (also described as 'elements'), alongside their associated Lifecycle Stage as derived from Publicly Available Specification (PAS 2080), have been identified in **Table 8.1**.

Table 8.1: Likely Emission Sources for the Proposed Development

LIFECYCLE STAGE (AS PER PAS 2080)	ELEMENT	LIKELY SOURCE OF EMISSION
CONSTRUCTION PHASE	Product stage (manufacture and transport of raw materials to suppliers) (A1-3)	Embodied emissions associated with extraction and manufacturing of the required raw materials.
	Transport of materials to site (A4)	Emissions from fuel and electricity used in vehicles transporting materials to site.
	Plant and equipment used during construction (A5)	Emissions from fuels and electricity used in plant and equipment on site.
	Transport of waste (A5)	Emissions from fuel/energy used in vehicles transporting materials away from site.
	Disposal of waste (A5)	Emissions from the final disposal of waste materials.
	Land use, land use change and forestry (A5)	Change in emissions associated with the clearance and disposal of biomass due to the Proposed Development.
OPERATIONAL PHASE	Operation (B1)	Embodied emissions, and emissions associated with electricity use for lighting.

LIFECYCLE STAGE (AS PER PAS 2080)	ELEMENT	LIKELY SOURCE OF EMISSION
	Maintenance (B2)	Embodied emissions, and emissions from transport and plant associated with maintenance.
	Repair (B3)	Embodied emissions, and emissions from transport and plant associated with repair.
	Replacement (B4)	Embodied emissions and emissions from transport and plant associated with replacement.
	Refurbishment (B5)	Embodied emissions and emissions from transport and plant associated with refurbishment.
	Operational Energy Use (B6)	Emissions resulting from the energy used, e.g., heating and cooling, ventilation, lighting, and the combustion of gas.
	Operational Water Use (B7)	Emissions from the use of water required by infrastructure to enable it to operate and deliver its service.
	Land use, land use change and forestry (B8)	Change in emissions associated with the existence of the Proposed Development hindering or promoting the sequestration of CO_2 into biomass.
	Effect on the grid mix (B9/D)	The change in emissions due to the impact of the Proposed Development hindering or promoting the sequestration of CO_2 into biomass.
END OF LIFE	Decommissioning process (C1)	Emissions from decommissioning work (i.e., fuel/electricity).
	Transport and disposal of materials (C2-C4)	Emissions sources as fuel/energy consumption from the transport of materials to disposal sites or recovery.

8.11 Based on the information in **Table 8.1**, professional judgement has been used to identify the emission sources in the construction (C), operation (O) and end of life (EOL) phases, which should be scoped in or out from further consideration in the ES.

8.12 In line with the emission sources identified in, the elements scoped in or out of further assessment are detailed in **Table 8.2**.

Table 8.2: Scoped In and Scoped out Emission Sources in the Proposed Development

ELEMENT	DESCRIPTION OF POTENTIAL EFFECT	APPLICABLE DEVELOPMENT PHASE (C/O/EOL)	SCOPED IN/OUT
CONSTRUCTION			
Product Stage (manufacture and transport of raw materials to suppliers (A1-A3)	Raw materials required for the Proposed Development will result in embodied emissions and have the potential to be significant.	C	In
Transport of materials from suppliers to site (A4)	Construction stage emissions from fuel/energy consumption due to the delivery of material to site have the potential to be significant.	C	In
Plant and equipment use during construction (A5)	Fuel/energy consumption of plant and equipment used during construction would generate GHG emissions.	C	In
Disposal of waste (A5)	Emissions from the disposal of waste are unlikely to be significant, due to a large proportion of construction waste being inert.	C	Out
Land use, land use change and forestry (A5)	The reduction in carbon sequestration due to the Proposed Development during the construction period is not considered to be significant as land use, land use change and forestry will not be in scope due to the type and scale of the Proposed Development.	C	Out
OPERATION			
In-use Emissions B1	This is not considered to be a significant emission source.	O	Out
Replacement and refurbishment B2-B5	The replacement and refurbishment of the Proposed Development would release a potentially significant magnitude of emissions.	O	In
Maintenance B2-B5	Maintenance associated with the Proposed Development is not considered to be a significant emissions source as only a small amount will be additional to the maintenance that already takes place across the Site.	O	Out
Repair B2-B5	The Proposed Development is designed to be maintained rather than repaired, therefore subsequent repair emissions sources are not considered to be material to the assessment.	O	Out
Operational Energy Use B6	Emissions will be released from the heating, cooling, ventilation, domestic hot water,	O	In

ELEMENT	DESCRIPTION OF POTENTIAL EFFECT	APPLICABLE DEVELOPMENT PHASE (C/O/EOL)	SCOPED IN/OUT
	lighting, and auxiliary systems for constructed buildings.		
Operational Water use B7	Emissions due to water usage during the operation phase are unlikely to be significant.	O	Out
End-user emissions (regional traffic flows) – traffic B9/D	Changes to regional traffic flows are expected and this has the potential to result in a significant adverse effect on GHG emissions.	O	In
Land use, land use change and forestry B8	The reduction in carbon sequestration due to the Proposed Development is not considered to be significant as land use, land use change and forestry will not be in scope due to the type and scale of the Proposed Development.	O	Out
DECOMMISIONING/END-OF-LIFE			
Decommissioning process C1-C4	Since there is no certainty of information on the extent of, or processes for, decommissioning Proposed Development assets at their end of life, it is not possible to accurately assess the associated emission impacts of this phase. It is recommended that the C1-C4 stage is, therefore, scoped out.	EOL	Out
C: Construction, O: Operation, EOL: End of Life			

Approach and Methodology

8.13 The GHG emissions assessment is not restricted by geographical area. As per the accepted guidance, it includes any increase or decrease in emissions because of the Proposed Development, wherever that may be. This includes:

- **Construction stage**: embodied carbon emissions (as per stages A1-A5 of PAS 2080) associated with the transport of materials to and from the Site and their manufacture, in addition to the disposal of the building elements during construction;
- **Operational stage**: embodied carbon emissions (as per stages B1-B9 of PAS 2080) associated with the replacement/refurbishment of building parts, emissions associated with the buildings' energy use, including but not limited to: electricity, heating and lighting. Transport emissions arising from the use of the Proposed Development, as well as the surrounding regional road network to gain access to the Site, would also fall under operational emissions, in addition to any shifts in transport modes/patterns which may result;
- **Decommissioning/End of life stage**: embodied carbon emissions (as per stages C1-C4 of PAS 2080) associated with decommissioning works as well as from transport, processing, and disposal of materials during this phase.

Methodology

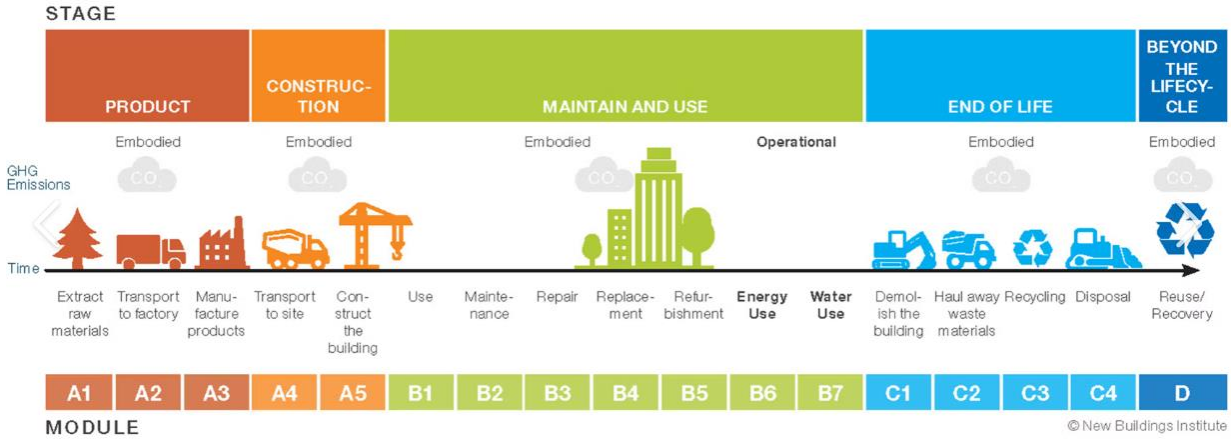
8.14 The methodology outlined in this Scoping Report is based on guidance from IEMA's "Assessing Greenhouse Gas Emissions and Evaluating their Significance" (IEMA 2022). For the GHG assessment required in an EIA, this involves identifying early mitigations, scoping to pinpoint GHG concerns and key sources, defining the assessment's scope and methodology, conducting the GHG emissions assessment with boundaries and methodology, evaluating the significance of emissions, and reporting on the findings.

8.15 The overarching goal of the technical assessment is to both quantify and provide context for GHG emissions throughout the Project's lifecycle. This includes consideration of material use, transport, construction processes, O&M, decommissioning activities, and the consequential reduction in GHG emissions due to the Project's influence on fossil fuel-based energy generation.

8.16 The proposed assessment methodology follows the PAS 2080 guidance covering the 'before use,' 'use,' and 'end of life' stages of the infrastructure lifecycle to estimate the GHG emissions throughout the Project's lifecycle. This approach aligns seamlessly with the latest IEMA guidance, ensuring a comprehensive evaluation with a focus on a reasonable worst-case scenario.

8.17 **Figure 8.1** represents the GHG emissions from the different PAS2080 lifecycle stages.

Figure 8.1: Different Lifecycle Stages in PAS2080



8.18 GHG emissions associated with the various activities considered in the proposed scope of the Project will be calculated by multiplying the activity data with the associated GHG emission factor.

8.19 Baseline data for the GHG assessment will be derived and modelled using:

- One Click LCA Software - embodied carbon calculations;
- The Energy Statement (as submitted in support of the planning submission);
- The Transport Assessment (as submitted in support of the planning submission);
- Department for Energy Security and Net Zero-2005 to 2022 UK local and regional CO2 emissions – data tables, 2022; and

- Royal Institute of British Architects (RIBA) 2030 Climate Challenge

8.20 Subject to the agreement of scoped in elements, the assessment of likely significant effects will follow IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance.

8.21 For all lifecycle stages and sub-stages of the Proposed Development, the assessment will include the following:

- Collection of available data/information on the scale of GHG emitting activities (e.g., tonnes concrete, number of vehicle trips, kWh electricity) for the baseline scenario and for the Proposed Development. In each case this will cover the whole study period; and
- Calculation of the GHG emissions by applying a suitable emissions factor (tCO2e per unit of emissions generating activity).

8.22 The assessment of GHG emissions from the construction of the Proposed Development will employ the following approach:

- Embodied carbon emissions from the construction of the Proposed Development will be based on professional standards and guidance published by the Royal Institution of Chartered Surveyors (RICS); and
- The use of One Click LCA Software (if detailed design information is available).

8.23 The assessment of GHG emissions from the operational energy consumption of the Proposed Development will employ the following approach:

- Operational energy consumption from the building will be calculated using appropriate benchmarks and energy modelling; and
- Projections of future GHG emissions will be calculated using government published data on grid decarbonisation.

8.24 Emissions calculations will focus on emissions annually and values will be reported as tonnes of carbon dioxide equivalents (tCO2e).

8.25 The GHG assessment will quantify the GHG emissions resulting from the Development and determine their significance in the context of local, regional, national climate and international change policy, regulations and technical guidance.

Significance of effect

8.26 The methodology adopted in the ES will attribute a significance of effect level based on the sensitivity/value of the affected receptor(s) and the magnitude of change arising from the Proposed Development. As there is only one receptor ‘the climate’, the IEMA guidance applied recommends a consistent sensitivity (high) no matter the location of the emissions source.

8.27 With regards to assigning significance, the 2nd edition of the IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022) provides five distinct levels

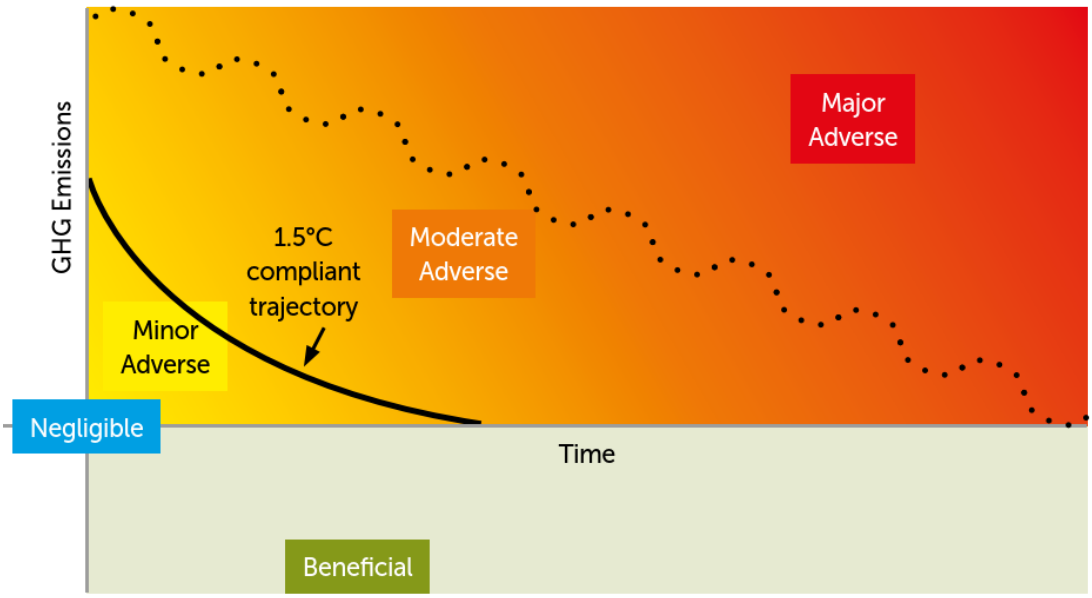
of significance (outlined in para 16.5.8 of the guidance) which are not solely based on whether a project emits GHG emissions alone, but how the project makes a relative contribution towards achieving a science-based 1.5 °C aligned transition towards net zero. Specifically, when considering the aspect of significance, the IEMA guidance states:

*"When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative, or negligible…*and

…The crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050.

8.28 **Figure 8.2** illustrates how the significance of a project's whole life GHG emissions can be determined and how these align with the UK's net zero compatible trajectory.

Figure 8.2: A project's whole life GHG Emissions and how it Aligns with the UK's Net Zero Trajectory



8.29 The levels of significance as defined in the IEMA guidance are outlined below:

- **Major adverse**: the project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
- **Moderate adverse**: the project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project

with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.

- **Minor adverse**: the project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
- **Negligible**: the project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
- **Beneficial**: the project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

8.30 As per the IEMA guidance: major or moderate adverse effects (as well as beneficial effects) are considered significant; minor adverse and negligible effects are considered to be **not significant**.

8.31 Contextualising the GHG emissions from a Proposed Development helps to determine whether it supports or undermines the UK's trajectory towards net zero. IEMA guidance further suggests that *"It is down to the practitioner's professional judgement on how best to contextualise a project's GHG impact"*.

8.32 To contextualise the forecast carbon emissions of the Proposed Development, acquired data will be compared to:

- UK Fourth to Sixth Carbon Budgets (**Table 8.5Table**); and
- RIBA 2030 Climate Change Targets (**Table 8.4**).

Table 8.3: UK's Carbon Budgets 2021

CARBON BUDGET PERIOD	UK CARBON BUDGET
Third: 2018-2022	2,544 $MtCO_2e$
Fourth: 2023-2027	1,950 $MtCO_2e$
Fifth: 2028-2032	1,725 $MtCO_2e$
Sixth: 2033-2037	965 $MtCO_2e$

Table 8.4: RIBA 2030 Climate Challenge Targets – Version 2

RIBA SUSTAINABLE OUTCOME METRICS	BUSINESS AS USUAL (NEW BUILD, COMPLIANCE APPROACH)	2025 TARGETS	2030 TARGETS
DOMESTIC			
Operational Energy kWh/m^2/y	120 kWh/m^2/y	<60 kWh/m^2/y	<35 kWh/m^2/y
Embodied Carbon $kgCO_2e/m^2$	1,200 $kgCO_2e/m^2$	<800 $kgCO_2e/m^2$	<625 $kgCO_2e/m^2$
NON-DOMESTIC			
Operational Energy kWh/m^2/y	130 kWh/m^2/y	<75 kWh/m^2/y	<55 kWh/m^2/y
Embodied Carbon $kgCO_2e/m^2$	1,400 $kgCO_2e/m^2$	<970 $kgCO_2e/m^2$	<750 $kgCO_2e/m^2$

8.33 Based on this contextualisation and professional judgement, the overall significance of effect of the Proposed Development will be defined (based on RIBA targets as per **Table 8.4**) as follows:

- **Major magnitude of impact**: Where the Proposed Development exceeds the "Business as Usual" threshold for embodied carbon and operational energy performance, respectively, as defined by the RIBA guidance;
- **Moderate magnitude of impact**: where the Proposed Development is between the "Business as Usual" and the "2025 Targets" for embodied carbon and operational energy performance, respectively, as defined by the RIBA guidance;
- **Minor magnitude of impact**: where the Proposed Development is between the "2025 Targets" and the "2030 Targets" for the embodied carbon and operational energy performance, respectively, defined by the RIBA guidance; and
- **Negligible magnitude of impact**: Where the Proposed Development is below the "2030 Targets" for the embodied carbon and operational energy performance respectively defined by the RIBA guidance.

Consultation

8.34 The GHG assessment will be prepared based on desk-based research; no primary surveys or consultations will be carried out for the purpose of this work.

9.0 Climate Change Resilience

Introduction

9.1 This chapter considers the impacts of climate change on the Proposed Development, during construction and operation. It sets out the proposed scope and methodology for the EIA and identifies potential impacts.

Baseline Conditions

9.2 The current climate baseline has been assessed using the baseline period from 1991 to 2020. Data has been obtained from the UK Met Office climate averages for the closest weather station to James Paget University Hospital. The weather station is Lowestoft, located approximately 10km south of the Site (Met Office, 2022).

9.3 The UK Climate Projections (UKCP)18 (Met Office, 2018) probabilistic projections for Representative Concentration Pathway (RCP) 8.5[1,2] (high emission scenarios) has been used to infer future changes in a range of climate variables that may affect the vulnerability of the Proposed Scheme to climate change. The Climate Risk Indicators (CRI) (Arnell 2021), developed as part of the UK Climate Resilience Programme have been used in this assessment.[3] The CRI utilises the UKCP18 projections and allows for a range of climate related indicators (including but not limited to, Met Office Heatwaves and heat stress). The CRI data for the local authority of Great Yarmouth Borough Council has been used to inform this assessment.

9.4 The future climate has been presented for the 2030s (2020-2049), the 2050s (2040-2069) and 2080s (2070-2099) to identify the anticipated climate conditions. These projections are provided against the model data baseline period of 1981-2010, and 1991-2020 (current climate) as an indication of change from the baseline period.

9.5 Great Yarmouth has a warm, summer climate, with a narrow range of temperatures and rainfall throughout the year.

9.6 Climate change is projected to lead to warmer wetter winters and hotter drier summers, with an increase in the intensity and frequency of extreme events such as heatwaves, drought, extreme rainfall leading to flash flooding, storms, and wind events. The information presented in

9.7 **Table 9.1** and **Table 9.2** illustrates how the climate may evolve by the end of the century.

[1] Representative Concentration Pathways (RCPs) specify concentrations of greenhouse gases that will result in total radiative forcing increasing by a target amount by 2100, relative to pre-industrial levels. Radiative forcing targets for 2100 have been set at 2.6, 4.5, 6.0 and 8.5 W m-2 named RCP2.6, RCP4.5, RCP6.0 and RCP8.5, respectively.
[2] RCP8.5 (high emission scenarios) is used to ensure a suitable conservative approach in line with IEMA guidance.
[3] There are inherited limitations and uncertainties within the data. Further information on the methodology used to produce this data can be found in Arnell, et al., (2021) Changing climate risk in the UK: a multi-sectoral analysis using policy-relevant indicators. Climate Risk Management 31, 100265 10.1016/j.crm.2020.100265.

9.8 **Table 9.1** provides an overview of current and projected summer and winter temperature and rainfall for Great Yarmouth Local Authority area. Indicators of climate risk are shown in **Table 9.2**. These provide an indication of sector specific thresholds which are projected to change in the future.

Table 9.1: Temperature and rainfall data for the current (1991-2020) and future climate (2030s, 2050s and 2080s) for RCP8.5 (anomalies), the table shows the 50th percentile (10th percentile to 90th percentile) values (Met Office, 2018).

CLIMATE VARIABLE	MODEL REFERENCE (1981-2010)	CURRENT BASELINE (1991-2020)	RCP8.5		
			2030	2050	2080
Average summer temperature (°C change)	16.4° C	16.7 °C	1.3 °C (0.6 °C to 6.6 °C)	2.4 °C (1.2°C to 3.6 °C)	4.5°C (2.4°C to 6.6 °C)
Average winter temperature (°C change)	4.7° C	5.1 °C	1.0° C (0.2°C to 1.8 °C)	1.8 °C (0.7oC to 2.9° C)	3.2 °C (1.9°C to 5.1 °C)
Min winter temperature (°C change)	4.4 °C	2.7 °C	1.3 °C (0.2oC to 1.9° C)	1.8 °C (0.6°C to 3.3 °C)	3.4 °C (1.3oC to 5.7 °C)
Max summer temperature (°C change)	17.2 °C	20.3 °C	1.5 °C (0.5°C to 2.5°C)	2.6 °C (1.1oC to 4.1 °C)	4.9 °C (2.4oC to 7.5 °C)
Average summer Rainfall (% change)	157.5%	170.9%	-9.4% (-25.8% to 6.8%)	-17.4% (-38.9 to 1.8%)	-32.4% (-58.2% to -5.5%)
Average winter rainfall (% change)	147.6%	154.7%	4.6% (-3.1% to 13.3%)	8.7% (-2.8% to 21.9%)	18.9% (0.8% to 40.7%)

9.9 The indicators presented in **Table 9.2** are provided against the model reference period of 1981-2010. These indicators are unavailable for the current baseline period (1991-2020).

Table 9.2: Future projections (absolute) of climate risk indicators for the 2030s, 2050s and 2080s for RCP8.5, the table shows the 50th percentile (10th percentile to 90th percentile) values[4]

CLIMATE VARIABLE	MODEL REFERENCE (1981-2010)	RCP8.5		
		2030	2050	2080
Met office heatwave[4] (events per year)	0.2	0.8 (0.3 to 1.6)	1.7 (0.6 to 3.6)	4.0 (1.7 to 5.6)

[4] A UK heatwave threshold is met when a location records a period of at least three consecutive days with daily maximum temperatures meeting or exceeding the heatwave temperature threshold. The threshold for the local area is 28 °C.

CLIMATE VARIABLE	MODEL REFERENCE (1981-2010)	RCP8.5		
		2030	2050	2080
Met office Cold weather alert[5] (events per year)	2.8	1.8 (1.2 to 2.5)	1.2 (0.7 to 2.1)	0.6 (0.2 to 1.5)
Road melt risk (days per year)[6]	11.2	23.4 (15.3 to 33.7)	36.7 (20.9 to 56.2)	67.0 (35.6 to 98.3)
Road accident risk (days per year)[7]	38.4	26.2 (18.5 to 34.4)	19.0 (10.7 to 30.2)	10.0 (3.7 to 23.0)
Soil moisture – summer (% change)*	0	-13.5 (-24.2 to -7.0)	-19.0 (-29.6 to -16.9)	-29.4 (-38.8 to -25.7)
Soil moisture – winter (% change)*	0	-3.6 (-8 to -1.6)	-5.4 (-11.1 to – 2.8)	-8.1 (-13.3 to -4.7)
Heat stress[8] (days per year)	0.02	0.1 (0.1 to 0.5)	1.1 (0.2 to 3.7)	8.0 (1.6 to 22.6)
Heating degree days[9]	2152.7	1868.9 (1721.9 to 2010.5)	1684.8 (1479.8 to 1888.3)	1343.6 (1051.4 to 1646.7)
Cooling degree days[10]	109.9	42.5 (27.0 to 63.4)	71.7 (38.2 to 123.9)	169.8 (72.1 to 323.1)
Wildfire events[11] (days per year)	19.1	31.6 (19.4 to 48.5)	42.6 (22.4 to 69.9)	69.5 (31.8 to 108.2)
SPEI Drought*	0.7	0.1 (0.1 to 0.2)	0.2 (0.1 to 0.3)	0.3 (0.1 to 0.4)

*Regional data only

Sea Level Rise and Flood Risk

9.10 The Proposed Development is located approximately 1km from the coast. Sea level projections at the closest marine projections data point, approximately 20km north-west of the closest section of the red line boundary, range from 0.20m in the 2030s to 0.64m in the 2080s. **Table 9.3** below depicts the projected sea level rise for the 2030s, 2050s and 2080s using UKCP18 marine projections data.

9.11 The Proposed Scheme is not likely to be impacted by sea level rise due to its location at least 10m above sea level.

[5] The occurrence of a public health cold weather alert.
[6] Days with maximum temperature above 25 ºC.
[7] Days with minimum temperature below 0ºC.
[8] Days with shade Wet Bulb Globe Temperature (WBGT) above 25ºC.
[9] Average annual number of heating degree days. Heating degree days are a measure of how much (in degrees), and for how long (in days), the outside temperature sits below 15.5ºC.
[10] Average annual number of cooling degree days. Cooling degree days are a measure of how much (in degrees), and for how long (in days), the outside temperature sits above 22ºC.
[11] Days with Met Office Wildfire Index at the Very High Fire Severity Level or above.

Table 9.3: Projected Sea Level Rise data (m) at the nearest data point to the Proposed Development

2030S	2050S	2080S
0.20m (0.16m to 0.25m)	0.35m (0.27m to 0.44m)	0.64m (0.49m to 0.83m)

Humidity

9.12 The annual relative humidity levels for the area around the Site are 80% to 84% (Met Office 2022). Projections for humidity anticipate an average decrease of approximately -1.98% in the 2030s (-3.1% to -0.25%), and a decrease of -1.28% in the 2050s (-2.74% to 0.10%).

Snow

9.13 With regards to future changes, rising winter temperatures are likely to reduce the amount of precipitation that falls as snow in winter. Snowfall data is unavailable for the probabilistic projections (25 km), however both the regional (12 km) and the local (2.2 km) show a decrease in both falling and lying snow across the UK for the period of 2061-2080 relative to the 1981-2000 baseline.

Wind

9.14 UKCP18 depicts a wide spread of future changes in mean surface wind speed, however, there is large uncertainty in projected changes in circulation over the UK and natural climate variability contributes to much of this uncertainty. It is therefore difficult to represent regional extreme winds and gusts within regional climate models.

9.15 Central estimates of change in mean wind speed for the 2050s are small in all ensemble runs (<0.2 ms^{-1}). A wind speed of 0.2 ms^{-1} (approximately 0.4 knots) is small compared with the typical magnitude of summer mean wind speed of about 3.6–5.1 ms^{-1} (7 – 10 knots) over much of England. Seasonal changes at individual locations across the UK lie within the range of –15% to +10%.

9.16 In terms of storms, the analysis presented is a summary of expected changes in storm patterns under a changing climate. A storm is defined by the Met Office as a wind event measuring 10 or higher on the Beaufort scale (equivalent to a wind speed of 27 ms^{-1} or 60 mph).

9.17 Studies (Blecher *et al* 2014) relating to future projections of storms suggest that climate driven storm changes are less distinct in the northern than southern hemisphere. However, such is the wide range of inter-model variation, robust projections of changes in storm track are not yet possible and there is low confidence in the direction of future changes in the frequency, duration or intensity of storms affecting the UK.

Potential Impacts

9.18 For the climate change resilience assessment, potential impacts arise as a result of climate change effects on the components (receptors) of the Proposed Development. Receptors will be confirmed at ES stage but are likely to include the new hospital, ancillary buildings, parking, landscaping, road network and land for future development.

9.19 The construction phase will include the demolition of the existing hospital building. The anticipated construction time is in the short term (2027-2031) and a Construction Environmental Management Plan will be developed which will include measures for managing extreme weather-related events. The construction phase will be scoped out at ES stage.

9.20 The climatic conditions for the Proposed Development will continue to change over the century. Based on the future climate projections, the climate trends and hazards which may impact the receptors identified in **Table 9.4**. Furthermore, potential impacts that may occur to the receptors due to the climate hazard have also been summarised in **Table 9.4**.

Table 9.4: Climate Trends for the Site Location

CLIMATE PARAMETER	CLIMATE TREND DESCRIPTION	CLIMATE HAZARD	POTENTIAL IMPACTS
Temperature	Increased frequency and intensity of hot spells (summer)	Hotter days (and nights). Decrease in relative humidity.	Increased occurrence of heat stress or fatigue for staff, patients, and visitors during prolonged time in high temperatures. Increased energy demand for cooling and ventilation and related increased reliance on energy suppliers. Interrupted power supply due to overheating. Increased demand for water to maintain green spaces. Damage to greenspaces due to extreme heat and water availability.
	Decreased frequency and intensity of cold spells (winter)	Colder days	Breakages, failure of equipment and leakage due to pipework becoming more brittle when cold or frozen. Damage to greenspaces as a result of frost. Materials become more brittle when cold or frozen, resulting in breakages and potential failure of equipment.
Precipitation	Increased frequency, volume, and duration of extreme precipitation events (winter)	Surface water flooding (and standing water). Soil destabilisation, landslips, landslides, or subsidence. Heavy rainfall.	Overwhelming of drainage systems leading to general site flooding. Increased rates of rusting or corrosion of above ground equipment and infrastructure. Damage to plants and greenspaces due to heavy rainfall.
	Decreased frequency, volume, and duration of snow/ice events (winter)	Days with snow/ice	Damage to equipment or infrastructure from snow loading or ice build-up. Increased risk of accidents (slips and falls). Road infrastructure damaged by freeze-thaw action.

CLIMATE PARAMETER	CLIMATE TREND DESCRIPTION	CLIMATE HAZARD	POTENTIAL IMPACTS
Dry Periods and Drought	Increased number of dry days and decreased precipitation	Soil hardening, cracking, and destabilisation. Reduced water availability.	Damage to structures due subsidence from changes in soil moisture and ground water levels. Damage to plants and greenspaces as a result of drought.
		Wildfire	Critical damage to structures from wildfire.
Wind and Storms	Increased intensity of wind and storm activity	High winds. Lightning and lightning strikes.	Damage to critical infrastructure Information Technology and communications. Increase in lightning events leading to asset damage due to strike/fire. Interrupted power supply due to high winds.

Approach and Method

9.21 The approach to assessing risk from climate variables is based on current best practice, standards, and guidance such as ISO 14091 (ISO 2019), the UK Independent Assessment of Climate Risk, IEMA Environmental Impact Assessment (EIA) Guide to Climate Change Resilience and Adaptation, and ISO 14090: Adaptation to climate change – Principles, requirements, and guidelines.

9.22 The climate change resilience assessment will use a risk assessment approach to evaluate the vulnerability of the receptors to the climate hazards and assess the likelihood and consequence of the potential impacts.

9.23 The climate change resilience assessment follows a step-by-step methodology focusing on the identification of impacts to the receptors due to specific climate hazards and effects based on climate influenced changes. In summary, the process begins with the identification of climate hazards and trends using observed climate data and future projections. Then the sensitivity of the receptors, considering any existing resilience measures (adaptive capacity), are considered, to understand the receptor vulnerability.

9.24 Where receptors are identified to have medium, high or very high vulnerability, the associated potential impacts are assessed in terms of the likelihood of potential impact occurring due to climate change and the consequence to the Proposed Development if the impact did occur. The likelihood and consequence assessment also takes into account the findings of the vulnerability assessment and measures embedded into the design to build in resilience to climate change.

9.25 The assessment of significance will be determined by the results of the risk assessment.

Consultation

9.26 Consultation has not been required to inform the scoping as the baseline information is publicly available and the methodology follows good practice guidance.

10.0 Daylight and Sunlight

Introduction

10.1 This chapter of the ES will assess the impact of the Proposed Development on daylight and sunlight conditions. The assessment will determine the effect of the Proposed Development on daylight and sunlight availability to windows, rooms, and amenity areas of relevant surrounding developments. Additionally, it will evaluate the level of daylight within key spaces of the hospital, such as wards and other sensitive areas where natural light is expected. In addition, the daylight and sunlight chapter will assess the level of daylight within key spaces of the hospital such as wards and other sensitive areas where there is an expectation of natural light.

10.2 The daylight, sunlight, and overshadowing assessment will determine the likely loss of light to adjacent buildings and open amenity areas resulting from the Proposed Development. To this end, the study will quantify the daylight and sunlight availability to the receptors identified and will derive the resulting ratio between the baseline and the proposed conditions to define the impact.

10.3 The study will identify sensitive receptors such as the adjacent residential properties, but also schools, and any other building that relies on natural light for its operation. These areas are where occupants reasonably expect to receive daylight and sunlight, including the proposed amenity areas within and off-site. Surrounding open amenity spaces such as gardens and playgrounds that may be affected by the Application Site will also be part of the assessment.

Baseline Conditions

10.4 The baseline assessment will be undertaken based on the current hospital site to set out the existing condition. This will be assumed to be the Site with the existing hospital buildings within the existing surroundings as shown in **Figure 10.1**.

10.5 The baseline assessment will be used as a reference from which the magnitude of change will be measured for the Proposed Development, which will be assessed under equal conditions.

10.6 The information to define the baseline model will be collected from available sources including existing drawings, topographical surveys, information from mapping data, aerial photographic data for the area, and drawings within the planning portal.

Figure 10.1: Existing Hospital for Baseline Assessment

Potential Impacts

10.7 Potential impacts are those where the daylight and sunlight conditions of a receptor deteriorate or improve as a result of the Proposed Development such that it either falls short or satisfies the recommended criteria of usage as defined in the recommended guidelines.

10.8 The assessment of effects on the receptors surrounding the Site will be based on an assessment of the change from the 'Baseline Scenario' assumed to be the existing application Site and the existing properties surrounding the Site (including properties under construction at the time of the assessment assessed in their final form, if applicable).

10.9 In the 'Proposed Scenario' the Proposed Development will be introduced on the Site replacing the existing buildings for a direct comparison. This approach allows determining the impact that the Proposed Development will have on the surrounding properties in terms of daylight, sunlight and overshadowing of open spaces.

Approach and Method

Impact On Neighbouring Properties

10.10 As mentioned in the Potential Impacts section, the assessment will consider the magnitude of change between the Baseline and Proposed Scenarios. An additional scenario will evaluate the cumulative effects, which include adjacent consented schemes along with the Proposed Development. The magnitude of impact for this scenario will also be measured against the Baseline Scenario.

10.11 The assessment of the daylight and sunlight impacts will comprise 3 scenarios:

- Baseline Scenario: Assessment of the existing buildings on the Site with the existing surrounding context;
- Proposed Scenario: Assessment of the Proposed Development on the Site with the existing surrounding context; and

- Cumulative Effects: This scenario includes the effects of the Proposed Development in combination with other future (consented) schemes.

10.12 The assessment criteria to be used for the study will be based on the guidelines within the Building Research Establishment (BRE) Guide: Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice which is recognised as the most appropriate method for daylight, sunlight and overshadowing assessments.

10.13 Whilst the BRE Guide provides numerical guidelines for daylight, sunlight and overshadowing, the Guide is not an instrument of planning policy, therefore some level of flexibility should be applied where appropriate.

10.14 The sensitive receptors to be considered in the assessment include:

- Existing properties in the surrounding area;
- Open amenity areas; and
- Key areas requiring natural light within the hospital building.

Receptors

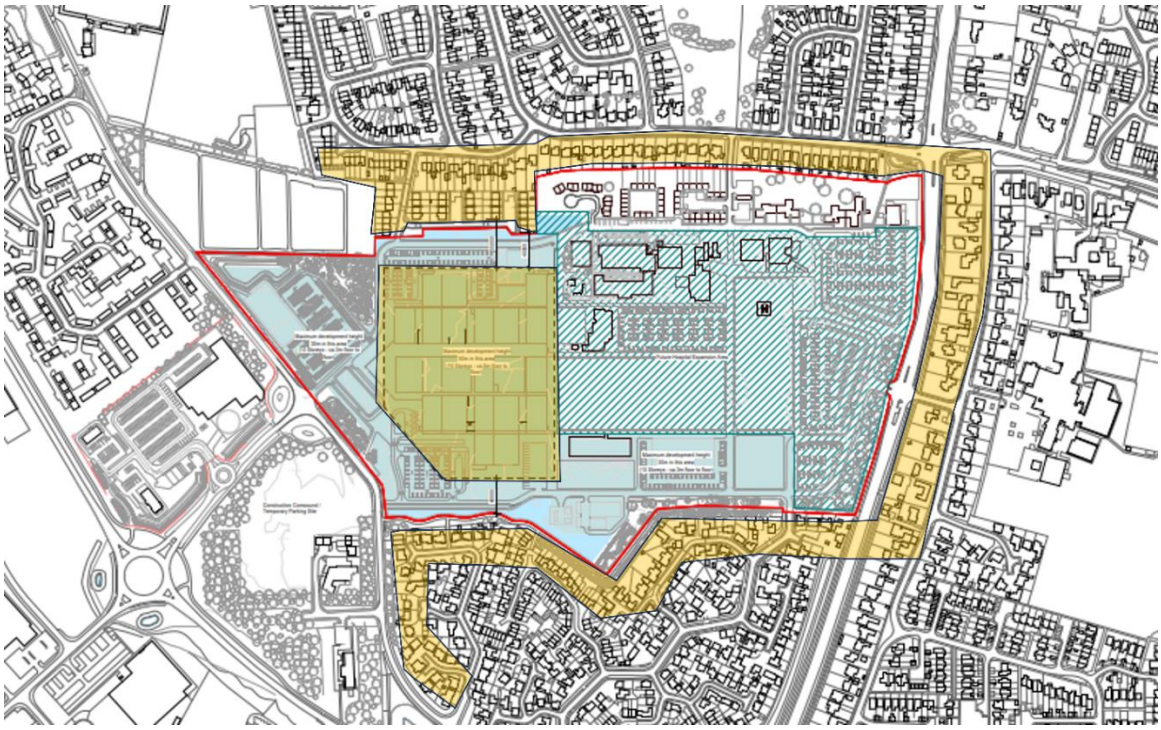
10.15 The receptors for the daylight and sunlight assessment will be the habitable rooms both within and outside the Proposed Development where there is a requirement for natural light. These would include spaces internal and external both within the hospital and sensitive adjacent properties.

10.16 In order to undertake the assessment, the key sensitive receptors around the Site need to be identified. According to the BRE Guide, sensitive receptors are described as rooms and windows to habitable rooms facing the Site where the occupants have a reasonable expectation of natural light.

10.17 The guidelines for sunlight will be applied to the existing properties for the windows facing within 90° of due south.

10.18 Sensitive receptors for overshadowing of open spaces include gardens and open amenity spaces on adjacent properties, excluding public footpaths, front gardens and car parks.

Figure 10.2: Indicative New and Existing Receptors.



Sensitivity of Receptors

10.19 A sensitivity rating has been developed using professional judgement based on the BRE Guide, which is described below and categorised into high, medium and low based on the function or use of the space being assessed. This rating is indicative and there will be occasions where the sensitivity may be interpreted differently:

Daylight

- Habitable rooms such as living rooms, kitchens and bedrooms within residential developments generally require good levels of daylight to render them more enjoyable and adequate to their function. Windows to such spaces are classified as having high sensitivity to daylight;
- Non-domestic buildings where the occupants have a reasonable expectation of daylight but where artificial light is common and do not solely rely on natural light, such as offices, hotels, hostels, and schools, have been classified as having a medium sensitivity to daylight; and
- Retail developments usually rely on mechanical control and are not considered spaces where there would be an expectation of daylight by the user. Thus, windows to such spaces can be classified as having low sensitivity to daylight.

Sunlight

- Windows of residential dwellings have been classified as having high sensitivity to sunlight, particularly for living rooms and conservatories. In the absence of internal layout information of the surrounding residential developments, all windows on the southern façades will be classified as having a high sensitivity to sunlight as a worst-case scenario;
- Windows of non-domestic buildings where people spend a considerable amount of their time, such as offices, hotels, hostels, and schools, are classified as having a medium sensitivity to sunlight particularly for the windows on the southern facades; and

- Retail developments usually rely on mechanical climate control to achieve comfort and reduce the effect of outside air and noise pollution, particularly in urban areas. Receptors to these spaces are classified as having a low sensitivity to sunlight.

Overshadowing of Open Amenity Spaces

- For the purpose of the overshadowing assessments, gardens and open amenity spaces on adjacent properties are classified as having a high sensitivity; and
- Open areas which are not designated to be used by the general public as an amenity area, such as street landscape, and roundabouts, are classified as having a low sensitivity.

10.20 For the purpose of this assessment and given the nature of the locality, only receptors with high and medium sensitivity will be assessed.

Metrics and Criteria - Existing Receptors

10.21 The assessment will be carried out to determine the level of adherence to the recommended BRE Guide on the existing adjacent properties.

10.22 The BRE Guide uses a set of metrics to quantify the potential effect on daylight and sunlight levels including:

- Obstruction Angle (25°);
- Vertical Sky Component (VSC);
- No-Sky Line (NSL); and
- Probable Sunlight Hours (PSH: Annual Probable Sunlight Hours - APSH and Winter Probable Sunlight Hours - WPSH).

Obstruction Angle

10.23 This is an initial check to identify any potential impacts. If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected, and further detailed studies should be carried out.

Vertical Sky Component (VSC)

10.24 When the obstruction angle and the visible sky angle (θ) vary significantly when multiple windows are involved, then the Vertical Sky Component (VSC) should be used instead. The calculation of VSC usually requires specialist computer software. The VSC, in simple terms, measures the amount of sky that can be viewed from the centre of a window accounting for all external obstructions, (with 40% being the maximum value for an unobstructed window). The recommended value for VSC is 27% or greater to maintain good levels of daylight. For existing surrounding windows, if the VSC is below 27%, then a comparison of the existing and proposed VSC levels with the new development in place is calculated and a ratio of impact is derived. The BRE guidance recommends that the maximum reduction of the VSC to existing windows should be 0.8 times their former value.

No-Sky Line (NSL)

10.25 No-Sky Line (NSL) is used to assess the daylight distribution within rooms of the surrounding properties where the internal layout of the property is known. The No-Sky Line divides the areas of the working plane that can receive direct skylight from those which cannot. If a significant area of the working plane (normally more than 20%) lies beyond the No-Sky Line (i.e. receives no direct skylight) then distribution of daylight in the room will look poor and supplementary electric lighting will be required. The BRE guidance recommends that the maximum reduction of the NSL to existing rooms should be 0.8 times their former value.

Probable Sunlight Hours (PSH)

10.26 Access to sunlight is measured from the windows of habitable rooms facing within 90° of due south. The Probable Sunlight Hours (PSH) calculation method measures the proportion of the window assessed that is sunlit for a period of time. The BRE Guide and BS EN 17037 recommend that the PSH is calculated for the annum (APSH) and for the winter months (WPSH) (21st September to 21st March). The recommended sunlight criteria for existing buildings potentially affected by a new development, are as follows:

- The window reference point should receive more than 25% of APSH, including at least 5% of WPSH;
- If the available sunlight hours are both less than the amount given above and less than 0.8 times their former value, either over the whole year or during the winter, then the occupants of the existing building will notice some loss of sunlight; and
- The overall loss of sunlight should be maintained below 4%.

Overshadowing of Open Amenity Areas

10.27 For gardens or amenity areas, the BRE Guide suggests that at least half the area (50%) should receive at least two hours of sunlight on 21st March (sunlight at an altitude of 10° or less is excluded). If, as a result of a new development, an existing garden (usually the main back garden of a house) or amenity area does not meet the above criteria and the area which can receive two hours of sunlight on 21st March is less than 0.8 times its former value, then the loss of sunlight is likely to be significant.

Determining Magnitude of Change

10.28 The BRE criteria will be used to assess the likely levels of daylight and sunlight to habitable rooms in the surrounding properties. Compliance with the BRE Guidelines is achieved if the levels of daylight/sunlight within the identified receptors of the surrounding properties are equal to or greater than the recommended values given in the Guide.

10.29 Compliance with the BRE Guide is also achieved for the identified receptors of the surrounding properties if the ratio of impact between the ‘Baseline Scenario’ and the ‘Proposed Scenario’ is 0.80 or higher, i.e., the reduction in daylight or sunlight hours is 20% or less. An additional criterion of overall annual loss for APSH values also needs to be satisfied to comply with the recommended BRE guidelines.

10.30 A negligible magnitude of change is defined if compliance with the BRE criteria is met.

10.31 When the criteria are not met, the BRE document does not provide guidelines for determining the magnitude of the impact. Therefore, a scale to measure the magnitude of change has been provided using professional judgement, which is discussed below.

10.32 For the affected receptors that lie below the recommended BRE guidelines, the magnitude of change will be rated depending on the ratio of impact between the 'Baseline Scenario' and the 'Proposed Scenario'. The criteria to be used for determining the magnitude of change for the VSC, NSL, APSH and WPSH results is detailed in **Tables 10.1 to 10.4**.

Table 10.1: Magnitude of Change for Vertical Sky Component (VSC) Results

VSC VALUES	RATIO OF IMPACT	MAGNITUDE OF CHANGE
VSC ≥ 27%	≥0.8	Negligible
VSC ≥ 27%	<0.8	Negligible
VSC < 27%	>0.8	Negligible
VSC < 27%	0.7 – 0.8	Low
VSC < 27%	0.6 – 0.7	Medium
VSC < 27%	<0.6	High

Table 10.2: Magnitude of Change for No-Sky Line (NSL) Results

NSL VALUES	RATIO OF IMPACT	MAGNITUDE OF CHANGE
NSL ≥ 80%	≥0.8	Negligible
NSL ≥ 80%	<0.8	Negligible
NSL < 80%	>0.8	Negligible
NSL < 80%	0.7 – 0.8	Low
NSL < 80%	0.6 – 0.7	Medium
NSL < 80%	<0.6	High

Table 10.3: Magnitude of Change for Annual Probable Sunlight Hours (APSH) Results

APSH VALUES	RATIO OF IMPACT	ABSOLUTE REDUCTION	MAGNITUDE OF CHANGE
APSH ≥ 25%	>0.8	≤4%	Negligible
APSH ≥ 25%	>0.8	>4%	Negligible
APSH ≥ 25%	<0.8	>4%	Negligible
APSH < 25%	>0.8	≤4%	Negligible
APSH < 25%	>0.7	>4%	Low
APSH < 25%	0.6 – 0.7	>4%	Medium
APSH < 25%	<0.6	>4%	High

Table 10.4: Magnitude of Change for Winter Probable Sunlight Hours (WPSH) Results

WPSH VALUES	RATIO OF IMPACT	MAGNITUDE OF CHANGE
WPSH ≥ 5%	>0.8	Negligible
WPSH ≥ 5%	<0.8	Negligible
WPSH < 5%	>0.8	Negligible
WPSH < 5%	0.7 – 0.8	Low
WPSH < 5%	0.6 – 0.7	Medium
WPSH < 5%	<0.6	High

Significance of Effects

10.33 In the absence of published guidance, a matrix for determining the significance of effects has been developed taking into account the sensitivity of the receptor and the magnitude of change (**Table 10.5).**

Table 10.5: Significance of Effect for VSC, NSL and PSH Results

MAGNITUDE OF CHANGE	SENSITIVITY OF RECEPTOR	
	HIGH	MEDIUM
High	Major effect	Moderate effect
Medium	Moderate to Major effect	Moderate to Minor effect
Low	Minor to Moderate effect	Minor effect
Negligible	Negligible effect	Negligible effect

Significance of Effects for Overshadowing of Open Amenity Areas

10.34 The BRE Guide recommends that for a garden or amenity area to appear adequately sunlit throughout the year, at least half of an amenity area should receive at least two hours of sunlight on 21st March. The BRE Guide also indicates that if, as a result of a new development, an existing garden or amenity area does not meet these guidelines, and the area which can receive some sun on the 21st March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable.

10.35 The following overshadowing significance of effects will be used in this assessment:

- Negligible - Where the assessment results fall within the BRE criteria either because ≥50% of amenity area achieves ≥2 hours of sunlight on 21st March; or by retaining ≥0.8 of its former value;
- Minor Adverse – Where the assessment results fall below the BRE criteria (<0.8 of its former value) but not by a significant margin (40-50% of the area assessed receives ≥2 hours of sunlight on 21st March);
- Moderate Adverse – Where the assessment results fall below the BRE criteria (<0.8 of its former value) by a moderate margin (30-40% of the area assessed receives ≥2 hours of sunlight on 21st March); and

- Major Adverse – Where the assessment results fall below the BRE criteria (<0.8 of its former value) by a significant margin (<30% of the area assessed receives ≥2 hours of sunlight on 21st March).

Metrics for Daylight within the Proposed Development

10.36 The method to be adopted for the internal daylight is the illuminance method, a detailed daylight calculation method where hourly (or sub-hourly) internal daylight illuminance values for a typical year are computed using hourly (or sub-hourly) sky and sun conditions derived from climate data appropriate to the Site.

10.37 The criteria states that for a particular room type with vertical and/or inclined opening with a given target illuminance (Et), e.g. 200 lux (lx), and appropriate reference plane at 0.85m height above the floor level, the criterion is that the target illuminance is achieved across the reference plane fraction for 2 190 h (i.e. half of the daylight hours of the year).

Mitigation

10.38 All receptors both within and off-site will need to satisfy the requirements for daylight and sunlight.

10.39 Where the results of the assessments identify areas where the recommended guidelines are not met, mitigation measures will be identified to limit the adverse effect of the Proposed Development and/or achieve the required daylight and sunlight levels.

10.40 Within the Site, typically, mitigation measures to improve the daylight and sunlight environment in addition to optimising the massing and orientation of the buildings can include adjustments to glazing types and size, rooms orientation and dimensions and material finishes.

Consultation

10.41 This report will be used as consultation to make sure that the Local Planning Authority are aware of the approach to address environmental concerns with regards to daylight and sunlight impacts on the site and immediate surrounding area. This report will also give the opportunity to provide feedback on any aspect of the approach for the proposed assessment.

11.0 Flood Risk and Drainage

Introduction

11.1 This chapter of the ES will focus on the likely significant impacts of the Proposed Development on the environment in terms of flood risk and drainage.

Baseline Conditions

11.2 The baseline conditions will be established based on:

- Review of previous reports;
- Review of data for the Site and adjacent areas within approximately a 2km radius;
- Review of Local Plan and current policies; and
- Consultation with the Lead Local Flood Authority and the Environment Agency.

11.3 The Site boundary extends approximately 28.6ha and is confined to the west by Woodfarm Lane and to the east by the existing James Paget Hospital site. To the north and south boundary, are two major housing developments.

Hydrology and Flooding

11.4 The Site is at a low or negligible risk of flooding from all sources. The EA Map for risk of flooding from surface water highlights one isolated area of risk in the middle of the Site. This does not appear to be part of a wider flood path originating outside of the Site and is likely to be due to a localised depression of the existing ground. This low point will be removed as part of the proposed level strategy.

11.5 No artificial sources of flooding have been identified within the vicinity of the Site including surface water or combined sewers, reservoirs (the EA Flood Risk from Reservoirs map shows that the Site does not fall within the maximum extent of flooding zone), canals, or culverts.

Hydrogeology

11.6 From initial site investigations, the site is anticipated to be underlain by superficial deposits comprising Happisburgh Glacigenic Formation – Sand and Gravel. The superficial deposits are shown to be underlain by sand and gravel of the Crag Group. The groundwater table is anticipated to be present within the superficial geology at approximately 1 metre above ordnance datum (m AOD). Ground level is anticipated to be 9 – 16m AOD and, therefore, groundwater is anticipated at around 8-15m depth.

11.7 The Site is not within or in the proximity of a Source Protection Zone nor a drinking water protection area. Aquifer Designation Map classifies the area as “Secondary A” for superficial drift, and “Principal” for bedrock.

Existing Sewers

11.8 An Anglian Water foul sewer main crosses the Site from south to north. A private foul water main running under Hoods Lane crosses the Site west to east and connects to the aforementioned adopted main.

11.9 The Anglian Water foul main discharges into a combined main located under Edinburgh Avenue, within the residential development north of the Site. The combined sewer ultimately conveys flows to the Caister – Pump Lane Water Recycling Centre. This facility is owned and managed by Anglian Water and its outfall is located outside of Natural England's Nutrient Neutrality assessment.

11.10 There is no record of adopted Surface Water mains within or adjacent to the Site.

Environmental Designations

11.11 The closest Site of Special Scientific Interest (SSSI) is Breydon Water, located approximately 4.5km north-west of the Site. It is designated as a Local Nature Reserve, a Ramsar site and a Special Protection Area. It is managed by the Royal Society for the Protection of Birds in the wider context of the Barney Marshes and Breydon Water Nature Reserve. Considering its distance from the Proposed Development and the drainage regime, there is no indication that the Site surface water discharges to the SSSI.

Sensitive Receptors

11.12 Sensitive receptors that will be considered in the assessment include:

- Superficial Deposits (Secondary A aquifers);
- Bedrock (Principal Aquifer);
- Existing Foul/Combined Sewer Network;
- Site Users;
- Construction Workers;
- Nearby Properties; and
- Future Site infrastructure.

Potential Impacts

Demolition and Construction

11.13 The likely significant effects identified for the demolition and construction works for assessment in the ES are set out in **Table 11.1.**

Table 11.1: Likely significant Effects during the Demolition and Construction

RECEPTOR	EFFECTS	SCOPED IN
Site and adjacent areas	• Alteration of drainage regime; and • Risk of flooding from all sources.	Yes

RECEPTOR	EFFECTS	SCOPED IN
Developments south of the Site	• Risk of service interruption for the Anglian Water foul water sewer during the diversion works.	Yes

Operation

11.14 The likely significant effects identified for the operational phase for assessment in the ES are set out in **Table 11.Table 11.2**.

Table 11.2: Likely Significant Effects for the Completed Development

RECEPTOR	EFFECTS	SCOPED IN
Site and adjacent areas	• Alteration of drainage regime; • Risk of flooding from all sources (i.e. surface water, watercourses, existing sewers, groundwater); • Increase in foul water treatment works demand; and • Existing Foul/Combined Sewer Network Capacity.	Yes

Non-Significant Effects

11.15 Potential effects during demolition and construction and once the Proposed Development is completed and operational that are not likely to be significant are set out in **Table 11.3**, together with justification of scoping out of the ES.

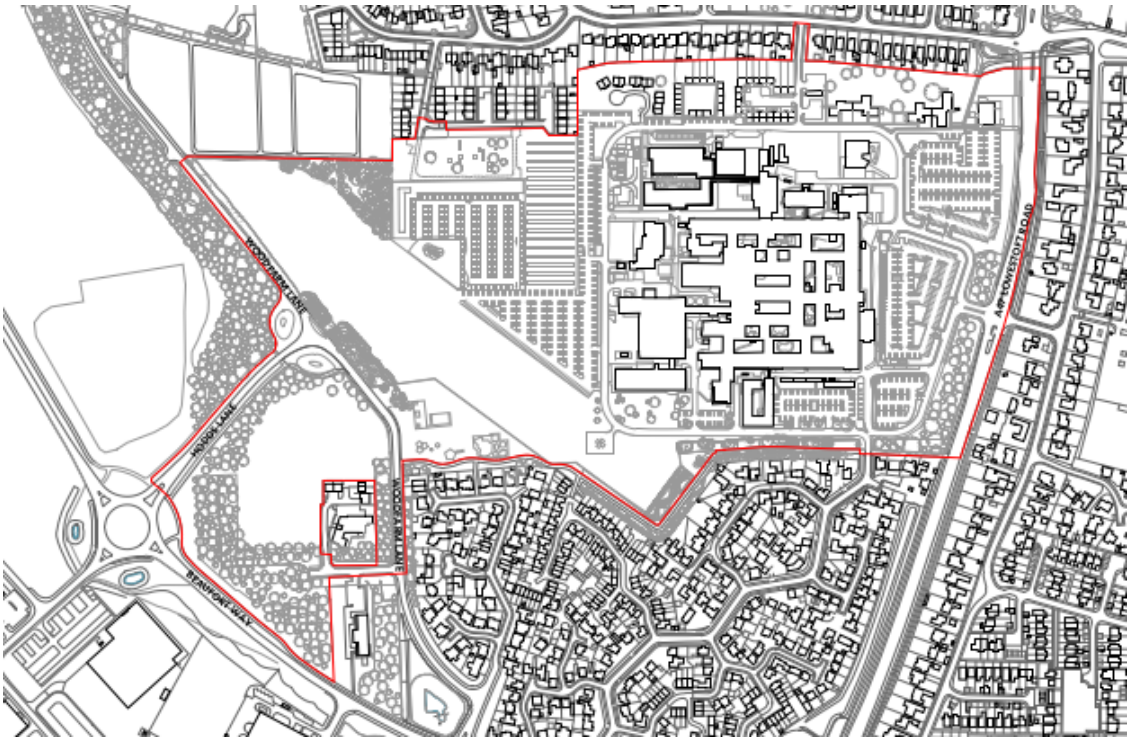
Table 11.3: Non-significant Effects Proposed to be Scoped out of the ES

RECEPTOR	EFFECT	SCOPED IN
Water resources	• **Potential contamination of water resources** The Site is not within or in the proximity of a Source Protection Zone or a drinking water protection area. Groundwater level is expected at least 8m below ground level. • **Nutrient Neutrality assessment** The Site falls within the catchment of Caister – Pump Lane Water Recycling Centre. This facility is owned and managed by Anglian Water and its outfall is located outside of Natural England's Nutrient Neutrality assessment. • **Potential Impact on SSSI "Breydon Water"** Considering its distance from the development (approx. 4.5km) and the drainage regime, there is no indication that the Site surface water discharges to the SSSI.	No

Approach and Method

11.16 The study area will comprise the Site shown in red below in **Figure 11.1** and the adjacent areas. The assessment will also include any flooding impact on the local infrastructure network including Woodfarm lane and Potters Field.

Figure 11.1: Indicative Flood Risk & Drainage Study Area



11.17 The assessment of the likely effects of the Proposed Development will be undertaken in accordance with current Government guidance and Environment Agency guidelines on EIA, surface water, and Flood Risk Assessment.

11.18 A site-specific Flood Risk Assessment will be undertaken and appended to the ES. The Flood Risk Assessment (FRA) will be prepared following the key methodology as follows:

- Obtain all pertinent data related to the Site, such as the site investigation, record drawings, and known constraints;
- Undertake consultation with the Environment Agency and the Lead Local Flood Authority (LLFA) to request records of any historical flooding and location of any flood defences within the region of the site;
- Perform a gap analysis and due diligence data review and highlight any related observations;
- Undertake initial flooding, surface water, Sustainable Drainage Systems (SuDS) and foul drainage review for the Site and highlight any related observations;
- Undertake appropriate design works, inclusive of outline calculations to inform the Site proposals in conjunction with the client and design team;
- Author the drainage strategy and FRA report in accordance with Local and National Policy Guidelines; and
- Review and issue final reports and associated plans/drawings.

11.19 Consultation and data review with relevant stakeholders (i.e. Environment Agency, Sewer Authority, LLFA, Local Highway Authority (LHA)) will be undertaken as appropriate and depending on the information already available through other studies.

11.20 The assessment will include a staged approach involving an examination of baseline conditions, followed by impact assessment considering both construction and operational stages of the Proposed Development, identification of mitigation measures (i.e. pollution prevention measures) and a review of likely residual effects.

11.21 A qualitative assessment of construction and operational effects will be completed, taking into consideration the supporting technical studies. Where feasible and appropriate, a quantitative assessment will be undertaken (based on other studies' results including the Outline Drainage Strategy which will be appended to the ES and capacity checks among others) to assess for example the required storage volume of infiltration features.

11.22 The significance level attributed to each effect will be assessed based on the magnitude of change/effect due to the Proposed Development and the sensitivity of the affected receptor/receiving environment to change. Magnitude of change/effect and sensitivity of the affected receptor/receiving environment will be assessed by adapting the relevant tables within the following documents:

- Design Manual for Roads and Bridges (DMRB); the DMRB provides guidance for appraising significance of potential impacts that road projects may have on the water environment; and
- Transport Analysis Guidance (TAG) Unit A3 Environmental Impact Appraisal – Impacts on the Water Environment chapter.

11.23 The likely significant effects of the Proposed Development will be mitigated through a series of measures during both the construction and operational phases of the Proposed Development. Specifically, a CEMP, which will be secured through a planning condition, will address potential effects during construction, and the FRA will set out Flood Risk Mitigation measures to protect users of the Proposed Development and elsewhere. The proposed mitigation measures will be identified within the ES. Enhancement can be achieved by reducing flood risk off Site, and the synergies between a Sustainable Drainage network and ecological, amenity and open space aspirations.

Consultation

11.24 Anglian Water was engaged in their role of Sewer Authority for this area. They have confirmed that sufficient capacity is available at their Water Recycling Centre to allow for the Proposed Development, and they have no objection in principle to the diversion of the adopted foul water sewer crossing the site.

11.25 Further consultation with the Environment Agency, the LLFA, the LPA and the LHA will be undertaken as part of the planning process and to inform the ES and FRA.

12.0 Ground Conditions

Introduction

12.1 The Ground Conditions chapter of the ES will be prepared by WSP and will address the potential effects of the Proposed Development with respect to ground conditions.

12.2 The assessment of geology and soils considers a study area that includes the Site and a radial study area (500m) around the Proposed Development. The extent of this zone has been developed using professional judgement on the basis that contamination migration beyond this distance is likely to be negligible.

Baseline Conditions

12.3 The extent of the study area will encompass information on current and historical anthropogenic activities within the following areas:

- Within the red line boundary of the Site;
- Within 500m of the Site for Human Health Receptors; and
- Within 500m of the Site for Controlled Waters.

12.4 Existing uses, soil, geological, hydrogeological, and hydrological conditions have been reviewed to establish the initial baseline conditions of the study area, including the potential receptors of contamination. The following reports have been used to establish the existing conditions at and around the site to inform this EIA Scoping Report:

- Harrison Geotechnical Engineering (HGE) – Site Investigation Report, James Paget University Hospital Great Yarmouth, dated March 2022 (Ref: GN24776_SI);
- HGE - Desk Study Report, James Paget University Hospital Great Yarmouth, dated May 2022 (Ref: GN25201_DS);
- Tier Environmental Ltd – Ground Investigation Report, James Paget University Hospital Great Yarmouth, dated June 2022 (Ref: TE1649-TE-00-XX-RP-GE-001-V03);
- HGE - Desk study report, James Paget University Hospital, Great Yarmouth, dated March 2023 (Ref: GN25728_DS);
- HGE – Site Investigation Report, James Paget University Hospital, Great Yarmouth dated June 2023 (Ref: GN25728_SI_S1A_1B_23);
- HGE – Site Investigation Report, James Paget University Hospital, Great Yarmouth dated July 2023 (Ref: GN26072_SI_S2);
- HGE – Supplementary Site Investigation Report, James Paget University Hospital, Great Yarmouth dated August 2023 (Ref: GN26072_SSI_S2); and
- Castons – Non-Technical Summary Report – James Paget University Hospital, dated August 2023, REF 0410.1508.

Current Site Use

12.5 The majority of the centre and east of the Site comprises the existing James Paget Hospital campus with hospital buildings, associated carparks, access roads, tanks and an electrical substation.

12.6 The south and west central areas comprise undeveloped grassland which acts as an emergency landing strip with a separate area that comprises a playground, skate park and games court. A helipad is also located in the east of this area.

12.7 In the far south-west of the Site, a parcel of land containing scrubland and a vegetated area with multiple stockpiles across the area, fly tipped waste, areas of burning and areas of hardstanding present from previous developments.

12.8 The former nursery buildings are present to the north of the Site.

History

12.9 The entire Site formally comprised agricultural fields with Wood Farm located in the south-west of the Site and Cliffe Farm located in the south-east of the Site. Wood farm was expanded in the 1970s.

12.10 By 1981 the nursery had been developed in the north of the Site as well as the main James Paget Hospital building in the east of the Site. The Cliffe Farm buildings are no longer present. Anecdotal information states that Wood farm comprised a fertiliser works at this time.

12.11 The emergency runway appears to be in place by 2006 as is the play park and a car park in the centre of the Site serving the James Paget hospital

12.12 By 2006 the Wood Farm buildings and yard appear to have been demolished to slab level.

12.13 The solar farm is present to the north of the central car park from 2015 with the wood farm area shown to be used a stockpile area (likely used as a highway contractor compound).

Geology

12.14 The geology of the Site has been reviewed using British Geological Survey (BGS) mapping sheet 162 – Great Yarmouth (1:50,000, 1991) and indicates that the Site is underlain by the superficial deposits of the Corton Formation (sand, sandy clay and gravel), which overlies the Crag group (sand and gravel) bedrock.

12.15 Made ground is also identified on the BGS map sheet and was encountered to a maximum depth of 1.60m below ground level (bgl) during the initial ground investigation conducted by Harrisons Geotechnical in June 2023 (ref: GN25728_SI_S1A_1B_23) and was found to depths of 2.0m bgl during the supplementary site investigation in July 2023 (ref: GN26072_SI_S2). Made ground generally comprised granular material and contained asphalt, brick, ceramic, glass, concrete and locally, plastic and clinker.

12.16 The Corton Formation was encountered to maximum proven depth of 16.50m bgl during the June 2023 site investigation. The Crag group bedrock was only encountered during the June 2023 site investigation to a maximum unproven depth of 30.0m bgl.

Hydrogeology

12.17 The superficial deposits of the Corton Formation are classed as Secondary (A) Aquifer, and the underlying Crag Group bedrock is classified as a Principal Aquifer.

12.18 Groundwater was encountered in three exploratory wells (between 8.28m bgl to 19.00m bgl) within both the Corton Formation and Crag Formation during the ground investigations in June and July 2023.

12.19 The Site is not situated within a groundwater source protection zone (SPZ).

12.20 There are no groundwater or surface water abstractions within 500m of the Site.

Hydrology

12.21 No detailed river networks or surface water features were noted within 500m of the Site.

12.22 There are six ponds found within 500m of the site, the closest of which is found adjacent to the western boundary.

Landfill, Infilled Ground and Waste Exemptions

12.22.1 There are no landfills located within the Site boundary. However, a historic refuse landfill was situated approximately 200m north-east.

12.22.2 Areas of infilled ground may also be present in the southern parcel of land with backfilled pits and ponds possibly recorded.

12.22.3 There are seven waste exemption sites on-site or within 500m of the Site. The on-site waste exemption is found in the current James Paget Hospital campus and relates to storing and de-naturing of controlled drugs for disposal.

Safeguarded Mineral Resources

12.23 The Site is located within a Mineral Safeguarding area for Sand and Gravels. Polices are in place to ensure that mineral resources are not built upon and to avoid detrimental impact of the mineral resource through development. These policies are set out in Norfolk Mineral Safeguarding Policy.

Agricultural Land

12.24 The Site lies on land classified as Grade 1 (Excellent quality) and Grade 2 (considered to be ‘very good quality’ best and most versatile land (BMV)).

UXO

12.25 A detailed UXO risk assessment was undertaken which identified the risk between moderate risk and low risk across the Site. An assessment is not available for the main James Paget Hospital site.

Conceptual Site Model

12.26 Environmental risk can be defined as the combination of the consequence of a harmful effect and the probability of its occurrence. The existence of a contaminant linkage is primarily dependant on the study area usage and environmental conditions.

12.27 This EIA Scoping Report has been carried out by identifying and evaluating the significance of the following:

- Potential sources of contamination: these include any actual or potentially contaminating materials and activities, located on or within 500m of the Proposed Development;
- Potential pathways for contamination migration: these are the routes or mechanisms by which may migrate from the source to the receptor; and
- Potential receptors of contamination: these include present or future land users, activities or persons at the Proposed Development.

Potential Sources

HGE Site Investigation (Car park area in the north of the Site) – March 2022

12.28 No exceedances were noted in three soil samples from the encountered Made Ground when compared with GAC/C4SLs. No positive asbestos identifications were made in the samples taken.

12.29 No groundwater was encountered during the works.

12.30 Based on the ground gas monitoring data the Site would be classified as a Characteristic Situation (CS) 1 with no ground gas protection measures needed in the construction of new dwellings.

Tier Environmental Ground Investigation (Car Park area in the north of the Site) – June 2022

12.31 No measured soil concentration of potential contaminant of concern were noted in excess of GACs within the three samples tested. The samples were classified as non-hazardous waste.

12.32 There were not positive asbestos identifications noted in the seven samples tested.

HGE Desk study – March 2023

12.33 Sources of potential contamination identified in this report:

- Former Agricultural and industrial site uses;
- Demolition waste;

- Stockpiled materials;
- Fly-tipped materials;
- Made ground soils and surficial anthropogenic material;
- Historical landfill (200m north)
- Potential backfilled pits/ponds and;
- Asbestos containing materials.

12.34 These sources have the potential to contaminate near-surface soils, impact groundwater and generate ground gases.

HEG Ground Investigation – June 2023

12.35 This investigation identified material stockpiled in the south-west area of the Site was found to have elevated concentrations of vanadium, polycyclic aromatic hydrocarbons, petroleum hydrocarbons, and low concentrations of polychlorinated biphenyls. Chrysotile cement-bound asbestos was also identified in one location.

12.36 No further exceedances were noted across the Site when screened against a residential or commercial end use.

12.37 Elevated Heavy Metals were noted within groundwater samples and from leachate samples taken from the stockpiles. It is considered that the groundwater samples were representative of background water quality and leachate exceedances can be mitigated by the removal of the stockpiles.

12.38 No elevated levels of ground gases were identified during this investigation.

HGE – Ground investigation – July 2023

12.39 The findings of this investigation have been taken from the Castons Non-technical summary report (dated August 2023) and the Supplementary Ground investigation (August 2023).

12.40 Hand dug trial pits were advanced in the north of the Site which identified concentrations of di-benzo(a,h)anthracene and bulk chrysotile cement/bitumen cement bound asbestos in discrete locations.

12.41 In addition, lead and bulk chrysotile cement-bound asbestos were noted within stockpiles located in the north-west of the Site.

12.42 It was recommended that further investigation was undertaken to determine the nature and extent of the asbestos contamination.

12.43 No elevated levels of ground gases were identified during this investigation.

HGE – Supplementary Ground investigation – August 2023

12.44 This supplementary site investigation was undertaken following contamination noted within the stockpiles in the Site which was identified in the ground investigation undertaken in July 2023.

12.45 Asbestos was detected in nine samples collected from six locations.

12.46 Bulk asbestos containing material was encountered at the surface of and within the identified stockpiles. Loose bulk asbestos was also noted on the site surface.

12.47 Remediation of asbestos noted in both the July and August investigations was recommended.

12.48 Source removal (via excavation, machine and hand segregation of wastes) has been determined to be the preferred remedial option.

12.49 It is unknown to WSP whether these works have been completed to date.

Summary

12.50 From the review of online sources and previous reports the following have been identified as potential sources of contamination:

- Unknown infilled ground;
- Stockpiles and areas of made ground shown to contain various contaminants, in particular asbestos;
- Fly tipped materials on the Site;
- Demolition waste in the south-west corner of the Site and northern parts of the Site;
- Historical use of the Site as agricultural land; and
- Potential asbestos in the existing James Paget Hospital buildings.

Sensitive Receptors

12.51 The following receptors may be impacted by potential sources of contamination within the Site:

- Human Health:
  - Construction/maintenance workers;
  - Current/future Site users including road and pavement users; and
  - Off-site users in the immediate vicinity of the Proposed Scheme including neighbouring residents.
- Controlled Waters:
  - Groundwater – Corton Formation (Secondary (A) Aquifer), Crag Group (Principal Aquifer).
- Geology:
  - Mineral Safeguarding Areas.

Contamination Pathways

12.52 The plausible contaminant pathways that have been designed for the Proposed Development works include:

- Human Health:
  - Dermal Contact;
  - Direct Ingestion;
  - Direct exposure to impacted shallow groundwater and/or surface water;
  - Inhalation of particulates/fibres and/or soil/water derived vapours; and
  - Asphyxiation by accumulation of ground gases in internal/confined spaces.
- Groundwater/geology:
  - Leaching of contaminants through the unsaturated zone and subsequent impact on groundwater; and
  - Lateral migration of impacted groundwater.
- Surface water features:
  - Surface water runoff; and
  - Migration of immiscible contaminants.
- Agricultural Land
  - Leaching of contaminants;
  - Surface water runoff; and
  - Lateral migration of impacted groundwater; and
  - Migration of immiscible contaminants.

Potential Impacts

12.53 The following issues will be considered within the ES:

- Agricultural land use with a potential of use of herbicides and pesticides;
- Localised Made ground including unknown infilled ground;
- Asbestos within existing buildings;
- Contaminated stockpiles on-site; and
- Localised industrial and commercial land use within 500m of the Proposed Development.

12.54 Following provision of a site wide Preliminary Risk Assessment (PRA) which will include all ground investigations to date, the findings will be evaluated and presented in the ES Chapter. The ES Chapter will describe the methodologies employed, findings of the Conceptual Site Model presented in the PRA along with results of the ground investigations, potential impacts and mitigation measures required to prevent identified potential impacts.

12.55 Potential significant impacts on human health, controlled waters will be assessed for the construction stage. WSP will recommend that assessment for the operational stage is scoped out of the Proposed Development in the ES.

12.56 During the construction stage of the Proposed Development the principal human health receptors will be construction workers, Site users and neighbouring Site users. Controlled waters receptors including underlying aquifers on-site and any nearby surface water features (not shown within 500m) as well as agricultural land receptors will also be considered.

12.57 During the operational stage of the Proposed Development, the principal human health receptors will be Site users and neighbouring Site users. Maintenance workers will be considered should the groundworks be required for the maintenance of the Proposed Development. Controlled waters receptors including underlying aquifers and on-Site nearby surface water features as well as agricultural land receptors will also be considered.

12.58 **Table 12.1** Error! Reference source not found.provides a summary of all the elements that have been scoped in and out for further assessment regarding geology and soils.

Table 12.1: Elements Proposed to be Scoped in/out of the ES Chapter

ELEMENT	PHASE	SCOPED IN	SCOPED OUT	JUSTIFICATION
Potential impact on human health receptors including Construction workers, on-site users and neighbouring Site users.	*Construction*	Yes		Potential for ground contamination to be experienced during construction and potential control of this material for environment/human effects. Construction works could disturb and exacerbate contamination or contribute a new source of pollution to the Site. The risk will need to be considered and mitigation measures applied. Asbestos may be present within the fabric of the existing buildings on-site.
Potential impact on controlled water receptors.	*Construction*	Yes		Potential for ground and groundwater contamination. Construction works could disturb and exacerbate historical contamination or contribute a new source of pollution to the Site. Both the historical sources, and potential new sources introduced, could impact sensitive receptors including surface waters and underlying aquifers unless mitigation measures are applied.

ELEMENT	PHASE	SCOPED IN	SCOPED OUT	JUSTIFICATION
Potential impact on agricultural land.	*Construction*		Yes	Site is not currently used as agricultural land and is in urban area.
Potential impact on geology – Mineral Safeguarding Areas.	*Construction*		Yes	Site is in urban environment and unlikely to be worked for resource.
Potential impact on health of maintenance workers, future Site users and neighbouring Site users.	*Operation*		Yes	With the Site needing to be suitable for its new use and the Proposed Development not expected to introduce new sources of contamination to the Site, there are not likely to be significant effects in relation to human health or controlled waters once the Proposed Development is completed and operational.
Potential impact on controlled waters receptors.	*Operation*		Yes	With the Site needing to be suitable for its new use and the Proposed Development not expected to introduce new sources of contamination to the Site, there are not likely to be significant effects in relation to human health or controlled waters once the Proposed Development is completed and operational.
Potential impact on agricultural land.	*Operation*		Yes	Due to urban and no current agricultural processes being undertaken, no further works likely.
Potential impact on geology – Mineral Safeguarding Areas	*Operation*		Yes	Due to urban setting no further works likely.
Potential sterilisation of areas of geological importance.	*Construction and Operation*		Yes	No areas of geological importance have been identified on, or in the vicinity of the Proposed Scheme.

Approach and Method

12.59 In the guidance that accompanies the Environmental Protection Act 1990 there is advice on what constitutes significant harm and what constitutes a significant possibility. The following reports provide further guidance on the risk assessment process:

- Land Contamination: Risk Management (LCRM) (Environment Agency);
- Guidance on the legal definition of contaminated land (Defra (2008) Guidance on the legal definition of contaminated land; and
- Guiding Principles on Land Contamination (Environment Agency).

12.60 Guidance on the assessment of contaminated sites acknowledges the need for a tiered risk-based approach, underpinned by a Conceptual Site Model:

- Development of the specific Conceptual Site Model (Stage 1);
- Assessment of site investigation results against Generic Assessment Criteria (GAC) (Stage 2) where available and appropriate as derived by Generic Quantitative Risk Assessment (GQRA); and
- Assessment of site investigation results against Site Specific Assessment Criteria (SSAC) (Stage 3) as derived by Detailed Quantitative Risk Assessment (DQRA).

12.61 The impact associated with contaminated land are generally assessed by means of a source/contaminant-pathway-receptor methodology in accordance with The Land Contamination Risk Management (LCRM) document:

- **Contaminant:** contamination that has the potential to cause unacceptable adverse impacts to a receptor. It may comprise chemical, biological or physical agents;
- **Receptor:** a target that may be affected by contamination; examples include human occupants or users of the site, water resources or structures; and
- **Pathway:** a route whereby a contaminant may come into contact with the receptor; examples include ingestion of contaminated soil and leaching of contaminants from soil into water resources.

Significance Criteria

12.62 A number of criteria will be used to determine the significance of the potential effects of the Proposed Scheme and whether or not they are ‘significant’. The effects will be assessed quantitatively wherever possible.

12.63 The significance rating for an effect will take account of the following criteria:

- Likelihood of occurrence;
- Geographical extent;
- Adherence of the proposals to legislation and planning policy;
- Adherence of the proposals to international, national and local standards/guidance;
- Sensitivity of the receiving environment or other receptor;
- Value of the affected resource;

- Whether the effect is temporary or permanent;
- Whether the effect is short, medium or long-term in duration;
- Whether the effect is reversible or irreversible; and
- Inter-relationship between effects (both cumulatively and in terms of potential effect interactions).

12.64 The proposed outline methodology for assessing significance takes into consideration relevant guidance/regulations including:

- Design Manual for Road and Bridges (DMRB) LA 109, Geology and Soils.

Sensitivity of Receptors

12.65 The sensitivity of potential receptors has been described qualitatively using professional judgement and guidance within Roads and Bridges (DRMB) LA 109, Geology and Soils (2019) as detailed in **Table 12.2**.

Table 12.2: Sensitivity of Receptors

SENSITIVITY	HIGH	MEDIUM	LOW	NEGLIGIBLE
Human Health (construction/ maintenance workers and adjacent land users)	Residential properties with private gardens/schools/care homes/playing fields Allotments Construction/ maintenance workers	Residential properties without plant uptake Retail and business parks (public and workplaces) Public open spaces	Commercial/ industrial properties Highways and rail	N/A
Controlled Waters (groundwater and surface water)	EA defined Principal Aquifers EA defined Secondary A Aquifers overlying Principal Aquifers EA groundwater SPZ1 Surface water bodies of High quality	EA defined Secondary A and B Aquifers (where not overlying Principal Aquifers) EA groundwater SPZ 2 and 3 Surface water bodies of Moderate quality	EA defined Unproductive Strata and Secondary Undifferentiated Aquifers Minor local drainage network	N/A
Geology	SSSIs Major strategic mineral resource areas Strategic underground storage space Solution features RIGS	Local geological sites and important mineral resource areas MSAs	Mineral Areas of Search/ Consultation Areas (‘MCA’)	N/A

SENSITIVITY	HIGH	MEDIUM	LOW	NEGLIGIBLE
Agricultural Land	Soils directly supporting a designated site e.g. SAC, SPA, Ramsar Soils directly supporting a designated UK site e.g. SSSI Agricultural Land Classification (ALC grade 1, 2 and Grade 3a	Soils supporting non-statutory designated sites e.g. Local Nature Reserves ALC Grade 3b	Soils supporting non-designated notable or priority habitats ALC Grade 4 or 5	N/A

Magnitude of Change

12.66 The magnitude of change of the Proposed Development on geology and soils is assessed by comparing the difference in risk each contaminant linkage at baseline to those at construction and at operational phases. This provides a way of assessing both the adverse and beneficial effects during construction and the operational period. The magnitude of change has been described qualitatively using professional judgement and guidance within Roads and Bridges (DRMB) LA 109, Geology and Soils (2019) as detailed in **Table 12.3.**

Table 12.3: Magnitude of Change

MAGNITUDE OF CHANGE	DEFINITION	EXAMPLE
Large	Total loss or major alteration to key elements/features of the baseline. Results in loss of attribute and/or likely to cause exceedance of statutory objectives and/or breach of legalisation.	Likely significant human health impact. Contamination of a Principal aquifer or loss or isolation of strategic mineral resource.
Medium	Partial loss or alteration to one or more key elements/features of the baseline. Results in effect on integrity of attribute/or loss of part of attribute, and/or possibly cause exceedance of statutory objectives and/or breach of legislation.	Reduction in the value of a feature, Moderate human health impact, loss or isolation of regional/local mineral resource.
Small	Minor shift away from baseline. Results in minor effects on attribute.	Measurable change in attribute, but of limited size/proportion.
Negligible	Very slight change from baseline. Results in a very slight change or effect on attribute.	No significant loss in quality of feature/attribute.

Significance Criteria

12.67 The level of risk for each plausible contaminant linkage will be determined through the combination of severity and probability using the risk matrix presented in **Table 12.4**.

Table 12.4: Matrix for Classifying the Significance of Effect.

		SENSITIVITY (VALUE / IMPORTANCE)			
		HIGH	MEDIUM	LOW	NEGLIGIBLE
MAGNITUDE OF CHANGE	LARGE	Major	Moderate – Major	Minor - Moderate	Negligible
	MEDIUM	Moderate – Major	Moderate	Minor	Negligible
	SMALL	Minor - Moderate	Minor	Negligible - Minor	Negligible
	NEGLIGIBLE	Negligible	Negligible	Negligible	Negligible

Source: Significance criteria has been developed using professional judgement based on those presented within DMRB guidance.

12.68 The significance of effects on geology and soils will be determined by measuring the level of change (either adverse or beneficial) in the risk categorisations (defined in **Table 12.4**) for each plausible contaminant linkage between the baseline conditions and either the construction or operational phase. The following terms will be used to define the significance of the effects identified:

- **Major effect**: An adverse or beneficial difference of four risk categorisations, where the Proposed Development could be expected to have a very significant effect (either positive or negative) on receptors;
- **Moderate effect**: A difference of three risk categorisations, where the Proposed Development could be expected to have a noticeable effect (either positive or negative) on receptors;
- **Minor effect**: A difference of one or two risk categorisations, where the Proposed Development could be expected to result in a small, barely noticeable effect (either positive or negative) on receptors; and
- **Negligible**: No change in risk categorisation, where no discernible effect is expected as a result of the Proposed Development on receptors.

12.69 Effects that are classified as **moderate or above** are considered to be **significant**. Effects classified as **minor** or below are considered to be **not significant**.

Further works

12.70 A Preliminary Risk Assessment (PRA) including a conceptual site model for the Proposed Development followed by any further required ground investigation would be completed in order to confirm the ground and groundwater conditions present, the level of contamination (if any) and inform the mitigation measures that would be required.

12.71 Discussions with the Minerals officer at Norfolk County Council to be undertaken to determine whether a Minerals Resource Assessment would be required for a site in an urban setting such as this.

Limitations and Assumptions

12.72 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- This EIA Scoping Report is based on information available at the time of writing; and
- Further assessments including a PRA, any ground investigation and any Minerals Resource Assessment (MRA) would be required to inform the assessment and preparation of the ES.

Consultation

12.73 No consultation specific to geology and soils has been undertaken to date.

Proposed Consultation

12.74 Consultation will be undertaken with

- Contaminated land officer at Great Yarmouth Borough Council; and
- Norfolk County Council regarding the safeguarded mineral resources which is indicated in the Proposed Development to assess the importance of these resources and understand any proposed mineral extraction, planning or development restrictions.

13.0 Landscape and Visual

Introduction

13.1 Given the potential for significant effects on landscape character and visual amenity, landscape and visual impacts will be scoped into the EIA.

13.2 The ES will present the findings of a comprehensive Landscape and Visual Impact Assessment (LVIA). This assessment will evaluate the effects of the Proposed Development on identified landscape and visual receptors.

Baseline Conditions

13.3 The existing land uses at the site are as follows:

- existing hospital;
- open space and children's play park;
- surface car park and land accommodating solar PV panels;
- open space with a single storey building; and
- unused land.

13.4 The Proposed Development would be located to the west of the existing hospital site, which is found in the southern part of Gorleston-on-Sea. The Site is effectively contained within the existing built-up area.

Landscape Receptors

13.5 The effects on site features would be assessed in relation to soils, landform, land use, built form, vegetation and public access.

13.6 Landscape character assessments have been undertaken at the national, regional and district levels.

13.7 Landscape effects would be assessed in relation to the landscape character areas identified in the district-level landscape character assessments as these are the most detailed sources of information available. The district level assessments are the Great Yarmouth Borough Landscape Character Assessment (2008) and the Waveney District Landscape Character Assessment (2008) which were undertaken at the same time. Effects would also be assessed in relation to the landscape character areas identified within The Broads Landscape Character Assessment (2016).

13.8 It is unlikely that there would be significant effects on the National Character Areas and these are therefore proposed to be scoped out of the LVIA.

Visual Receptors

13.9 Two Zone of Theoretical Visibility (ZTV) maps have been prepared in order to understand the likely visual influence of the Proposed Development based on the maximum height parameter plan. The first based on topography alone and the second with screening elements (key vegetation and buildings) added. A belt of young woodland surrounds Beacon Park, and there is further, taller woodland at Hobland Plantation. Within the urban area potential views are somewhat restricted by buildings.

13.10 The potential visual receptors include:

- residential properties, streets, greenspaces and workplaces within the settlement of Gorleston-on-Sea/Bradwell;
- occasional residential properties in the wider area, for example at Browston Green;
- roads, lanes and public rights of way in the countryside to the west of the Site;
- roads and lanes in the countryside to the south of the Site;
- Gorleston Golf Club; and
- Gorleston-on-Sea cliffs (public open space).

13.11 The visual effects would be assessed in relation to a set of representative viewpoints. The proposed representative viewpoints are shown on in Figure 1 in **Appendix 7**.

13.12 It is proposed that Type 4 visualisations[12] would be prepared for the key views in accordance with the relevant guidance. The location of the key views and the form of visualisation (wireline/massing/rendered) would be agreed with the Local Planning Authority. It is assumed that visualisations would be prepared for four viewpoints.

Landscape Designations

13.13 The Site is located approximately 3.8km from The Broads National Park. The Site is located within the setting of The Broads and the effects on the designated landscape would therefore be considered within the LVIA.

Potential Impacts

13.14 The Site does not lie within a protected landscape, nor does it lie within the countryside. The Site lies within an existing town and this is therefore considered an appropriate place for development in landscape terms. The existing car park and open land within the hospital site do not represent a constraint to development. The existing children's play area on the other hand would need to be replaced within the final development. The Site does contain an existing tree belt, but these trees do not have any special value within the townscape. Potential shading of the allotments from the Proposed Development needs to be considered and, if possible, mitigated.

[12] Type 4 visualisations are those where a photomontage, photowire survey or scale verifiable methods are adopted to represent the scale, appearance, context form, and extent of the Proposed Development overlaid onto a photograph to illustrate a Landscape and Visual Impact Assessment.

13.15 The visual amenity of the area is that of an ordinary town, and the Proposed Development is unlikely to influence views from conservation areas. Views from private properties are however afforded high sensitivity and could potentially represent a constraint to development. Views from The Broads National Park could also represent a constraint to development.

Landscape Features

13.16 The Proposed Development is likely to have a significant effect on the built form of the Site.

Landscape Character

13.17 It is unlikely that the Proposed Development would have a significant residual effect on the character of the landscape beyond the site boundaries, or on the character of the setting of Gorleston-on-Sea.

Visual Receptors

13.18 There is potential for the Proposed Development to have a significant residual effect on visual receptors in close proximity to the site, e.g. Viewpoints U, L and K (see **Appendix 7**). These effects will be considered in the LVIA.

Non-Significant Effects

Landscape Features

13.19 It is likely that that the Proposed Development would have a non-significant residual effect on the following features of the Site: soil, landform, land use, vegetation, and public access. These effects will be considered in the LVIA.

Landscape Character

13.20 It is likely that the Proposed Development would have a non-significant residual effect on the character of the landscape beyond the boundaries, and on the character of the setting of Gorleston-on-Sea.

13.21 The LVIA will consider the effects of the Proposed Development on the following landscape units, as defined in published landscape character assessments:

- LCA G4: Hobland Settled Farmland (Great Yarmouth Borough);
- LCA H1: Blundeston Tributary Farmland (Great Yarmouth and Waveney);
- LCA A1: Waveney Rural River Valley (Great Yarmouth and Waveney);
- LCA 21: Church Farm, Burgh Castle, Fisher's and Humberstone Marshes (Broads Authority);
- LCA 20: Breydon Water (Broads Authority); and
- LCA 19: Halvergate Marshes (Broads Authority).

Visual Receptors

13.22 It is likely that the Proposed Development would have a non-significant residual effect on visual receptors at points within the wider town and countryside e.g. Viewpoints A to J (See **Appendix 7**). These effects will be considered in the LVIA.

Landscape-Related Designations

13.23 The LVIA would also consider the potential effects on the setting of The Broads National Park.

Approach and Method

13.24 LVIA is a tool which is used to assess the significance of effects on both the landscape as an environmental resource in its own right, and on people's views and visual amenity.

13.25 The LVIA would be prepared in accordance with the Guidelines for Landscape and Visual Impact Assessment, Third Edition, and other relevant guidance.

13.26 The methodology for the assessment of effects is set out in **Appendix 8**.

Effects on Landscape as a Resource

13.27 The European Landscape Convention supports the need to deal with landscape as a resource in its own right. This includes direct physical effects on the landscape as well as effects on landscape character.

Views and Visual Amenity

13.28 The assessment of visual effects comprises an assessment of the effects on specific views and on the general visual amenity of the view.

Baseline

13.29 The baseline assessment would establish the sensitivity of the various landscape and visual receptors. Sensitivity is understood to be a combination of the value of a receptor and its susceptibility to change.

The Assessment of Effects

13.30 The magnitude of the effect would be assessed on the basis of the size or scale of change, the geographic extent, and the duration and reversibility of the effect.

13.31 The LVIA would also provide a judgement on the significance of the effects. The significance of the effect is understood to be a combination of the sensitivity of the receptor and the magnitude of change.

13.32 The LVIA will consider the effects during the construction and operation phases, with the effects of the completed development being assessed at Year 1 and Year 15. The residual effects of the Proposed Development would be those experienced at Year 15. The effects will be assessed with mitigation in place.

13.33 The LVIA would consider views from public viewpoints which include views from roads, public rights of way and public open space. The LVIA would not include a Residential Visual Amenity Assessment unless this is requested.

Preliminary Mitigation and Enhancement Measures

13.34 It is assumed that the children's play area would be replaced but not within the Site. Opportunities should be sought to incorporate tree planting within the proposals at an early stage of the design, including tree planting within car parks. Consideration needs to be given to the drainage strategy as this has implications for the landscape. Consideration should be given to permeable pavements and flood storage cells, to minimise the effects on the landscape. Tree planting could also be combined imaginatively with SuDS. There is an opportunity to provide improved amenity space within the southern part of the site, including a straight, well-lit footpath/cycle route. Poor quality amenity shrub planting should be replaced with better landscape treatments e.g. trees, hedges, and meadows.

Consultation

13.35 Consultation with the LPA is proposed during EIA Scoping to agree viewpoints.

14.0 Noise and Vibration

Introduction

14.1 The noise and vibration ES chapter will describe the baseline noise environment at existing receptor locations, the magnitude of any potential noise or vibration impacts that could arise from the construction, demolition and operational stages of the Proposed Development and their significance.

Baseline Conditions

14.2 Background sound levels in the vicinity of the Site are generally dominated by road traffic noise arising from the A47 Lowestoft Road dual carriageway to the east of the development site, although existing sources at the hospital may be material in localised areas.

14.3 An initial noise survey undertaken over a week in March 2023 indicates that ambient sound levels within the areas proposed for development are typically around 45 dB $L_{Aeq,T}$ during the daytime and 40 dB $L_{Aeq,T}$ during the night-time. Sound level data gathered in proximity to residential receptors to the north and south of the redline boundary indicate that background sound levels vary between 37 and 43 dB $L_{A90,T}$ during the day and 30 and 38 dB $L_{A90,T}$ during the night.

14.4 Ambient and background sound levels will be measured at additional locations to take account of new and proposed residential receptors off Woodfarm Lane during the preparation of the ES. Baseline sound levels for road links will be derived via calculation of basic noise levels (BNLs) from the traffic flow data for comparison with the BNLs predicted for the ES assessment scenarios.

Potential Impacts

14.5 Potential impacts from the construction/demolition phase include noise and vibration from on-site works, and noise from construction/demolition traffic on the highway.

14.6 Potential noise impacts from the operational phase include mobile and fixed plant from the Site, noise from the helipad and helicopter movements and road traffic noise increases from traffic generated by the Proposed Scheme.

14.7 Vibration from construction traffic and the operational phase is scoped out on the basis that risks of impacts are negligible (vibration from the helipad into the proposed hospital structure itself may be considered separately but would not need to form part of an ES).

Approach and Method

14.8 Noise and vibration from site activities during the construction phase will be predicted and assessed according to BS5228 part 1 and 2: 2009+A1:2014.

14.9 Construction and operational phase road traffic noise assessment according to guidance from Design Manual for Roads and Bridges LA111.

14.10 Noise from mechanical fixed and mobile plant and ancillary operational activities will be predicted using ISO 9612 algorithms where possible. Where insufficient design details are available to underpin robust predictions, the need for planning conditions to control noise from these sources in the future will be considered. These would most likely be based on the BS 4142 approach and informed by the established survey data.

14.11 Helicopter noise would be predicted based on measurement data of similar helicopter models, if available, or the FAA AEDT aviation noise model. Its significance would be considered with reference to UK aviation noise policy ($L_{Aeq,16h}$ and $L_{Aeq,8h}$) plus the likely incidence and magnitude of night-time maximum noise events if necessary.

Consultation

14.12 No consultation with regards to noise and vibration has been undertaken at this stage. Consultation with the LPA Environmental Health Officer will be undertaken as part of the EIA Scoping stage.

15.0 Socio-economics

Introduction

15.1 The Socio-economic assessment, prepared by Bidwells LLP, will consider the impact of the construction and operation of the Proposed Development on the local economy.

15.2 The assessment will be prepared in the context of the National Planning Policy Framework (NPPF) and adopted development plan documents for Great Yarmouth.

Baseline Conditions

15.3 The assessment will set out the baseline conditions of the Great Yarmouth local authority area, and the wider Norfolk and Waveney area that the hospital serves. This will include:

- The evidence base supporting the emerging local plan;
- The Great Yarmouth Economic Strategy 2020-2025; and
- Data from the 2021 Census and other national datasets produced by the Office for National Statistics (ONS), the Office for Health Improvement and Disparities (OHID) and other government departments.

Potential Impacts

15.4 The Proposed Development will likely see an increase in the employment the Site supports directly. Each additional employment opportunity is likely to make a further contribution to the economic output of the area, measured in terms of Gross Value Added (GVA), which may induce further employment opportunities. Furthermore, each additional direct employment will generate a wage that may, when spent, indirectly support more employment in the local economy. Consequently, the following will be measured:

- Net additional employment opportunities, both during construction and operation;
- Net additional GVA and wages; and
- Estimates of potential induced and indirect employment opportunities.

Approach and Method

Construction Economic Effects

15.5 Direct construction employment is measured in ‘job years’, which accords with Treasury Guidance. Based on the convention adopted by the Treasury, ten job years of employment is assumed to equate to one permanent full-time job created.

15.6 Direct construction employment is calculated by dividing the estimated capital cost of the Proposed Development by the average gross output per construction industry employee derived from the ONS Annual Business Survey (ABS).

Operational Economic Effects

15.7 The amount of employment directly supported by the Proposed Development will be provided by the hospital. For healthcare, employment numbers are generally driven by a combination of the number of patients the facility is intended to serve and how efficiently patients can be treated, including the availability of modern technologies. While floorspace is a factor, the relationship between area and employment numbers supported (employment density) is not reliable in a healthcare setting.

15.8 Production-based GVA is defined as the value for the amount of goods and services that have been produced by a country, minus the cost of all inputs and raw materials that are directly attributable to that production. ONS have produced estimates of economic output per filled job, by industrial sector, that can be used to approximate the change in GVA attributable to the Proposed Development.

15.9 Induced employment is generated when those directly employed spend their wages in the economy. 'Wages' in this context means any compensation given to someone in employment for undertaking their job. As such it is a gross figure including income tax, national insurance and pension contributions, plus any other benefits. Fundamentally it is additional to GVA. Wages can be calculated using ONS estimates per industrial sector.

15.10 In addition, where possible, consideration will be given to the potentially significant improvements in health because of the Proposed Development, including:

- The net change in healthcare capacity for key services;
- Identification of the key elements of the Proposed Development that would result in significant improvements in patient outcomes;
- Key elements of the Proposed Development that would benefit employees; and
- The opportunity for further medical research.

15.11 The method for calculating the overall impact on an area is known as 'additionality' or place-based analysis, which is advocated by the 2022 Green Book (updated 16 May 2024) and Ministry of Housing, Communities and Local Government (MHCLG) Appraisal Guide (March 2023). The most authoritative guide on additionality however was prepared by Homes England (Additionality Guide (4th edition), January 2014). Although now discontinued, the Additionality Guide still provides a robust methodological approach to considering the socio-economic effects of new development.

15.12 Additionality is the calculation of the net effect of an intervention (in this case the Proposed Development) on a defined area (the study area). To do this the baseline conditions (also known as the reference case or deadweight) are subtracted from the impact of the intervention to identify the difference between the two. To calculate the additionality of an impact, four variables are used:

- **Leakage effects**, which the HCA defines as "the number or proportion of outputs (occurring under the reference case and the intervention options) that benefit those outside of the intervention's target area or group";
- **Displacement**, which the HCA defines as "the number or proportion of intervention outputs (occurring under the reference case and the intervention options) accounted for by reduced outputs elsewhere in the target area";
- **Substitution effects**, which the HCA defines as "where a firm substitutes one activity for a similar one"; and

- **Economic multiplier effects**, which the HCA defines as "further economic activity (jobs, expenditure or income) associated with additional local income, local supplier purchases and longer-term development effects".

15.13 Additionality can be applied to all socio-economic impacts. In some cases, it cannot be applied quantitatively but the same steps can be followed to provide a qualitative assessment of how the impact interacts with the study area.

15.14 Once the socio-economic effects have been determined, their significance needs to be determined. Baseline sensitivity is described using the criteria in **Table 15.1**. The sensitivity attributed is based on a detailed review of the baseline conditions and informed by professional judgement.

Table 15.1: Baseline Sensitivity and Value Criteria

SENSITIVITY	ECONOMIC VALUE
Very High to High	The area of assessment suffers from high levels of economic deprivation where the labour market is under stress, business is struggling to stay viable and economic growth is unlikely. Unemployment is often high and wages below average, particularly amongst young adults. Economic inactivity is also often high.
Medium	The area of assessment is comparable to regional and national averages in terms of economic activity, employment rates and economic growth. Economic deprivation might be present amongst some parts of the usual resident population, which need particular policy intervention. Existing businesses are generally viable.
Very Low to Low	The area of assessment has a strong vibrant economy with low levels of economic inactivity and unemployment, including amongst components of the usual resident population that are statistically more likely to be economically disadvantaged.

15.15 The overall economic impact of the Proposed Development is assessed collectively, as individual impacts will inevitably interact. Again, the level attributed is based on a detailed review of the baseline conditions and informed by professional judgement (**Table 15.2**).

Table 15.2: Magnitude of Change Criteria

MAGNITUDE	CHARACTERISTICS OF CHANGE
Major beneficial	The Proposed Development would directly address known economic and employment issues in the area of assessment and is likely to contribute to an improved long-term economic outlook of the area.
Moderate beneficial	The Proposed Development would create economic and employment opportunities in the area of assessment and could assist in an improved long-term economic outlook for the area.
Minor beneficial	The Proposed Development would make some economic and employment contribution to the area but is unlikely to make a material difference to the overall economic outlook of the area.
Neutral	The Proposed Development would not result in any meaningful economic change to the area of assessment.

MAGNITUDE	CHARACTERISTICS OF CHANGE
Minor adverse	The Proposed Development would likely reduce economic and employment activity in the area of assessment but is unlikely to make a material difference to the overall economic outlook of the area.
Moderate adverse	The Proposed Development would reduce economic and employment activity in the area of assessment and is likely to detract from the long-term economic outlook of the area.
Major adverse	The Proposed Development would undermine the economic and employment strengths of the area of assessment and is likely to directly lead to a notable worsening of the long-term economic outlook of the area.

15.16 The sensitivity of the baseline and the magnitude of effect are then combined to determine the significance of effect using the matrix in **Table 15.3**.

Table 15.3: Significance of Effect Criteria

		BASELINE SENSITIVITY				
		VERY HIGH	HIGH	MEDIUM	LOW	VERY LOW
MAGNITUDE OF CHANGE	MAJOR BENEFICIAL	Major Beneficial	Major-Moderate Beneficial	Moderate Beneficial	Moderate-Minor Beneficial	Minor Beneficial
	MODERATE BENEFICIAL	Major-Moderate Beneficial	Moderate Beneficial	Moderate-Minor Beneficial	Minor Beneficial	Minor Beneficial
	MINOR BENEFICIAL	Moderate Beneficial	Moderate-Minor Beneficial	Minor Beneficial	Minor Beneficial	Negligible
	NEUTRAL	Negligible	Negligible	Negligible	Negligible	Negligible
	MINOR ADVERSE	Moderate Adverse	Moderate-Minor Adverse	Minor Adverse	Minor Adverse	Negligible
	MODERATE ADVERSE	Major-Moderate Adverse	Moderate Adverse	Moderate-Minor Adverse	Minor Adverse	Minor Adverse
	MAJOR ADVERSE	Major Adverse	Major-Moderate Adverse	Moderate Adverse	Moderate-Minor Adverse	Minor Adverse

Data limitations

15.17 The assessment will be based on the most recent and accurate data that is publicly available. However, there are undoubtedly small errors within this, either through sampling errors or intentional data swapping to ensure individual privacy. Any estimates of employment generation are based on best practice multipliers. However, these represent average yields from similar development within which there might be some variation. As such, the effects identified are considered the most probable based on the information available.

Consultation

15.18 No consultation has been undertaken to date. Given the wealth of information available from all levels of local government, it is not anticipated that any consultation beyond this scoping exercise will be necessary for the purposes of this assessment.

16.0 Transport

Introduction

16.1 This section of the EIA Scoping Report considers the likely impacts of the Proposed Development on traffic and transport, during construction and operation, and any likely significant environmental effects. It outlines the proposed methodology for the transport assessment and identifies which impacts can be scoped out. Where further assessment is necessary, it will be presented in the ES or the accompanying Transport Assessment (TA).

Baseline Conditions

16.2 The key sources of information of traffic and transport conditions will be:

- Desktop review, supplemented by a site visit, to establish existing:
  - pedestrian routes/access to local services and facilities;
  - cycle routes/access to local services and facilities;
  - bus/rail services and associated infrastructure/facilities; and
  - highway network characteristics, including highway safety records (data to be obtained from the Local Highway Authority).
- Survey data:
  - Traffic volumes and queues on the existing transport and highway network: a series of traffic surveys including, Automatic Traffic Counts (ATC), Manual Classified Counts (MCC) and queue length surveys will be undertaken, particularly at junctions where changes in vehicle movements are anticipated as a result of the Proposed Development during the construction and operation phases. The traffic surveys will be carried out by WSP in July 2024, providing a snapshot of the traffic conditions within the local area; and
  - Engagement has been undertaken with Norfolk County Council (NCC) and National Highways to agree the extent of surveys required.
- Standalone junction modelling:
  - Stand-alone junction modelling will be undertaken at junctions where changes in vehicle movements are anticipated as a result of the Proposed Development. This will help understand the existing operation and performance of the highway network, including existing levels of delay and congestion.

16.3 The information gathered and presented within the ES will inform the baseline relevant to traffic and transport, where relevant.

Existing Baseline

Extent of Study Area

16.4 The study area for the Proposed Development will encompass the same study area as included within the traffic survey scope, which includes the following junctions and links:

- Junctions:
  - A47 Lowestoft Road/Existing Main Site Access (signalised junction);
  - A47 Lowestoft Road/Brasenose Avenue/Bridge Road (signalised junction);
  - Brasenose Avenue/Northern Site Access (priority junction);
  - A47 Lowestoft Road/Beaufort Way/Links Road (signalised roundabout);
  - Beaufort Way/Camelot Road/Jenner Road (four-arm roundabout);
  - Beaufort Way/Woodfarm Lane (priority junction);
  - Beaufort Way/Excalibur Road (priority junction);
  - Beaufort Way/Hodds Lane/Gawain Road (four-arm roundabout);
  - Carrel Road/Woodfarm Lane (priority junction);
  - Hodds Lane/Woodfarm Lane;
  - Unnamed Parameter Road/Link to Brasenose Avenue (priority junction);
  - Beaufort Way/Wiltshire Drive/Gorleston Lane (four-arm roundabout);
  - Beaufort Way/Colby Drive (three arm roundabout);
  - Beaufort Way/New Road/Beccles Road (four-arm roundabout);
  - A47 Lowestoft Road/B1370 (three-arm roundabout);
  - Woodfarm Lane/Norfolk Coastal Centre for Independent Life (priority junction); and
  - A47 Lowestoft Road Victoria Roundabout (three-arm roundabout).
- Links:
  - Beaufort Way;
  - A47 Lowestoft Road (just north of the A47 Lowestoft Road/Beaufort Way/Link Road roundabout);
  - A47 Lowestoft Road (just south of the A47 Lowestoft Road/Brasenose Avenue/Bridge Road junction);
  - Woodfarm Lane;
  - Hodds Lane;
  - Brasenose Avenue;
  - Jenner Road;
  - Beaufort Way (north of Hodds Lane);
  - Brasenose Avenue (between Edinburgh Avenue and St Peters Avenue);
  - Edinburgh Avenue (just north of Ruskin Avenue);
  - Bridge Road (north);
  - Kennedy Avenue;
  - Carrel Road;
  - Hospital Ring Road;
  - Hospital Entrance;

- Kennedy Avenue (south);
- Kennedy Avenue (west between A47 Lowestoft Road and Kennedy Avenue);
- Edinburgh Avenue (east);
- Potters Field;
- Edinburgh Avenue (West of Potters Field); and
- Jenner Road (just south of Paget Crescent).

Site Accesses

16.5 There are currently three existing vehicular access points to the existing James Paget University Hospital:

- A47 Lowestoft Road: a signalised crossroad junction of the A47 Lowestoft Road/Kennedy Avenue/Hospital Access forms the main access to the hospital. The A47 Lowestoft Road arms have two travel lanes in each direction – northbound travellers can access the hospital from the nearside lane (also allowing ahead movements), whilst southbound travellers have a ghost-island right-turn lane beyond the signal heads to facilitate the turning movement;
- Brasenose Avenue: a standard priority T-junction of Brasenose Avenue/Hospital Access to the north of hospital forming a secondary access. The hospital access road routes south (20mph zone) to a priority T-junction (with stop sign) which provides access to the circulatory loop road around the perimeter of the hospital; and
- Jenner Road: a continuation of a residential road (accessible via a 4-arm roundabout on Beaufort Way) into the James Paget University Hospital – reserved for staff only.

Local and Strategic Road Network

16.6 The Local and Strategic Road Network (SRN) within the vicinity of the Site will be described within the ES. This will include:

A47 Lowestoft Road

16.7 The primary route providing access to the existing hospital is the A47 Lowestoft Road, which forms part of the SRN managed by National Highways and connects Peterborough to Lowestoft via Norwich and Great Yarmouth. The A47 Lowestoft Road is dual carriageway, with a speed limit of 40mph within the vicinity of the hospital. It is well lit, with footway/cycleways on both sides of the carriageway.

A143 Beccles Road

16.8 The A143 Beccles Road is one of the main highway routes to/from Great Yarmouth and provides connection to Bury St Edmunds and Haverhill.

The B1534 Beaufort Way

16.9 The B1534 Beaufort Way provides connectivity between the A47 Lowestoft Road and the A143 Beccles Road to the south of the existing hospital. It also provides access to Jenner Road that provides staff only vehicular access to the south of the site.

Legislation, Policy and Guidance

Legislation

16.10 The following legislation will inform the assessment:

- Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Traffic and Movement (2023).

IEMA Guidelines: Environmental Assessment of Traffic and Movement

16.11 The *'IEMA Guidelines: Environmental Assessment of Traffic and Movement'* (July 2023) provides practitioners with good practice advice on how to carry out the assessment of traffic and movement of people as part of a statutory EIA or non-statutory environmental assessment.

16.12 The document provides guidance on the assessment of specific traffic and movement related impacts. This includes:

- Severance of communities;
- Road vehicle driver and passenger delay;
- Non-motorised user delay;
- Non-motorised amenity;
- Fear and intimidation on and by road users;
- Road user and pedestrian safety; and
- Hazardous/large loads.

16.13 The IEMA Guidelines state in paragraph 3.12 that:

"*A critical feature of an environmental assessment is determining whether a given effect is significant. Having quantified the magnitude of the impact (i.e. the level of change), there are various ways of interpreting whether or not the resulting outcome is considered significant. […] therefore there is a need for interpretation and judgement on the part of the competent traffic and movement expert, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing an impact and the sensitivity of those people, as well as the assessment of the damage to various natural or cultural resources*."

Policy & Guidance

16.14 The following policy and guidance documents will inform the transport assessment:

- National:
  - NPPF, Promoting Sustainable Transport (2023);
  - NPPG transport evidence bases in plan making and decision taking. Travel Plans, Transport Assessments and Statements (2023);
  - Decarbonising Transport: A Better, Greener Britain (2021);
  - Bus Back Better: National Bus Strategy for England (2021);

  - Gear Change: A Bold Vision for Walking & Cycling (2020);
  - Cycle Infrastructure Design, Local Transport Note (LTN) 1/20 (2020);
  - DMRB Volume 11 Environmental Assessment (2008); and
  - Cycling and Walking Investment Strategy (2016);
- Regional:
  - Transport East Transport Strategy 2023-2050 (2023);
- Local:
  - Norfolk Local Transport Plan 4 & Implementation Plan 2021-2036 (2021);
  - Norfolk Cycling and Walking Strategy (2017);
  - Norfolk Strategic Infrastructure Delivery Plan (2022);
  - Norfolk Strategic Planning Framework (2021);
  - Parking Guidelines for New Developments in Norfolk (2022);
  - Safe, Sustainable Development (2022);
  - Great Yarmouth Transport Strategy and Implementation Plan (2020);
  - Great Yarmouth Core Strategy (Local Plan Part 1 - 2015);
  - Great Yarmouth Local Plan Part 2 (2021); and
  - Great Yarmouth Emerging Local Plan to 2041 Regulation 18 (2024).

Potential Impacts

Sensitive Receptors

16.15 The following sensitive receptors have been identified for the Proposed Development:

- Non-motorised users (pedestrians and cyclists) of the surrounding highway network, Public Rights of Way (PRoW) and non-designated public routes; and
- Motorised users of the surrounding highway network, including vehicle drivers, public transport users and vulnerable groups.

Magnitude of Impact

16.16 To assist with assigning a magnitude to traffic and transport impacts, the IEMA 2023 Guidelines set out considerations, and in some cases thresholds, in respect to changes in the volume and composition of traffic.

16.17 The assessment methodology for defining the magnitude of traffic and transport impacts has been derived from the IEMA guidance. Where no guidance is available, commonly agreed thresholds for judging the magnitude of traffic and transport impacts and professional judgement, backed-up by data/quantified information, has been applied as suggested in paragraph 3.12 of the IEMA guidance.

16.18 Dependent on whether the magnitude of effects is positive or negative, the effect on receptors can be beneficial or adverse. An impact may also be classed as temporary or permanent.

16.19 The sensitivity of a receptor to traffic and transport impacts depends upon a combination of its value and susceptibility. The sensitivity of different receptors to traffic and transport effects is outlined in **Table 16.1** below. For the purpose of this assessment, different sensitivity values will be assigned to links for non-motorised users, motorised users (in respect of driver delay) and motorised users (in respect of road safety).

16.20 It is assumed that an increase in delay on a link which experiences a high level of congestion is worse than an increase in delay on a link with a minimal level of congestion. As such a higher ratio of traffic volume/highway capacity (i.e. V/C ratio) is assumed to relate to a higher sensitivity.

16.21 It is assumed links with clusters of more serious severity accidents will be more sensitive to change than those with clusters of less serious severity accidents.

Table 16.1: Receptor Sensitivity – General Overview

RECEPTOR SENSITIVITY	RECEPTOR TYPE
High	Users who access property via the existing transport network. Users making essential journeys and who do not have any other alternative route available. Users with the greatest susceptibility to traffic flow (e.g. users near schools, colleges, playgrounds, accident clusters, retirement homes, pedestrians walking along roads without footways).
Medium	Users of the transport network who use the affected routes frequently for essential journeys such as education and commuting but also have an existing choice of alternative routes. Users with moderate susceptibility to traffic flow. For example, at and along congested junctions and links, near doctors' surgeries, recreation facilities, hospitals, shopping areas with roadside frontage, roads with narrow footways (<1.2m).
Low	Users of the transport network who use the affected routes frequently for non-essential journeys such as leisure and recreational purposes and those who use the routes less frequently for essential journeys. Users with low susceptibility to traffic flow. For example, near places of worship, public open space, tourist attractions and residential areas with adequate footway provision (2.0m to 1.2m).
Very Low	Users of the network who use the routes infrequently for non-essential journeys. Users with little or no susceptibility to traffic flow (e.g., roads with good footway provision (> 2.0m), areas sufficiently distant from affected roads and junctions).

Assessment of Significance

16.22 The significance of the traffic and transport effects is a product of the receptors' sensitivity magnitude of impact. A matrix for determining the significance of traffic and transport effects is provided in **Table 16.2**.

Table 16.2: Matrix for Determining the Sensitivity of Receptors to Environmental Effects

		SENSITIVITY OF RECEPTOR TO ENVIRONMENTAL EFFECTS			
		HIGH	MEDIUM	LOW	NEGLIGIBLE
MAGNITUDE OF IMPACT	**High**	Major	Moderate to Major	Minor to Moderate	Negligible
	Medium	Moderate to Major	Moderate	Minor	Negligible
	Low	Minor to Moderate	Minor	Negligible to Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

16.23 The following terms have been used to define the significance of the effects identified:

- Major effect: where the Proposed Development could be expected to have high/significant effect (either positive or negative) on users of the local transport network;
- Moderate effect: where the Proposed Development could be expected to have a medium/noticeable effect (either positive or negative) on users of the local transport network;
- Minor effect: where the Proposed Development could be expected to result in a low/small, barely noticeable effect (either positive or negative) on users of the local transport network; and
- Negligible: where no discernible effect is expected as a result of the Proposed Development on users of the local transport network.

16.24 Following the classification of an effect as detailed in **Table 16.2**, a clear statement is made as to whether the effect is 'significant' or 'not significant'. As a general rule, major and moderate effects are considered to be significant and minor and negligible effects are considered to be not significant. However, professional judgement is also applied where appropriate.

Approach and Method

Assessment Methodology

16.25 Guidance on assessing the environmental impact of road traffic is clearly set out in the Institute of Environmental Management and Assessment's (IEMA) '*Environmental Assessment of Traffic and Movement*' (2023).

16.26 The IEMA 2023 Guidelines provide two 'rules of thumb' as a screening process to delimit the scale and extent of the assessment of traffic impacts and the determination of which traffic links require assessment. The rules of thumb are as follows:

- Rule 1: Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%); and
- Rule 2: Include highway links of high sensitivity where traffic flows have increased by 10% or more.

16.27 *DMRB Volume 11 Section 3 Part 82* provides additional guidance for the assessment of effects on pedestrians, cyclists, horse riders and the community. It suggests where relevant, it should include the key facilities and their catchment area.

Construction Phase

16.28 The construction phase assessment will be undertaken in line the IEMA Guidelines. The assessment will evaluate the transport and access conditions during a 'peak construction' year.

16.29 The construction phase assessment will consider:

- Construction traffic volume (Heavy Goods Vehicles (HGV) and light vehicles) including movements associated with materials and waste;
- Anticipated vehicle routing during construction; and
- The likely home location of construction workers based on journey to work data (obtained from the latest available Census data).

Operational Phase

16.30 The operational phase assessment will be undertaken in line with the IEMA Guidelines. It will evaluate the transport and access conditions for the future assessment year(s). The future assessment years will be agreed with NCC and National Highways as a part of the scoping of the Transport Assessment.

16.31 The operation phase assessment will consider:

- Operational traffic volumes (HGV and light vehicles);
- Proxy traffic volumes for committed developments;
- Changes in the routing of staff and patients as a result of the relocation of the site accesses; and
- The likely home location of staff and patients based on journey to work data (obtained from the latest available Census data).

Significance of Effect Criteria

16.32 The approach to determining the sensitivity of receptors, magnitude of impacts and the significance of effects considered for the impacts is identified below and required by the IEMA Guidelines:

- Severance of Communities:
  - Professional judgement will be applied to determine receptor sensitivity. The IEMA Guidelines set out a range of indicators for determining the magnitude of impact on pedestrian and cyclist severance. Changes in traffic flow of 30% are regarded as producing 'slight' impact, 60% as 'moderate' impact and 90% as 'substantial' impact. These indicators, together with specific local conditions (such as the provision of crossing facilities and traffic signal settings) will be used to determine the magnitude of impact on severance.
- Non-Motorised User Delay:
  - There is no formal or published guidance for the assessment of Non-Motorised User (NMU) delay. However, the IEMA Guidelines recommend assessors use their professional judgement to determine the significance of effect by considering both the sensitivity of the receptor and magnitude of the impact. For the purposes of this assessment, changes in traffic flows of 30%, 60% and 90% will be considered to represent a low, medium, and high magnitude impact on NMU delay. The receptor sensitivity will be determined using professional judgement.

- Non-Motorised User Amenity:
  - Professional judgement will be applied to determine receptor sensitivity. The IEMA Guidelines suggest a threshold for judging the magnitude of changes in NMU amenity would be where the traffic flow is halved or doubled. In the absence of other criteria, this threshold will be used in the assessment for the Proposed Development. The magnitude would be considered to be 'low' where traffic flows have increased by between 100% and 130%, medium where traffic flows have increased between 130% and 160% and high where traffic have increased by more than 190%.
- Fear and Intimidation On and By Road Users:
  - Professional judgement will be applied to determine receptor sensitivity. In the absence of commonly agreed thresholds for judging the significance of likely fear and intimidation effects, IEMA Guidelines recommends the thresholds outlined in **Table 16.3** are used to assess the magnitude of effect on fear and intimidation;
  - Considerations key to assessing the impact on fear and intimation include: volume of traffic; percentage of HGV; and the proximity of pedestrians to traffic. In addition, the speed of traffic, the number of turning movements, the proximity of schools and the level of vulnerable groups will be considered; and
  - The magnitude of change is based on the step changes in level of fear and intimidation with and without the Proposed Development. One step change in the level of fear and intimidation (and increase in 18-hour average traffic flows of less than 400 and/or less than 500 increase in 18-hour HGV flows) equals a low magnitude. One step change in the level of fear and intimidation (and increase in 18-hour average traffic flows of more than 400 and/or more than 500 increase in 18-hour HGV flows) equals a medium magnitude of impact. Two step changes in the level of fear and intimidation equals a high magnitude of impact.

Table 16.3: Transport and Access – Fear and Intimidation

DEGREE OF HAZARD SCORE	18-HOUR AVERAGE FLOW ALL VEHICLES (VEHICLE / HOUR) (A)	18-HOUR TOTAL HGV FLOW (B)	18-HOUR AVERAGE SPEED CHANGE (MPH) (C)
30	1,800+	3,000+	>40
20	1,200-1,800	2,000-3,000	30-40
10	600-1,200	1,000-2,000	20-30
0	<600	<1,000	<20
• The total score from all three elements is combined to provide a 'level' of fear and intimidation for all three elements (a + b + c); • An 'extreme' level of fear and intimidation is classified as a score greater than 71 from the table; • A 'great' level of fear and intimidation is classified as a score of between 41-70; • A 'moderate' level of fear and intimidation is classified as a score of between 21-40; and • A 'small' level of fear and intimidation is classified as a score of between 0-10.			

- Public Transport Network:
  - There is no formal or published guidance for the assessment of effects on the public transport network. Accordingly, professional judgement will be applied to determine the sensitivity of the receptor and the magnitude of impact on the public transport network. For the purposes of this assessment, the following factors will be taken into consideration:

- changes in bus and rail capacity;
- enhancements to existing routes/services;
- new routes/services; and
- changes to the connectivity/waiting facilities of public transport interchanges.

- Road Vehicle Driver and Passenger Delay:
  - To determine the traffic and transport impact of the Proposed Development on driver delay, junctions on the local and strategic highway network (to be agreed with NCC and National Highways as a part of the scoping of the Transport Assessment) will be modelled using appropriate junction assessment software (LinSig, ARCADY and PICADY) with and without the Proposed Development; and
  - These models will provide an assessment of the Ratio of Flow to Capacity (RFC), or Degree of Saturation (DoS) (in the case of signalised junctions), the expected level of queuing and average delay per vehicle at each junction approach during peak highway time periods. The magnitude of impact on driver delay will be based on the percentage change in average driver delay per vehicle. The percentage thresholds for low, medium and high magnitude impact will be based on the IEMA Guidelines thresholds of 30%, 60% and 90% respectively. The receptor sensitivity will be determined using professional judgement.
- Hazardous and Large Loads:
  - For the purpose of this scope, we have assumed that abnormal loads are scoped-out of the assessment, as no abnormal loads are expected during the construction and operational periods of the Proposed Development.
- Road User and Pedestrian Safety:
  - The assessment of accident risk and highway safety is based upon existing accident rates and specific local circumstances to identify accident clusters. For example, should a particular link or junction be found to have a high existing accident rate, the addition of substantial traffic volumes generally would be expected to have an adverse impact on highway safety, due to further increased opportunities for conflict;
  - The IEMA guidelines advise that engagement should be undertaken with local authorities to determine the best approach for determining the significance of road safety effects; and
  - For the purpose of this assessment, the magnitude of impact will be based on a qualitative assessment that uses professional judgement to considers the likely impact of a change in traffic flows on road user safety.

Cumulative Effects

16.33 The proposed methodology for assessing the cumulative effects is based on the Planning Inspectorate guidance. Based on this, the EIA will consider the following types of cumulative effects:

- Combined effects - the combination of individual environmental topic effects from the Proposed Scheme on a particular receptor; and
- Cumulative effects - effects due to interactions between the Proposed Scheme and other reasonably foreseeable, nearby future developments of an appropriate scale outside the Proposed Scheme boundary.

16.34 Cumulative effects from the Proposed Scheme alongside other developments in its vicinity will be assessed according to each topic and summarised in a Cumulative Effect chapter in the ES. The proposed list of developments to be addressed by the EIA will be confirmed presently and in line with the PINS methodology.

Assumptions and Limitations

16.35 The following limitations and assumptions have been identified:

- The assessment of transport conditions will utilise traffic surveys carried out by WSP in July 2024, as agreed with NCC and National Highways which will provide a snapshot of the traffic conditions within the local area;
- The proposed methodology will utilise available information and conform to the requirements of local and national guidance and planning policy;
- The assessment will be undertaken with information available at the time of writing, from various sources: documentary sources, cartographic evidence, evidence from traffic surveys and evaluation of results from detailed transport analysis; and
- The estimation of construction and operational trips will be informed by the design team as the EIA process progresses.

Consultation

16.36 Consultation is an important part of the ES process and in order to gather baseline data and identify the appropriate study areas for each of the environmental topics.

16.37 The Applicant will undertake pre-application consultation and engagement with the local community in order to inform the general public about the proposals. The application will be supported by a Statement of Community Involvement that will explain the engagement process undertaken, the themes raised in the responses received, and how the proposals have been modified in response to feedback from the public.

16.38 The scope of the traffic surveys has been discussed and agreed with NCC and NH and the scope of the TA will be discussed and agreed with NCC.

17.0 Waste

Introduction

17.1 Waste generation will occur during the construction and operational phases of the Proposed Development. This chapter reviews the potential environmental impact of these wastes focussing on the treatment requirements for each waste type and regional treatment/disposal infrastructure.

17.2 This chapter and theES Chapter will be prepared by WSP UK Ltd.

Baseline Conditions

Operational Commercial Waste

17.3 The main waste types of operational waste generated from the existing hospital are commercial (municipal type) wastes and waste arising directly from the provision of healthcare (healthcare waste).

17.4 A summary of JPUH 2023-24 commercial waste data provided by the Trust is summarised in the **Table 17.1**.

Table 17.1: JPUH Commercial Wastes 2023-24

	MIXED RECYCLING (TONNES)	RESIDUAL WASTE (TONNES)	WASTE ELECTRICAL & ELECTRONIC EQUIPMENT (TONNES)	METAL (TONNES)	FOOD WASTE * (TONNES)
JPUH 2023-24 *	92.5	385.9	92.5	11	106.5
* Except for food waste (2022-23)					

Operational Healthcare Waste

17.5 The NHS Clinical Waste Strategy imposes a set of critical targets to help deliver a more sustainable waste management system, through accurate segregation and associated % targets for healthcare waste segregation.

17.6 A summary of JPUH 2023-24 healthcare waste data provided by the Trust and the NHS clinical Waste Strategy waste segregation targets are summarised in **Table 17.2**.

Table 17.2: JPUH Healthcare Wastes 2023-24

	INCINERATION (CLINICAL WASTE, TONNES) *	SHARPS (CLINICAL WASTE, TONNES)	ALTERNATIVE TREATMENT (CLINICAL WASTE, TONNES)	OFFENSIVE WASTE (NOT CLINICAL WASTE, TONNES)
JPUH 2023-24 Annual Tonnage	88.2	1.5	102.5	322.7
%Total JPUH Healthcare Waste	17.1	0.003	20.0	62.9
% NHS Strategy Targets		20	20	60

17.7 **Table 17.2** confirms the Trust's healthcare waste segregation and resulting treatment outcomes are closely aligned with NHS targets.

Construction Phase

17.8 It is not possible to provide a baseline position for waste from the construction phase of the Proposed Development as excavation, demolition and construction waste types and quantities will be determined by the schedule of programme works.

Potential Impacts

Operational Phase

17.9 An Operational Waste and Recycling strategy will be implemented for the Proposed Development to reduce waste and facilitate recycling, in accordance with Health Technical Memorandum 07-01: Safe and sustainable management of healthcare waste. Sufficient waste and recycling storage facilities will be provided having regard to BS5906: Waste Management in Buildings, Code of Practice (2005) and other relevant sector guidance.

17.10 It is assumed that operational waste arisings at the Hospital summarised in **Tables 17.1** and **17.2** will be consistent across the Proposed Development period during transition from the current to the new hospital and processed at the waste treatment facilities currently used by the appointed waste contractors.

17.11 Using bed numbers at the current hospital and those proposed at the new hospital as an indication of potential increases in waste production, **Table 17.3** summarises the potential increase in waste arisings.

Table 17.3: JPUH Waste Arisings & Bed Numbers

	NO. BEDS	ESTIMATED INCREASE IN WASTE ARISINGS (%)	HEALTHCARE WASTE ARISINGS (TONNES)	RESIDUAL & RECYCLING WASTE ARISINGS (TONNES)
Current Hospital	550	-	514.9	478.4
New Hospital	630	17	602.4	559.7

17.12 In 2022 42,840 tonnes of mixed municipal waste was produced across Great Yarmouth and processed at authorised treatment facilities within and external to the region. JPUH accounted for approximately 1% of this waste, sent to the Veolia facility in Norwich for treatment. For the purpose of this EIA Scoping Report, it is not envisaged a 17% increase in residual and recycling waste will have a material environmental impact based on established treatment availability.

17.13 **Table 17.4** provides information on the key waste management treatment facility receiving healthcare waste from current hospital operations and the impact of JPUH waste on overall capacity, including a potential 17% increase in healthcare waste arisings.

Table 17.4: JPUH Healthcare Waste and Treatment

WASTE TYPE	WASTE TREATMENT FACILITY & TYPE	PERMIT REFERENCE	ANNUAL CAPACITY (TONNES)	JPUH WASTE 2023-24 (TONNES)	JPUH CURRENT WASTE REQUIREMENT OF FACILITY CAPACITY (%)	JPUH POTENTIAL FUTURE WASTE REQUIREMENT OF FACILITY CAPACITY (%)
Healthcare Waste	Stericycle, Transfer Facility, Ipswich.	BB3608FF	5,000	514.9	3.8	4.5
	Stericycle, Incineration Plant, Ipswich.	EP3530XY	8,500			

17.14 For the purpose of this EIA Scoping Report, it is not envisaged a 17% increase in healthcare waste will have a material environmental impact based on treatment availability.

Construction Phase

17.15 Potential impacts during the construction phase of large projects such as this typically include:

- Production of additional waste material from excavation, demolition and construction works;
- Excavation of possible contaminated land, requiring disposal at a suitably permitted facility; and
- Surplus materials and waste may occur where material supply exceeds material demand.

17.16 Demolition and construction waste would be managed by the contractor in accordance with legislative requirements, best practice and local and regional policy standards. This will be specified in a Site Waste Management Plan ensuring that measures are in place to reduce waste generation and minimise material going to landfill. In general, a high proportion of non-hazardous demolition wastes are reused or recycled using off-site sorting facilities (95% processed in Norfolk in 2022).

17.17 These wastes can increase in demand at local waste treatment and disposal facilities. It is considered that these could be significant and the assessment of excavation, demolition and construction waste generation would be included in the EIA process, to determine whether the potential impacts are significant or not.

17.18 With regard to excavation waste, the design of the Proposed Development will ensure that a mass balance of cut and fill material is achieved, and as such, it is considered that potential impacts from

uncontaminated excavation waste will be insignificant and therefore should be scoped out of the EIA process.

Approach and Method

17.19 A review of national legislation, regional and local waste policies will be undertaken initially, to determine and confirm the requirements expected for waste and recycling provision. This will also include a review of any waste planning guidance specific to Great Yarmouth and Norfolk.

17.20 An assessment of the main expected waste types generated during the excavation, demolition and construction phase will be undertaken using available information. As a pre-demolition audit has not yet been undertaken, a qualitative assessment on the expected main types of demolition waste and their subsequent treatment and/or use will be undertaken.

17.21 For construction waste, appropriate waste benchmarks (such as from the Building Research Establishment) will be used to estimate volumes from the Proposed Development. An assessment on the expected main types of construction waste and their subsequent treatment and/or disposal will be undertaken.

17.22 Opportunities for preventing, reducing, reusing and recycling waste materials from the demolition and construction activities associated with the Proposed Development will be identified.

Consultation

17.23 No consultation activities for waste have been undertaken in support of the preparation of the waste EIA Scoping Report as is it anticipated the baseline position for operational waste will be maintained throughout the development period and any subsequent increase in waste production at the fully operational new hospital will not have a material impact in terms of available treatment capacity.

18.0 Cumulative Impacts

Approach

18.1 The EIA Regulations require an ES to consider cumulative effects resulting from the *'cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.'* Schedule 4, 5(e).

18.2 No cumulative impact assessment guidance methodology exists for EIA within the Town and Country Planning regime; thus, standard practice has been developed based on approaches used in other types of EIA, as well as professional experience. The proposed approach for cumulative effects draws on these resources and is set out in the following section.

Screening of Cumulative Projects

18.3 The Cumulative Screening Assessment has been undertaken according to the following methodology. Firstly, existing and approved projects in line with the requirements of the EIA Regulations have been identified. Secondly, projects which are known to be in the earlier stages of planning (pre-consent) are considered. There will be less information available about non-consented projects, and consequently this will have limitations on the level of assessment that will be undertaken.

18.4 To assist the identification of the cumulative projects, the following criteria have been applied:

- Development which is within a zone of influence of the Proposed Development. This zone has been set at 2km;
- Planning applications during the last two years;
- Development which is expected to be constructed at the same time as the Proposed Development;
- EIA development (which is likely to have significant effects in its own right);
- Development which introduces sensitive receptors in close proximity to the Site (acknowledging that the agent of change principle means the introducer of any sensitive receptors is responsible for assessing impacts on those receptors); and
- Major Development.

18.5 Major Development is classified as development involving one or more of the following:

- The winning or working of minerals or the use of land for mineral-working deposits;
- Waste development;
- The provision of dwelling houses where:
  - The number of dwelling houses to be provided is 10 or more; or
  - The development is to be carried out on site having an area of 0.5 hectares or more.
- The provision of a building or buildings where the floor space to be created is 1,000 square metres or more.

18.6 The criteria listed above have been used to identify applications which should be assessed for likely significant cumulative effects in conjunction with the Proposed Development. These are shown in **Table 18.1** below.

Table 18.1: Results of Cumulative Impact Screening Assessment

PROJECT	PLANNING REFERENCE	PROJECT INFORMATION / STATUS	REASONS FOR INCLUSION/EXCLUSION BASED ON CRITERIA PROVIDED ABOVE
Projects to be Included in the Cumulative Assessment			
Land South of Links Road and East of Lowestoft Road Gorleston	06/24/0752/ESN	Full planning application for the development of approximately 550 residential dwellings (C3) including 112 of these as individual care/retirement dwellings, community facilities and services, commercial, business and service units (Class E) or Local Community and Learning (Class F) (c. 375 m2) and associated landscaping, highway works and associated infrastructure. Status: Undecided (06/11/2024)	Screened in despite currently being undecided due to proximity to, expected to be constructed at same time if granted consent and being a major development.
South Bradwell Urban Extension, Bradwell	Mixed use urban extension - (06/13/0652/O).	Some phases of South Bradwell have been fully built and are operation. One outline consent remains live for the consent of 850 units, commercial space and a primary school. The later phases south of Beaufort Way haven't been built out yet, but the consent has lapsed for those applications.	Screened in due to the size of the development. We will monitor applications that have lapsed in case they become live again.
Woodfarm Lane 'Site 25', Gorleston	06/16/0391/SU (hybrid residential development for up to 231 units)	Scoped in (56 units in Phase 1 built and occupied. Reserved matters for Phase 2 (06/21/0313/D) for 44 units and Phase 3 (06/16/0391/SU) for 17 units implemented and extant totalling 61 units together. Remainder of the outline permission has expired.) No cumulative impacts identified.	Screened in.

PROJECT	PLANNING REFERENCE	PROJECT INFORMATION / STATUS	REASONS FOR INCLUSION/EXCLUSION BASED ON CRITERIA PROVIDED ABOVE
Land at Emerald Park, off Woodfarm Lane	06/24/0102/F (construction of 79 dwellings) – site is same as 06/18/0707/O for 97 units	Screened in (application pending consideration) No cumulative impacts identified.	Screened in. Application 06/24/0102/F remains pending consideration but previous application for 97 dwellings which is expired established principle of development at site
Beacon Park Business Park, Beaufort Way, Gorleston	Covered by Beacon Park Local Development Order. Vacant parcels have benefit of permission through LDO.	Screened in. No cumulative impacts identified.	Screened in (revised Beacon Park LDO adopted in February 2022 expiring 1st April 2037) – new LDO grants same permissions as previous order.
Projects Excluded from the Cumulative Assessment			
Beacon Park District Centre, off Woodfarm Lane/Beaufort Way	Local plan allocation BL1	Screened out (draft allocation in emerging Local Plan, no application for consent made at time of previous ES)	Screened out (allocation BL1 in adopted Local Plan but no application for consent made).
Proposed extension to Beacon Business Park	Allocation GN5 for approximately 20 hectares of new employment land	Screened out (no application for consent made at time of previous ES)	Screened out (no application for consent made).
Land to west of Coast Road, Hopton-on-Sea	Allocation HP2 for approximately 40 dwellings	Screened out (no application made at time of previous ES)	Screened out (no application for consent made).
North Lowestoft (NLOW) Garden Village at Corton	DC/24/1267/SCO	Screened out (no application made at time of previous ES)	Screened out. Scoping request submitted in April. 2024 but no application for consent made)

Conclusion

18.7 Projects proposed to be included within the cumulative assessment, however, require the LPA's confirmation/agreement, include:

- Land South of Links Road and East of Lowestoft Road Gorleston;
- South Bradwell Urban Extension, Bradwell;
- Woodfarm Lane 'Site 25', Gorleston;
- Land at Emerald Park, off Woodfarm Lane; and
- Beacon Park Business Park, Beaufort Way, Gorleston.

19.0 Proposed Structure of the ES

19.1 Outlined by Schedule 4 of the Regulations, the ES will comprise three parts: The Main Report, its Technical Appendices and the Non-Technical Summary (NTS). The ES forms part of a sequence of reports that will support the planning application for the Proposed Development.

19.2 In recognition of the consultant team approach proposed for preparing the ES, the document will be structured on a topic basis. This is an alternative to the process approach, whereby baseline conditions are described first, then the construction and operational effects, then the mitigating measures and finally any residual effects. This approach will, however, be adopted in the presentation of each of the individual topic chapters.

19.3 After the initial context setting sections, each topic chapter will approach the assessment by following a consistent structure, which is generally as follows:

Introduction

19.4 The introduction provides a brief summary of the topic to be addressed.

Assessment Methodology

19.5 This section will outline the methods used to undertake the assessment of the environmental effects for the particular topic area. Reference will be made to the data sources used and the relevant standards, guidelines and best practice. Sensitive receptors and significance criteria are also identified.

Baseline Conditions

19.6 The assessment of baseline conditions is fundamental to the EIA process; environmental effects are measured by the degree of deviation from the baseline. In addition, this section will cover how the baseline environment would otherwise evolve without the Proposed Development. The detailed studies and surveys that inform the baseline will be included in the Technical Appendices.

Predicted Impacts (and their Evaluation)

19.7 This will address the nature, extent and magnitude of any potential effects, as a consequence of the Proposed Development, both during the construction phases and once the Proposed Development is complete, operational and occupied.

19.8 Where possible, estimation of impacts will be in measurable quantities with ranges and/or confidence limits, as appropriate.

19.9 Where potential environmental effects are identified, this section will outline:

- The source and/or cause of the effect(s);

- The receptor(s) of the effect;
- The way in which the effect is transmitted from the source to receptor; and
- Potential consequences.

19.10 The significance of predicted impacts will be assessed and categorised as follows:

- Major, minor or no significance;
- Adverse, beneficial;
- Short, medium or long term;
- Permanent or temporary;
- Reversible or irreversible;
- Direct or indirect; and
- Unavoidable or uncertain.

Mitigation and Monitoring

19.11 This section will detail the scope for mitigation of any adverse effects and the effectiveness of the mitigating measures, along with any monitoring of the suggested mitigation measures, if necessary.

Residual Impacts

19.12 This section will evaluate the significance of any unavoidable or residual impacts that remain after the mitigation measures. Monitoring of residual impacts, if necessary, is also addressed.

Summary and Conclusions

19.13 A table to summarise the impacts will be provided in this section.

19.14 The EIA will be compiled into an ES, which will be produced in accordance with the EIA Regulations.

19.15 The ES will comprise the following chapters:

- Volume 1: Main Report
  - Chapter 1 Introduction
  - Chapter 2 Methodology
  - Chapter 3 Site Context
  - Chapter 4 Description of the Proposed Development (including assessment of alternatives)
  - Chapter 5 Planning Policy Context
  - Chapter 6 Air Quality
  - Chapter 7 Biodiversity

  - Chapter 8 Built Heritage
  - Chapter 9 Climate Change – Greenhouse Gas
  - Chapter 10 Climate Change Resilience
  - Chapter 11 Daylight and Sunlight
  - Chapter 12 Flood Risk and Drainage
  - Chapter 13 Ground Conditions
  - Chapter 14 Landscape and Visual
  - Chapter 15 Noise and Vibration
  - Chapter 16 Socio-Economics
  - Chapter 17 Transport
  - Chapter 18 Cumulative Effects
  - Chapter 19 Summary of Effects
- Volume 2: Technical Appendices
- Volume 3: ES Non-Technical Summary

References

Arnell, N (2021), *The Climate Risk Indicators*. Available online at: https://uk-cri.org/.

Belcher, S., *et al* (2014), *The recent storms and floods in the UK*. Met Office. Available online at: https://www.researchgate.net/publication/310018373_The_Recent_Storms_and_Floods_in_the_UK.

British Standards Institution (2013), *BS 420020:2013. Biodiversity. Code of practice for planning and development.*

British Standards Institution (2021), *BS EN 17037:2018+A1:2021 Daylight in buildings*.

Climate Change Committee (2021), Independent Assessment of UK Climate Risk. Available online at: https://www.theccc.org.uk/publication/independent-assessment-of-uk-climate-risk/.

Chartered Institute for Archaeologists (2020), *Standard and Guidance for Historic Environment Desk-based Assessment*.

Chartered Institute for Archaeologists (2020a), *Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment*.

Chartered Institute of Ecology and Environmental Management (2018), *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1.* Available online at: https://cieem.net/wp-content/uploads/2019/02/Combined-EclA-guidelines-2018-compressed.pdf.

Department for Environment, Food and Rural Affairs (2008), *Guidance on the legal definition of contaminated land*. Available online at: https://www.envirotrain.co.uk/wp-content/uploads/2010/09/B5-DEFRA-contaminated-land.pdf.

Environment Agency (2010), *Guiding Principles on Land Contamination*.

Environment Agency (2020), *Land Contamination: Risk Management (LCRM)*. Available online at https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks.

Environment Agency (2022), *Waste Interrogator 2022*.

Froglife (1999), *Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10.

Highways England, Transport Scotland, Welsh Government and Department for Infrastructure (2019), *Design Manual for Roads and Bridges LA 109 Geology and Soils*. Available online at: https://standardsforhighways.co.uk/dmrb/search/adca4c7d-4037-4907-b633-76eaed30b9c0.

Highways England, Transport Scotland, Welsh Government and Department for Infrastructure (2020), *Design Manual for Roads and Bridges LA04 Environmental assessment and monitoring*. Available online at: https://www.standardsforhighways.co.uk/tses/attachments/0f6e0b6a-d08e-4673-8691-cab564d4a60a?inline=true.

Historic England (2015), *Managing Significance in Decision-Taking in the Historic Environment, Historic Environment Good Practice Advice in Planning: 2*. Available online at: https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/gpa2/.

Historic England (2017), *Conservation Principles for the Sustainable Management of the Historic Environment (draft).*

Historic England (2017a), *The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning: 3* (Second Edition). Available online at: https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/heag180-gpa3-setting-heritage-assets/.

Historic England (2019), *Statement of Heritage Significance: Analysing Significance in Heritage Assets, Historic England Advice Note 12*. Available online at: https://historicengland.org.uk/images-books/publications/statements-heritage-significance-advice-note-12/heag279-statements-heritage-significance/.

Institute of Environmental Management and Assessment (2022), *Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition*. Available at: https://www.iema.net/preview-document/assessing-greenhouse-gas-emissions-and-evaluating-their-significance.

Institute of Environmental Management and Assessment (2020), *Climate Change Resilience & Adaptation*. Available online: https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020.

Institute of Environmental Management and Assessment (2021), *Principles of Cultural Heritage Impact Assessment in the UK*. Available online at: https://www.iema.net/articles/principles-of-cultural-heritage-impact-assessment.

Institute of Historic Building Conservation (2017), *Conservation Professional Practice Principles*. Available online at: https://ihbc.org.uk/Conservation-Professional-Practice-Principles/.

International Standards Organisation (2019), *ISO 14090:2019 Adaptation to climate change — Principles, requirements, and guidelines*.

Joint Nature Conservation Committee (2010), *Handbook for Phase 1 habitat survey – a technique for environmental audit*. JNCC, Peterborough, UK. Available online at: https://data.jncc.gov.uk/data/9578d07b-e018-4c66-9c1b-47110f14df2a/Handbook-Phase1-HabitatSurvey-Revised-2016.pdf.

Landscape Institute (2019), *Technical Guidance Note 06/19: Visual Representation of Development Proposals*. [Technical Note currently under review].

Littlefair, P.J. (2022), *Site Layout and Planning for Daylight and Sunlight: a guide to good practice*. BRE Construction Research Communications, Garston, UK. 2022 edition.

Meteorological Office (2022), *UK Climate Averages – Lowestoft*. Available online at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/u134xcy4j.

Meteorological Office (2018), *UK Climate Projections (UKCP) Data*. Available online at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/data/index.

Meteorological Office (2024), *Beaufort wind force scale*. Available online at: https://www.metoffice.gov.uk/weather/guides/coast-and-sea/beaufort-scale.

Ministry of Housing, Communities and Local Government (2023), *National Planning Policy Framework*. Available online at: https://assets.publishing.service.gov.uk/media/669a25e9a3c2a28abb50d2b4/NPPF_December_2023.pdf .

National Health Service (2022), *Health Technical Memorandum 07-01: Safe and sustainable management of healthcare waste*. Available online at: https://www.england.nhs.uk/wp-content/uploads/2021/05/B2159iii-health-technical-memorandum-07-01.pdf

National Health Service (2023), *NHS Clinical Waste Strategy*. Available online at: https://www.england.nhs.uk/publication/nhs-clinical-waste-strategy/.

Norfolk County Council (2011), *Norfolk Minerals and Waste Local Development Framework*. Available online at: https://www.norfolk.gov.uk/article/38668/Minerals-and-waste.

PCA Heritage (2023), *James Paget University Hospital, Gorleston: Sites 1 to 3 Archaeological Desk-based Assessment and Heritage Appraisal*; [unpublished report 10235/R01].

PCA Heritage (2023a), *James Paget University Hospital, Gorleston: Site 5 Archaeological Desk-based Assessment*; [unpublished report 10235/R02].

PCA Heritage (2023), *James Paget University Hospital, Gorleston: Sites 1 to 3 Archaeological Desk-based Assessment and Heritage Appraisal*; [unpublished report 10235/R01].

PCA Heritage (2023a), *James Paget University Hospital, Gorleston: Site 5 Archaeological Desk-based Assessment*; [unpublished report 10235/R02].

Pre-Construct Archaeology (2024), *Land at James Paget University Hospital, Gorleston, Norfolk: An Archaeological Evaluation;* [unpublished report].

Pre-Construct Archaeology (2024a), *Land at James Paget University Hospital, Gorleston, Norfolk. Site 1A: An Archaeological Trial Trench Evaluation*; [unpublished report].

Royal Institute of British Architects (2021). *RIBA 2030 Climate Challenge version 2*. Available online at: https://www.architecture.com/about/policy/climate-action/2030-climate-challenge/resources.

Royal Institution of Chartered Surveyors (2023), *Whole life carbon assessment for the built environment (2nd ed.)*. Available online at: Whole_life_carbon_assessment_PS_Sept23.pdf (rics.org).

Stanbury, A., *et al* (2021), *The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747.*

The Chartered Institution of Building Services Engineers London (1999), *CIBSE Lighting Guide 'LG10'*. The Friary Press, Dorchester.

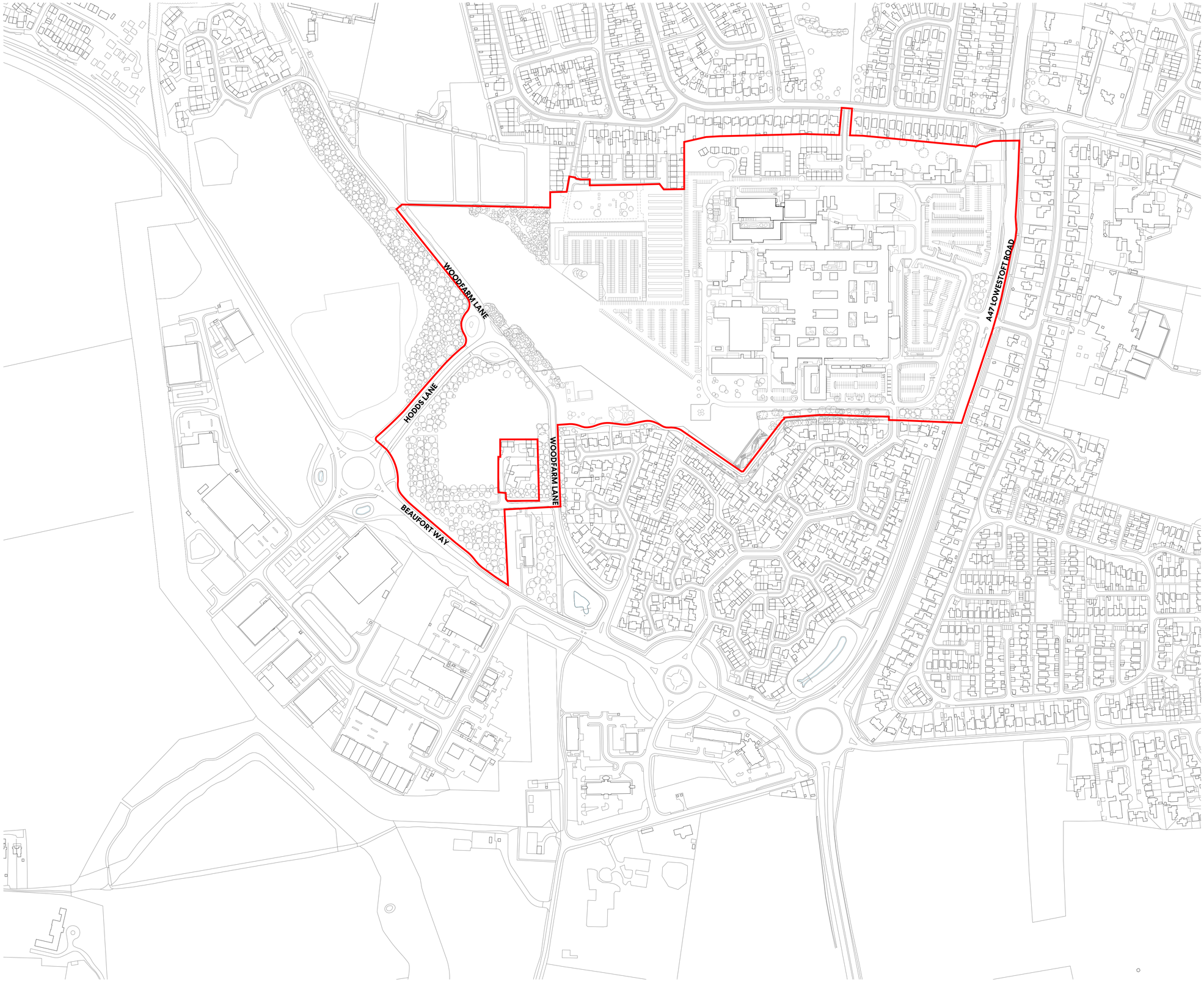
UK Government (2021), *The Carbon Budget Order 2021*. Available online at: The Carbon Budget Order 2021 (legislation.gov.uk).

UK Government (2024), *Statutory biodiversity metric tools and guides.* Available online at: https://www.gov.uk/government/publications/statutory-biodiversity-metric-tools-and-guides.

UK Habitat Classification Working Group (2018), *UK Habitat Classification – Habitat Definitions V1.0*. Available online at: https://ecountability.co.uk/ukhabworkinggroup-ukhab/SECTION BREAK – DO NOT DELETE

APPENDIX 1
SITE LOCATION PLAN

250m
100
50
0m
Scale 1:2500



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NOTES

Drawing indicates design intent only.

All information, areas, dimensions and datum levels are subject to detailed survey, detailed design and investigative work.

Do not scale from the drawing.

PROJECT

Project Site Boundary

KEYPLAN

ISSUE CHART

MARK	ISSUE	DATE
P01	For Information	06/11/2024

Date	11/06/24
Job Number	322909.000
Scale	As indicated
Drawn	LZ
Checked	MK
Approved	RM

CDE STATUS

Suitable for Information

TITLE

JPUH Project Site Boundary - EIA

SHEET NUMBER

FPP-PWA-ZZ-00-DR-A-01005

PROJECT - ORIGINATOR - VOLUME - LEVEL - FORM - DISCIPLINE - NUMBER

CDE STATUS CODE	REVISION
S2	P01

Autodesk Docs://James Paget University Hospital/FPP-PWA-ZZ-ZZ-M3-A-0001.rvt
06/11/2024 15:53:28

APPENDIX 2
ARCHAEOLOGICAL SCOPE OF WORKS

Simon Myles

From: John Percival <john.percival@norfolk.gov.uk>
Sent: 19 July 2024 12:20
To: Andy Shelley
Cc: SNAPE Andy
Subject: James Paget University Hospital - EIA Scoping

Our Ref CNF50264

Dear Andy,

James Paget University Hospital - EIA Scoping

Thank you for your email and phone call.

As discussed no issues with any of the search areas.

Also as discussed although it is likely that the proposed scheme will have significant impact on below-ground archaeology my feeling at the moment is that scoping in below-ground archaeology will not have much benefit from our point of view. We will wait to be consulted by Great Yarmouth Borough Council on the EIA Scoping.

Regards

John Percival

John Percival, Historic Environment Senior Officer (Specialist Advice)
Communities and Environment
Tel: 01362 869275 | Mobile: 07775 697616
Correspondence address, Historic Environment Record, The Archive Centre, Martineau Lane, Norwich, NR1 2DQ
Please Note I work in a flexible hybrid pattern but remain contactable by landline, mobile phone and email

We now have a general mailbox for historic environment strategy and advice. Please send all new site/application consultations, existing casework enquires where you are unclear who our case officer is, and reports for review to hep@norfolk.gov.uk

Norfolk County Council introduced *Standards for Development-led Archaeological Projects in Norfolk* on 1 May 2018. Please visit https://www.norfolk.gov.uk/libraries-local-history-and-archives/archaeology-and-historic-environment/planning-and-the-historic-environment for copies.

From: Andy Shelley <andy.shelley@pcaheritage.co.uk>
Sent: Thursday, July 18, 2024 9:06 AM
To: John Percival <john.percival@norfolk.gov.uk>

Cc: SNAPE Andy <andy.snape@castons.arteliagroup.com>; Historic Environment Planning <hep@norfolk.gov.uk>
Subject: James Paget University Hospital

Dear John,

As historic environment consultants engaged to assist in the redevelopment of James Paget University Hospital in Gorleston-on-Sea we are currently feeding into Bidwells' ES Scoping Report. To this end I am writing to you to agree an appropriate search area for assessment of archaeological heritage assets beyond the perimeter of the development. As you are aware, we prepared archaeological DBAs for Sites 1 to 3 and Site 5 in March 2023. Both utilised NHER archaeological data from for a 1km search area from the site boundaries, with separate search areas of 3kms for listed buildings and 5kms for scheduled monuments and registered parks and gardens. I feel these search areas remain appropriate for EIA but I'd be grateful if you could confirm whether you agree.

On a related matter, I am in receipt of PCA's evaluation report which I'm afraid has been languishing with me for several weeks. It is one of my priorities to finish reviewing this so that I can get a revised copy to you ASAP for approval.

I look forward to hearing from you.

Kind regards,

Andy

Andy Shelley MCIfA AIEMA

07795 608034 / 020 3793 4236

www.pcaheritage.co.uk

PCA HERITAGE

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APPENDIX 3

ARBORICULTURAL IMPACT ASSESSMENT FOR JPUH AND SITE 5

Norfolk Wildlife Services supports the Norfolk Wildlife Trust by providing funds for nature conservation

Wildlife Trust Consultancies

Arboricultural Impact Assessment for James Paget University Hospital

Arboricultural Report Ref: NWS 2022.261.1_JPUH_AIA

March 2023

Norfolk Wildlife Services
Bewick House
22 Thorpe Road
Norwich, NR1 1RY
Tel: 01603 625540
office@norfolkwildlifeservices.co.uk
www.norfolkwildlifeservices.co.uk
Company Registration No: 3957786 VAT No. 876 3225 06

Norfolk Wildlife Services supports the Norfolk Wildlife Trust by providing funds for nature conservation

Client	Castons Consulting Ltd on behalf of James Paget University Hospitals NHS Foundation Trust
Site address	James Paget University Hospital, Gorleston-on-Sea, Norfolk, NR31 6LA.
Survey scope	BS 5837:2012 'Trees in relation to demolition, design and construction – Recommendations'
Survey date(s)	20th February 2023
Report reference	NWS 2022.261.1_JPUH_AIA
Principal author	James Allitt L4 Dip Arb (TechArborA)
Quality checked by	Seth Lambiase MCIEEM

Document version	Date	Issued by
Draftv1	16.03.2023	J. Allitt
Issue v1	22.03.2023	J. Allitt

Declaration of Compliance

The information which I have prepared and provided is true, and has been prepared and provided in accordance with the BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations*. I confirm that the opinions expressed within this document are my bona fide professional opinions.

Third Party Disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Norfolk Wildlife Services Ltd on behalf of the client named above. It does not in any way constitute advice to any third party who is able to access it by any means.

Arboricultural Association Technician Member

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Table of Contents

Executive Summary

Castons Consulting Ltd, on behalf of their client, commissioned Norfolk Wildlife Services to undertake an Arboricultural Impact Assessment for a proposed development site covering land west of the existing James Paget Hospital.

It is proposed to construct a new core hospital building and associated wards, administration building, energy centre, multi-storey car park and surface car parking.

The tree survey and report are in accordance to BS 5837:2012 "Trees in relation to design, demolition and construction- Recommendations".

There are no trees relevant to the development that are protected by a Tree Preservation Order, and the proposed development site does not enter any Conservation Areas. No trees are considered ancient or veteran.

A summary of survey results provides an overview of the trees (including their arboricultural categories) that have the potential to be impacted by the proposed new hospital site, and an analysis highlights the predicted impacts (e.g. tree loss or negative impact to health). No assessment of the potential impacts to trees from utilities or drainage has been undertaken at this stage.

Tables 2 and 3 indicate the trees that are within the footprint of the proposed new structures. The root protection areas and canopy spreads of these trees could be significantly impacted, with resulting negative impacts on long term tree health if protective measures are not in place.

There is unavoidable tree loss necessary to build the proposed new hospital site. However, the majority of the arboricultural attributes would suggest an overall low impact in the short term, with enhancements made through a detailed landscape planting plan and maintenance schedule.

The Tree Asset Plan displays the tree positions, radial spread of roots and canopies of trees, and is provided as a separate document (Ref: 2022.261.1_NWS TAP_JPUH).

An Arboricultural Method Statement and Tree Protection Plan is required to allow construction to proceed without having a negative impact on retained trees. This will be produced once a final development layout is agreed.

1. Introduction

1.1 Project brief

Castons Consulting Ltd, on behalf of their client, commissioned Norfolk Wildlife Services to undertake an Arboricultural Impact Assessment for a proposed development site covering land west of the existing James Paget Hospital.

It is proposed to construct a new core hospital building and associated wards, administration building, energy centre a multi-storey car park and surface car parking.

Construction compounds and adequate working requirements are anticipated, but these have yet to be finalised.

The main focus of this report is detailing the predicted impacts to trees and woody vegetation within the proposed construction zone. The report indicates which trees and hedgerows would be susceptible to a decline in tree health due to construction activities in the form of direct damage from excavation works and from potential root system damage from plant machinery maneuvering within close proximity.

The tree survey and report are in accordance to BS 5837:2012 "Trees in relation to design, demolition and construction- Recommendations".

1.2 Limitations to the survey

This survey is not a tree condition survey and should not be used to identify tree hazard or risk, or be used to provide information for risk indemnity purposes. If any trees are identified as being dangerous then comments shall be made with regards to the removal or retention according to the proposed development. A full inspection for Health and Safety purposes would identify faults and make relevant recommendations on an appropriate schedule of future inspections for faults.

Access to the trees outside the red line boundary and on private land may have been restricted. Estimated dimensions for inaccessible trees, where applicable, is identified with a suffixed '#' in the tree survey schedule.

1.3 Limitations to the Arboricultural Impact Assessment

This report should be regarded as an initial arboricultural appraisal and should be used to inform the final design layout. Assessments or recommendations relating to tree protection zones, remedial tree works, protective fencing, foundation design, material specification and/or project design are not finalised within this report, and are based on the information supplied by the client at the time of the survey.

Anticipated areas for contractor parking have not been identified and as such an assessment has not been made of the potential to cause impacts to trees by soil compaction (root damage) and tree strike from plant machinery.

The impact assessment is based on the preliminary design information supplied by the client (Ref: R_211217_SOC Final Submission_pages 18-22 – Appendix 2) and is subject to change. An overlay is not available at this stage and therefore the assessment is only suggestive. Once a final design has been agreed, this report will require an update to assess actual impacts.

No plans have been made available for the installation of drainage pipes, electric ducting or run-off channels, and therefore the assessment does not take account for these potential impacts.

Where tree group assets are recorded, the average stem diameter is taken and the TAP displays the canopy spread plus 1.0m. Further assessments may be required if the development could impact individual trees within the group.

No formal assessment of the site soils has taken place as part of this report. The British Standard states that a soil assessment should be carried out by a competent person to establish the structure, clay content and potential for volume change of the soil if tree removal is necessary. A survey of this nature is considered outside the scope of this Arboricultural Impact Assessment. For guidance on soil structure in relation to construction, advice should be sought from an engineering consultant.

1.4 Site location

The proposed development site is situated adjacent to the existing hospital, which is west of the A47 and to the south of the main town of Great Yarmouth. The proposed site is mainly in an urban setting with residential areas to the north, east and south. To the west is an industrial site that leads into agricultural fields with occasional tree belts and hedgerows.

The site is within the district of Great Yarmouth Borough Council.

The existing ground levels are considered even throughout the site with a gentle slope aspect facing west with a height difference of approximately 4.0m over 350m.

1.5 Drawings and associated documents

The following drawings and documents were supplied to NWS by the client, to assist with the impact assessment and to facilitate the production of a Tree Asset Plan (TAP).

- Topographical drawing Ref: 47088NOLS-01_09
- 211207 - masterplan
- R_211217_SOC Final Submission_pages 18-22

The TAP Ref: 2022.261.1_NWS TAP_JPUH is supplied as a separate document.

1.6 Statutory checks

Under the UK planning system, the local planning authority has a statutory duty to consider the protection and planting of trees when granting planning permission for a proposed development.

A Tree Preservation Order (TPO) is an order made to protect trees which bring significant amenity benefit to an area. A TPO can be placed on a single tree or a group of trees if they are under threat from removal due to a development. It is a criminal offence to cut down, top, lop, uproot, willfully damage or willfully destroy a tree protected by that order.

It has been confirmed using Great Yarmouth Borough Council's interactive map service[1] (6th March 2023) that no relevant trees are subject to a TPO. TPOs can be applied at any time if a tree is suspected

[1] Tree Preservation Orders (arcgis.com)

of being under threat from development. It is advised to carry out a further check on trees before any tree work occurs.

The development site is not within the Goreleston Conservation Area.

No hedgerows have been identified as important.

Section 15 paragraph 180 of the National Planning Policy Framework (NPPF) makes reference to Veteran and Ancient trees and the habitat value and irreplaceable loss if they are removed for construction. A search using the woodland trust Ancient Tree Inventory[2] showed no trees being identified as veteran or ancient, and no trees surveyed are classed in this category.

[2] Tree Search - Ancient Tree Inventory (woodlandtrust.org.uk)

2. Methodology

2.1 Surveying of trees

Site visits were carried out by Jeremy Splude (Level 4 Arboriculture (ABC) of Norfolk Wildlife Services on 20th February 2023 to collect relevant data, and this report has been prepared by James Allitt (TechArborA). All trees which could be affected by, or have an effect on, the proposal have been inspected and their details are listed in Appendix 1.

Trees were surveyed at ground level and no climbing inspection was undertaken.

The survey was based upon the information collected and the conditions on that day. The survey details quantitative data on the following:

- Tree species
- Tree height
- Stem diameter
- Height and direction of first significant branch
- Crown spread
- Age class
- Brief qualitative assessment on tree condition and future potential

The brief qualitative assessment focuses on physiological and structural condition giving an indication between, good, fair and poor. Preliminary management recommendations have been made where applicable.

The term 'group' is intended to describe trees and shrubs that form a cohesion of arboricultural attributes and woody vegetation as a collective. This includes trees growing together where their canopies may touch, trees that provide companion shelter, and trees that are associable visually (avenues or screens), culturally or with respect to biodiversity (parkland or wood pasture).

Appendix 4 gives a full explanation of the survey terminology.

2.2 Tree assets

An assessment of the trees present was carried out following the guidance in BS 5837:2012. Trees were classified as category A, B, C or U. Tree categories are indicated on the Tree Asset Plan (TAP) by the colour of the crown spread. A calculation in meters (m) is made for the theoretical Root Protection Areas (RPA).

A TAP is presented, with the tree numbers on the TAP corresponding to the numbers in the Tree Survey Schedule (TSS).

The TAP was used as a basis for the assessment of the potential impact to trees and the constraints they pose with the proposed layout. They are represented in two areas:

- *Below ground constraints:* The TAP shows the theoretical RPA for the trees as a circle. The RPA informs the closest positions of any future developments in relation to the protection of the minimum rooting area the tree requires to function.

- *Above ground constraints:* The TAP shows the crown spreads to allow their consideration as a direct constraint in design. The branch spreads were measured for this survey as per BS 5837:2012, but these measurements are estimates only and should not be taken as definitive. Where the crown spread exceeds the RPA in dimensions, the crown spread will be taken as the minimum area to protect.

Where the TAP displays grouped trees the extent of the canopy spread is shown plus 1.0m for the RPA. In certain instances, trees within the group have been singled out for clarity to display the potential impact. Where this occurs further assessment of individual trees may be necessary to confirm the impact or mitigation.

3. Results and Evaluation

3.1 Summary of tree categories within the site

A schedule of results is given in Appendix 1, which contains all the information specified in section 4.4.2.5 of BS 5837:2012.

Data for 54 inspections[3] have been included within this report, which comprise of 32 individual trees and 22 tree groups. It is calculated that 7% of the inspections are category A trees, 22% are category B trees and 71% are category C trees. No trees are classified as category U trees.

Each inspection classifies the tree(s) in respect of age, with the majority being semi-mature. A very small number are either early-mature or mature.

A summary of tree categories is listed in Table 1 below.

Table 1: Summary of tree categories

Category	Description	Tree group / numbers	Totals
A	Trees of high quality which should, where possible, be retained throughout any proposed development	TG027, TG029, TG030, TG031,	4 groups
B	Trees of moderate quality which should, where possible, be retained throughout any proposed development.	T001, T002, T004, T007, T008, T014, TG028, T037, TG043, TG048, T053, TG056	8 trees, 4 groups
C	Trees of low quality which should not be considered a constraint to development.	T003, T005, T006, T010, TG011, TG012, TG013, TG015, TG016, TG017, T018, T019, TG020, T021, T022, T023, TG024, TG025, T026, TG032, TG033, TG034, T035, T036, T038, T039, T040, T041, T044, T045, T046, T047, TG049, T050, T051, T052, T054, TG055	24 trees, 14 groups
U	Trees which should be removed for sound management reasons, regardless of proposals.	n/a	0 trees

[3] Tree Ref: T9 and T42 do not exist

4. Arboricultural Impact Assessment

4.1 Background

The Arboricultural Impact Assessment sets out the impacts that the proposed new development and site entrance may have on trees and hedgerows. The assessment is based on the proposed development plans detailed in documents provided by the client and listed in section 1.5.

The theoretical RPAs of the boundary trees and groups are expected to extend out into adjacent areas; however, the radial spread of roots may be affected by a number of factors including previous land use, ditches, tracks and roads.

Most roots grow within the top 600mm of soil, so provisioning adequate space for construction, landscaping (ground level change) and utility service runs must be considered and appropriate measures taken to avoid the RPAs of the retained trees. Incursion from construction activities into an RPA will damage the roots through root severance or soil compaction. This will inhibit the tree's ability to take up the amount of water and nutrients needed in order to remain healthy. The impact from incursion into an RPA would be a decline in the tree's health, potentially resulting in premature death.

No preliminary management work to trees has been observed during the survey.

Details of appropriate barrier installation, where stated, to prevent incursion into the RPA can be seen in Appendix 5.

4.2 Analysis

Impact to trees from construction activities

Plant machinery access

Access for construction machinery is likely to be off Hodds Lane to the west of the proposed development site.

Tree group TG048 has low branches and root areas that may be susceptible to damage from plant machinery accessing the development site. Partial removal of this category B tree group would be required, with mitigation planting for the losses and adequate barrier protection for the remaining trees.

Utility and service connections

No information has been provided for utility and service runs at this stage. It is important to factor this aspect in at an early stage to avoid excavation for underground facilities within or close to the RPA of retained trees.

Underground drainage and SuDS need to be considered in the design stage. Any excavation for attenuation tanks or storm water management systems has the potential to impact retained trees and should avoid entering into the RPA.

Impacts to trees from the construction of the proposed administration building, energy centre and surface car park spaces

The trees listed in Table 2 are identified as likely to suffer significant impacts from the proposed development of the new hospital site. This may be as a result of excavation works destroying the root zone, soil compaction from construction vehicles or tree strike from machinery. These impacts could cause a decline in tree health and stability. The impact assessment is based on the preliminary design information supplied by the client (Ref: R_211217_SOC Final Submission_pages 18-22 – Appendix 2)

and is subject to change. A further assessment is needed when a final layout is agreed, and will require an update to this report.

Table 2: Direct impacts to trees

Tree ID	Impact	Mitigation
TG027	A group of category A mix-species mature trees that have roots and branches that extend into the proposed development area. They offer good amenity value and will have a long-term benefit to the landscape. Although the stems are protected behind a chain link fence, the roots are likely to extend beyond and potentially underneath the track running adjacent. The removal or upgrade of the track may damage roots, and machinery has the potential to compact the soil.	Protect the RPA with adequate barrier protection (Appendix 5)
TG011, TG012, TG013, TG015, TG016, TG017, TG020, TG024, TG025, T014, T018, T019, T021, T022, T023, T026	These trees and tree groups grow in the allotment area to the north of the site. They are considered category C based on their stem size, amenity value and remaining contribution. The development of the allotment area will require these trees to be removed to allow construction of the admin building, energy centre and surface car park areas.	Replacement can be part of a detailed landscape plan with a 5-year maintenance schedule.
TG043 – northern boundary	The trees within TG43 form a mixed species planted wooded area that contribute to the amenity value of the site. They have potential to offer the development a valuable green area that can be enjoyed and to provide benefit to wildlife and biodiversity. Any enhancement to the existing track that borders the north of the wood has the potential to cause a negative impact to trees. Root damage and branch strike from machinery can cause a decline in tree health leading to premature death.	Protect the RPA / canopy spread with adequate barrier protection. Design an upgrade to the track with sufficient space to allow plant machinery to maneuver. The branch spread / stem diameter would suggest a construction exclusion zone of 4.0m from the base of the trees.
TG043 – south western boundary	The construction of the 120 space surface car park to the south west of the trees growing in TG43 has the potential to cause a negative impact to trees. Root damage and branch strike from machinery can cause a decline in tree health leading to premature death.	Protect the RPA / canopy spread with adequate barrier protection. The branch spread / stem diameter would suggest a construction exclusion zone of 4.0m from the base of the trees.

Tree ID	Impact	Mitigation
TG048	The construction of the forecourt area and multi-storey car park has the potential to cause a negative impact category B to trees growing within TG48. Approximately 32 semi-mature mix species will require removal to allow construction with the loss of amenity value in the landscape.	Replacement can be part of a detailed landscape plan with a 5-year maintenance schedule.

Impacts to trees from the construction of the proposed core hospital building, hospital wards and surface car park spaces.

See Table 3.

Table 3: Trees susceptible to damage from construction activities

Tree ID	Impact	Mitigation
TG032, TG033, TG034, T035, T036, T037, T038, T039	These trees grow in a recreational area with low scrub and some small shrubs. The trees within these tree groups will require removal to facilitate the construction of the new hospital. The majority are small category C trees with the exception of an open-grown category B willow. The impact will be a slight loss of amenity value and some habitat loss.	The loss of these trees due to the building of the new hospital can be compensated with a detailed landscape planting scheme.
TG043 – eastern boundary	The construction of the core hospital building and the adjacent service road has the potential to cause a negative impact to trees. Root damage and branch strike from machinery can cause a decline in tree health leading to premature death.	Protect the RPA / canopy spread with adequate barrier protection. Design an upgrade to the track with sufficient space to allow plant machinery to maneuver. The branch spread / stem diameter would suggest a construction exclusion zone of 4.0m from the base of the trees.
TG043 – southern section	The construction of the service road leading from the forecourt area will require the removal of a number of trees towards the southern section of this group. It is undetermined the extent of loss and the remaining trees will require barrier protection to prevent damage leading to a long term impact in health and stability.	The loss of these trees due to the building of the new hospital can be compensated with a detailed landscape planting scheme. The remaining trees can be protected with adequate barrier fencing. A suggested construction exclusion zone of 4.0m

Tree ID	Impact	Mitigation
		from the base of the remaining trees.
TG046, TG056	These trees hold a higher arboricultural value as a group rather than as individual trees. The groups offer a screening to the site and could provide green infrastructure benefits into the future. The construction of the hospital wards and service roads will require some tree loss within these groups.	The loss of these trees due to the building of the new hospital can be compensated with a detailed landscape planting scheme. The remaining trees can be protected with adequate barrier fencing. A suggested construction exclusion zone of 4.0m from the base of the remaining trees.
TG049, TG031, TG028, TG030, TG029	These trees grow along the southern boundary to the existing site where a service road and car park areas are proposed. They are of higher value as a group and offer screening to the adjacent properties. Retention is advised where possible to allow the tree to mature and provide landscape benefits.	Protect the RPA with adequate barrier protection (Appendix 5). Allow sufficient space for plant to maneuver and design the car park area and service road with this in mind.

Tree works / removal

Table 4: Indicative loss of tree cover (to be confirmed)

Category	Tree ref. No	Justification
Category A	n/a	n/a
Category B	TG043 (partial loss), T037, TG048 (partial loss), TG056 (partial loss)	Construction of the hospital service roads, core hospital building, multi-storey and surface car parks areas.
Category C	TG011, TG012, TG013, TG015, TG016, TG017, TG020, TG024, TG025, T014, T018, T019, T021, T022, T023, T026	Construction of the hospital service roads, core hospital building, multi-storey and surface car parks areas.
Category U	n/a	n/a

Additional planting and landscaping

There are areas within the proposed development site that present an opportunity for additional planting to enhance the development and mitigate for the loss of trees. These areas are positioned in the north-west corner of the site and along the north, south and western boundaries. Opportunities to incorporate landscape planting within the site must consider the species, position and ultimate height and spread the trees will grow to.

Additional planting areas must be identified early in the design process and protected from soil degradation and construction activities using appropriate fencing. Areas that are not possible to protect within the site must undergo soil amelioration prior to planting trees.

Tree group TG042 offers a green space within the hospital grounds. Any accessible footpaths must consider the roots of trees when designing. The use of natural tree gaps, rather than felling should be considered as well as the use of no-dig pedestrian or wheel chair paths.

5. Conclusions

- The impact assessment is based on the preliminary design information supplied by the client (Ref: R_211217_SOC Final Submission_pages 18-22 – Appendix 2) and is subject to change. An overlay is not available at this stage. Once a final design has been agreed, this report will require an update to assess actual impacts.
- There are no TPO trees that are relevant to the construction of the proposed bypass. The proposed area does not enter into a Conservation Area.
- An assessment of proposed utilities has not been made in this report. Once proposed utility routes have been confirmed an update to this report may be required to assess potential impacts.
- Construction activities are expected to have a long-term negative impact to the trees highlighted in Table 2 if barrier protection is not installed around retained trees.
- Trees that potentially require removal are listed in table 4.
- Construction activities will have the potential to negatively impact the retained trees highlighted in Table 3, unless there is adequate tree protection in place before construction work begins.
- Overall, the anticipated impacts to trees is considered low in the short term, if replacement planting with similar species can be achieved through a detailed planting schedule to mitigate for the loss.

6. Recommendations

6.1 Design considerations

Allow sufficient space for plant machinery to manoeuvre where excavation is required in close proximity to retained trees. This may apply to areas close to the following trees:

- TG027 growing on the northern boundary,
- TG043 growing in the centre of the development site,
- TG048 growing along the western boundary and at the proposed new site entrance,

- TG030 and TG031 growing on the southern boundary.
- Adequate space for plant machinery to manoeuvre is suggested to be set at 3.0m between the edge of the RPA and the excavation.

Design the utility and service runs to avoid entering the RPA of retained trees.

Surface water run-off and any SuDS should be designed with enough space to avoid a negative impact to tree roots and branches.

The proposed new site entrance will impact trees within TG048. Where partial removal of trees within groups is necessary, account should be taken for the protection of retained trees with further assessment required.

6.2 Issues to be addressed by an Arboricultural Method Statement

- The positions of the Construction Exclusion Zone (CEZ) fencing will be taken from the TSS in Appendix 1 (the positions are also displayed on the TPP) and shall extend to the edge of the calculated RPA radius or the edge of the canopy spread – whichever is the greatest.
- The material storage area and contractors parking will be identified and constructed away from retained trees and hedges prior to plant and materials being delivered to site.
- Tree work and removal will be specified and must be completed by an appropriately trained arborist that works to high standard and follows guidance in BS3998:2010 Tree Work – Recommendations.
- A sequence of events and key actions that the principle contractor must adhere to ensure construction can safely proceed without any long term impacts to retained trees.
- A method of arboricultural monitoring should be followed throughout the construction phase, particularly where construction is in close proximity to retained trees.
- The principle contractor and arboricultural specialist responsibilities will be addressed and adhered to throughout the construction phase.

Signed: 

Date: 22/03/2023

Appendix 1: Tree Survey Schedule – NWS 2022.261.1 James Paget University Hospital

Surveyor: J. Splude
Date: 20.02.2023
Table 5: Tree survey schedule

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
T001	Common Hawthorn *(Crataegus monogyna)*	5.0	X4 @250	Semi Mature	30+ Years	Outside fence x2 trees. Good overall physiological and structural condition.	B1,3	N:5 E:5 S:5 W:5	1.0	1(S)	6.0	113
T002	Lombardy Poplar *(Populus nigra italica)*	25.0	450	Semi Mature	30+ Years	Outside fence. Good overall physiological and structural condition.	B1,2	N:3.5 E:3.5 S:3.5 W:3.5	5.0	1(S)	7.6	181
T003	Common Hawthorn *(Crataegus monogyna)*	3.5	150	Semi Mature	40+ Years	Fair overall physiological and structural condition.	C1	N:2.5 E:2.5 S:2.5 W:1.5	1.5	1(S)	3.1	30
T004	Sycamore *(Acer pseudoplatanus)*	21.0	550	Semi Mature	40+ Years	Crown lifted to 4m over roadway. Good overall physiological and structural condition.	B1,2	N:6 E:6 S:6 W:6	2.5	2(NE)	6.6	137

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
TG005	Apple x5 *(Malus sp.)*	3.5	100	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C2,3	N:1.5 E:1.5 S:1.5 W:1.5	0.5	0.5(W)	1.2	24
T006	Cherry *(Prunus sp. 'Cherry')*	4.0	250	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C3	N:4 E:4 S:4 W:4	0.0	0.5(E)	3.0	28
T007	Sycamore *(Acer pseudoplatanus)*	15.0	400	Semi Mature	40+ Years	Good overall physiological and structural condition.	B1	N:5 E:5 S:5 W:4	2.0	2(SW)	4.8	72
T008	Sycamore *(Acer pseudoplatanus)*	15.0	400	Semi Mature	40+ Years	Multi stemmed at 2m. Good overall physiological and structural condition.	B1	N:6 E:6 S:5 W:4	2.5	2(SW)	4.8	72
T010	Fig *(Ficus carica)*	2.0	50	Newly planted	20+ Years	Assorted fruit trees small less than 70mm. Fair overall physiological and structural condition.	C1,3	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	3
TG011	Cherry x2 *(Prunus sp. 'Cherry')*	4.0	160	Newly planted	20+ Years	Heavily pruned, some stem bleeds. Poor overall physiological and	C1	N:2.5 E:2.5 S:2.5 W:2.5	1.0	0.5(NW)	1.9	13

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
						structural condition.						
TG012	Cherry x3 *(Prunus sp. 'Cherry')*	5.0	80	Newly planted	20+ Years	Fair overall physiological and structural condition.	C1	N:2 E:2 S:2 W:2	1.0	1(E)	1.0	13
TG013	Cherry x3 *(Prunus sp. 'Cherry')*	5.0	50	Newly planted	20+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	25
T014	Norway Spruce *(Picea abies)*	9.0	200	Semi Mature	40+ Years		B1,3	N:3 E:3 S:3 W:3	0.5	0.5(S)	2.4	18
TG015	Cherry x3 *(Prunus sp. 'Cherry')*	4.0	50	Newly planted	20+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	39
TG016	Cherry x3 *(Prunus sp. 'Cherry')*	5.0	60	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	45
TG017	Cherry x3 *(Prunus sp. 'Cherry')*	3.0	50	Newly planted	20+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	5

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
T018	Cherry *(Prunus sp. 'Cherry')*	4.0	50	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C1,3	N:1 E:1 S:1 W:1	1.5	1.5(N)	1.0	1
T019	Apple *(Malus sp.)*	5.0	300	Semi Mature	20+ Years	Heavily pruned, long stubs. Fair overall physiological and structural condition.	C3	N:3.5 E:3.5 S:3.5 W:3.5	2.0	0.5(W)	3.6	41
TG020	Cherry x3 *(Prunus sp. 'Cherry')*	5.0	50	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	94
T021	Cherry *(Prunus sp. 'Cherry')*	4.0	250	Early Mature	10+ Years	Cushion fungus on pruning wounds, decay to stem. Poor overall physiological and structural condition.	C2,3	N:3 E:3 S:3 W:3	0.5	0.5(E)	3.0	28
T022	Cherry *(Prunus sp. 'Cherry')*	6.0	400	Semi Mature	10+ Years	Heavily pruned	C2,3	N:5 E:5 S:5 W:5	2.0	2(E)	4.8	72

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
T023	Cherry *(Prunus sp. 'Cherry')*	3.0	200	Semi Mature	10+ Years	Heavily pruned	C2,3	N:3 E:3 S:3 W:3	1.0	1(S)	2.4	18
TG024	Cherry x3 *(Prunus sp. 'Cherry')*	4.0	70	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C1	N:2 E:1 S:1 W:1	1.0	1(E)	1.0	61
TG025	Cherry x3 *(Prunus sp. 'Cherry')*	3.0	70	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	157
T026	Apple *(Malus sp.)*	5.0	250	Semi Mature	10+ Years	Heavily pruned	C3	N:3 E:3 S:3 W:1	1.0	1(N)	4.2	55
TG027	Lombardy Poplar x20 *(Populus nigra italica)* Cherry Plum x6 *(Prunus cerasifera)* Sycamore x3 *(Acer pseudoplatanus)*	24.0	630	Mature	40+ Years	Crown clearance higher over allotments. Fair overall physiological and structural condition.	A1,3	N:4 E:4 S:4 W:4	4.0	3(N)	7.6	1535

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
	Common Lime *(Tilia x vulgaris)*											
TG028	Oak x4 *(Quercus sp.)* Common Ash *(Fraxinus excelsior)* Cherry x2 *(Prunus sp. 'Cherry')*	10.0	300	Semi Mature	40+ Years	Cherry bleeds, crown lifted to 2m. Fair overall physiological and structural condition.	B1,2	N:4 E:4 S:4 W:4	2.0	1(N)	3.6	203
TG029	Common Beech x16 *(Fagus sylvatica)* Willow x11 *(Salix sp.)* Oak x20 *(Quercus sp.)* Pine x4 *(Pinus sp.)* Hazel x8 *(Corylus avellana)* Cherry x11 *(Prunus sp. 'Cherry')* Alder x10 *(Alnus sp.)*	15.0	300	Semi Mature	40+ Years	Landscape planting. Good overall physiological and structural condition.	A1,2	N:4 E:4 S:4 W:4	4.0	3	3.6	1001

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
TG030	Cherry x11 *(Prunus sp. 'Cherry')* Willow x11 *(Salix sp.)* Hazel x8 *(Corylus avellana)* Oak x20 *(Quercus sp.)* Common Beech x16 *(Fagus sylvatica)* Alder x10 *(Alnus sp.)* Pine x4 *(Pinus sp.)*	15.0	300	Semi Mature	40+ Years	Landscape planting. Good overall physiological and structural condition.	A1,2	N:4 E:4 S:4 W:4	4.0	3	3.6	1616
TG031	Scots Pine x3 *(Pinus sylvestris)*	22.0	590	Semi Mature	40+ Years	Within scrub group. Good overall physiological and structural condition.	A1,2	N:5 E:5 S:5 W:5	2.0	3(N)	7.0	349
TG032	White Willow x10 *(Salix alba)* Lombardy Poplar x3 *(Populus nigra italica)*	14.0	200	Semi Mature	30+ Years	Within patchy bramble, willow coppiced stems. Fair overall physiological and	C1,2	N:3 E:3 S:3 W:3	0.0	1	2.4	992

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
						structural condition.						
TG033	Common Hawthorn x10 *(Crataegus monogyna)* Lombardy Poplar x14 *(Populus nigra italica)*	8.0	80	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C2	N:3 E:3 S:3 W:3	0.0	0	1.0	1978
TG034	Pine *(Pinus sp.)* Birch x2 *(Betula sp.)* Goat Willow x18 *(Salix caprea)*	8.0	100	Semi Mature	20+ Years	Mixed group, willow typical tight multiple unions. Fair overall physiological and structural condition.	C2	N:2 E:2 S:2 W:2	0.0	0	1.2	615
T035	Willow *(Salix sp.)*	11.0	260	Semi Mature	20+ Years	Heavily pruned	C1	N:6 E:6 S:6 W:6	2.0	2(W)	8.8	243
T036	Willow *(Salix sp.)*	11.0	200	Semi Mature	20+ Years	Heavily pruned, historic stem torn out to S at base	C1	N:6 E:6 S:1 W:6	1.0	1(W)	5.9	109
T037	Willow *(Salix sp.)*	11.0	400	Semi Mature	30+ Years	Fair overall physiological and	B1	N:6 E:6	1.0	2(W)	8.3	216

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
						structural condition.		S:6 W:6				
T038	Willow *(Salix sp.)*	11.0	400	Semi Mature	20+ Years	Decay at base, previously failed stem stumps	C1	N:6 E:6 S:2 W:6	2.0	2(W)	4.8	72
T039	Willow *(Salix sp.)*	10.0	250	Semi Mature	20+ Years	Multiple stems from base	C1	N:5 E:5 S:5 W:5	2.0	2(E)	7.9	196
T040	Common Hawthorn *(Crataegus monogyna)*	5.0	70	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C1	N:3 E:3 S:3 W:3	0.0	0	1.9	11
T041	Willow *(Salix sp.)*	5.0	100	Semi Mature	20+ Years	Heavily pruned. Fair overall physiological and structural condition.	C1	N:4 E:4 S:4 W:4	0.0	0	1.7	9
TG043	Oak *(Quercus sp.)* Willow *(Salix sp.)* Hornbeam *(Carpinus betulus)* Scots Pine *(Pinus sylvestris)*	10.0	200	Semi Mature	40+ Years	Mixed woodland, planted 2mx2m spacing's, good health	B2	N:4 E:4 S:4 W:4	0.5	0.5	2.4	4373

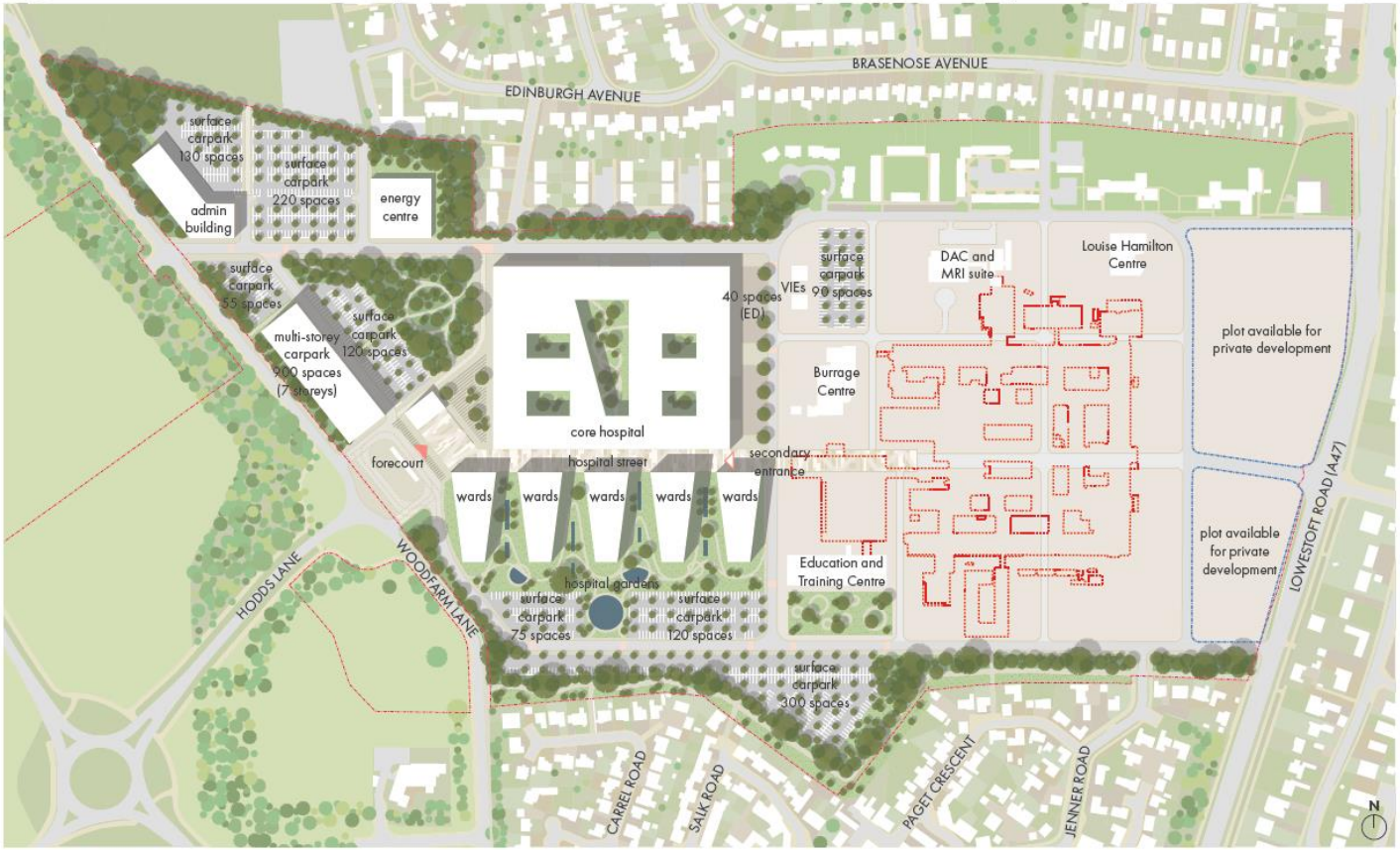
Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
	Common Birch *(Betula alba)* Swedish Whitebeam *(Sorbus intermedia)*											
T044	Elder *(Sambucus nigra)*	6.0	100	Semi Mature	10+ Years	Fair overall physiological and structural condition.	C2	N:4 E:4 S:4 W:4	1.0	1(E)	1.7	9
T045	Willow *(Salix sp.)* Cherry *(Prunus sp. 'Cherry')*	5.0	80	Semi Mature	20+ Years	Coppiced. Fair overall physiological and structural condition.	C2	N:1 E:2 S:2 W:3	0.0	0	1.0	38
T046	Buddleia *(Buddleia sp.)*	5.0	90	Mature	10+ Years	Fair overall physiological and structural condition.	C2	N:5 E:5 S:5 W:5	0.0	0	2.2	15
T047	Buddleia *(Buddleia sp.)*	5.0	90	Mature	10+ Years	Fair overall physiological and structural condition.	C2	N:5 E:5 S:5 W:5	0.0	0	2.2	15
TG048	Oak *(Quercus sp.)* Willow *(Salix sp.)*	10.0	200	Semi Mature	40+ Years	Mixed woodland, planted 2mx2m spacing's, good health	B1,2	N:4 E:4 S:4 W:4	0.5	0.5	2.4	2541

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
	Hornbeam *(Carpinus betulus)* Scots Pine *(Pinus sylvestris)* Common Birch *(Betula alba)* Swedish Whitebeam *(Sorbus intermedia)*											
TG049	Kapuka *(Griselinia littoralis)*	4.0	50	Semi Mature	10+ Years	Shrubs bounded by hedges.	C2	n/a	0.0	0	1.0	2948
T050	Cherry *(Prunus sp. 'Cherry')*	5.0	80	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C2	N:3 E:1 S:3 W:3	1.0	1(N)	1.4	6
T051	Cherry *(Prunus sp. 'Cherry')*	5.0	100	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C1	N:3 E:3 S:3 W:3	1.5	1.5(N)	1.2	5
T052	Cherry *(Prunus sp. 'Cherry')*	5.0	70	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C1	N:3 E:3 S:3 W:3	1.5	1.5(N)	0.8	2
T053	Birch *(Betula sp.)*	9.0	200	Semi Mature	30+ Years	Fair overall physiological and	B1	N:3 E:3	4.0	1.5(N)	2.4	18

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
						structural condition.		S:3 W:3				
T054	Cherry *(Prunus sp. 'Cherry')*	5.0	100	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C1	N:2 E:2 S:2 W:2	1.0	1.5(S)	1.2	5
TG055	Cherry x4 *(Prunus sp. 'Cherry')* Hawthorn x2 *(Crataegus sp.)*	7.0	200	Early Mature	20+ Years	Poorly pruned	C1	N:4 E:3 S:2 W:3	3.0	2(N)	2.4	118
TG056	Pine x4 *(Pinus sp.)* Hazel x2 *(Corylus avellana)* Common Ash x2 *(Fraxinus excelsior)* Birch x3 *(Betula sp.)* Cherry x5 *(Prunus sp. 'Cherry')*	10.0	250	Semi Mature	30+ Years	Good overall physiological and structural condition.	B1,2	N:4 E:4 S:4 W:4	1.0	0.5	3.0	628

Appendix 2: Proposed layout

figure 18 illustrative site plan for SOC Preferred Way Forward (option 3)



Complete new build, with Burrage Centre, Training and education, Louise Hamilton Centre and DAC on existing site

18

Appendix 3: Photographs

Photo 1: Trees within TG027 growing along the northern boundary.

Photo 2: Trees within TG043 growing in the centre of the development site.

Photo 3: TG056 southwest corner of the site.

Photo 4: TG034 growing in the recreational area.

Appendix 4: Explanations of Tree Survey Schedule headings

Reference # (Ref.).: This number identifies the trees and corresponds with the provided plans. Trees are prefixed T, groups G and hedges H. Where stumps are identified the suffix S will be used.

Species: The common and Latin name is given for each tree.

Height: Overall current height of the tree estimated in metres.

Stem Diameter (Stem Diam.): Measured at 1.5m above ground level as per Figure C1a) of BS 5837, or at an appropriate height, as per Figures C1b) to C1f) of BS 5837. Estimated stem diameter recorded in millimetres.

Life Stage: This refers to the age of the individual tree relating to the average life expectancy of each species in a similar environment.

Newly planted (NP) – a tree within 3 years after planting

Semi-mature (SM) – a tree within its first one third of life expectancy

Early-mature (EM) – a tree within its second third of life expectancy

Mature (M) – a tree in its final one third of life expectancy

Over-mature (OM) – a tree having reached its maximum lifespan and is declining in health and size due to old age

Veteran (V) – a tree that is of interest biologically, aesthetically or culturally because of its age, size and condition

Estimated Remaining Contribution (Rem. Contrib.): Has been estimated by subtracting the current age from the life expectancy of a tree in same location and condition. Each tree is given a retention category according to BS 5837:2012: <10 yrs; 10+ yrs; 20+yrs; 40+yrs

General Observations: Various comments relating to the tree's previous and possible future management e.g. the tree's physiological and/or structural condition that may affect their estimated life expectancy; nearby structures and services where trees and their future growth may have an impact; previous pruning history.

Retention Category: Based upon the categories in Table 1 of BS 5837: 2012 regarding tree quality assessment and suitability for retention.

Crown Spread: Estimated in metres and given at cardinal compass points.

Crown Clearance: Existing height of the canopy from ground level, measured in metres.

Lowest Branch: Existing height above ground level of the first significant branch, recorded in metres. Direction of growth may be given as a cardinal compass point, e.g. 3N.

RPA Radius (m): Calculation of the radius the Root Protection Areas based on the stem diameter(s), to inform the scheme designer of each tree/group's area of sufficient rooting volume that should be retained and protected. See section 4.6 of BS 5837: 2012 for details of the calculation.

RPA Area (m^2): A calculation derived from the single stem diameter taken from BS 5837:2012 Annex D, table D.1 Root Protection Areas

Appendix 5: Protective Barriers – Installation Methods

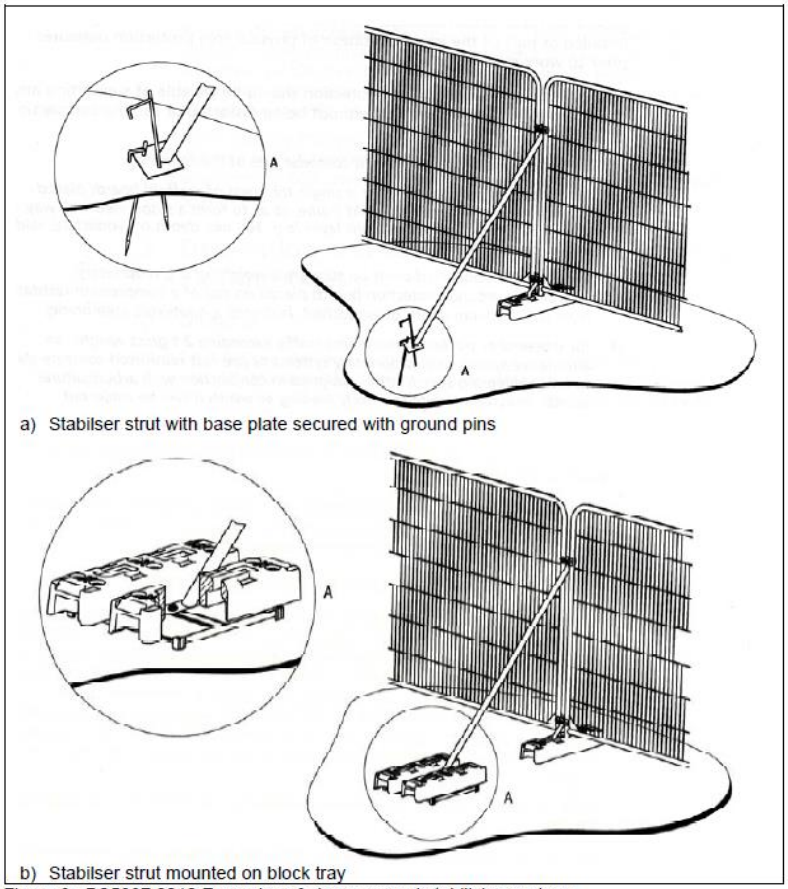


Figure 3: BS5837:2012 Examples of above-ground stabilising systems

Photo 5: Heras fencing with base plate & sign.

Photo 6: Block plate and stabiliser strut (pinned)

Norfolk Wildlife Services supports the Norfolk Wildlife Trust by providing funds for nature conservation

Wildlife Trust Consultancies

Arboricultural Impact Assessment for James Paget University Hospital – Site 5

Arboricultural Report Ref: NWS 2022.261.1_JPUH_AIA

March 2023

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Norfolk Wildlife Services supports the Norfolk Wildlife Trust by providing funds for nature conservation

Client	Castons Consulting Ltd on behalf of James Paget University Hospitals NHS Foundation Trust
Site address	James Pagent University Hospital, Gorleston-on-Sea, Norfolk, NR31 6LA.
Survey scope	BS 5837:2012 'Trees in relation to demolition, design and construction – Recommendations'
Survey date(s)	20th February 2023
Report reference	NWS 2022.261.1_JPUH_AIA
Principal author	James Allitt L4 Dip Arb (TechArborA)
Quality checked by	Seth Lambiase MCIEEM

Document version	Date	Issued by
Draftv1	22/03/2023	J. Allitt
Issue v1	29.03.2023	J. Allitt

Declaration of Compliance

The information which I have prepared and provided is true, and has been prepared and provided in accordance with the BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations*. I confirm that the opinions expressed within this document are my bona fide professional opinions.

Third Party Disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Norfolk Wildlife Services Ltd on behalf of the client named above. It does not in any way constitute advice to any third party who is able to access it by any means.

Arboricultural Association Technician Member

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Table of Contents

Executive Summary

Castons Consulting Ltd, on behalf of their client, commissioned Norfolk Wildlife Services to undertake an Arboricultural Impact Assessment for a proposed development site covering land west of the existing James Paget University Hospital.

This initial tree survey and report is to provide an overview of the existing vegetation and the vulnerabilities to impact. This will enable the design process to limit the impact to retained trees and establish which trees, if any, are required to be removed.

The tree survey and report are in accordance to BS 5837:2012 "Trees in relation to design, demolition and construction- Recommendations".

There are no trees relevant to the development that are protected by a Tree Preservation Order and the development does not enter any Conservation Areas. No trees are considered to be ancient or veteran.

A summary of survey results provides an overview of the trees (including their arboricultural categories) that have the potential to be impacted by a proposed development.

The trees have been grouped, as they are growing together with similar arboricultural attributes and growth forms. An average stem diameter, canopy spread, canopy height and age class has been provided.

There are small shrubs growing within the site that are outside the scope of a BS5837:2012 survey.

The Tree Asset Plan displays the tree positions, radial spread of roots and canopies of trees, and is provided as a separate document (Ref: 2022.261.1_NWS TAP_JPUH – site 5).

An Arboricultural Method Statement and Tree Protection Plan have not been produced at this stage. Once a final design has been agreed, an update to this impact assessment will be required, followed by an Arboricultural Method Statement and Tree Protection Plan aimed at preventing long-term health impacts to retained trees.

1. Introduction

1.1 Project brief

Castons Consulting Ltd, on behalf of their client, commissioned Norfolk Wildlife Services to undertake an Arboricultural Impact Assessment for a proposed development site covering land west of the existing James Paget University Hospital.

This initial tree survey and report is to provide an overview of the existing vegetation and the vulnerabilities to impact. This will enable the design process to limit the impact to retained trees and establish which trees, if any, are required to be removed.

Construction compounds and adequate working requirements are anticipated, but these have yet to be finalised.

The tree survey and report are in accordance to BS 5837:2012 "Trees in relation to design, demolition and construction- Recommendations".

1.2 Limitations to the survey

This survey is not a tree condition survey and should not be used to identify tree hazard or risk, or be used to provide information for risk indemnity purposes. If any trees are identified as being dangerous then comments shall be made with regards to the removal or retention according to the proposed development. A full inspection for Health and Safety purposes would identify faults and make relevant recommendations on an appropriate schedule of future inspections for faults.

Access to the trees outside the red line boundary and on private land may have been restricted. Estimated dimensions for inaccessible trees, where applicable, is identified with a suffixed '#' in the tree survey schedule.

The topographical survey drawing did not show individual tree stems for this site, rather it indicated trees displayed as a group. Therefore, the positions are displayed as a group. More accurate positions may be required if partial felling is required depending on the final design layout.

1.3 Limitations to the Arboricultural Impact Assessment

This report should be regarded as an initial arboricultural appraisal and should be used to inform the final design layout. Assessments or recommendations relating to tree protection zones, remedial tree works, protective fencing, foundation design, material specification and/or project design are not finalised within this report, and are based on the information supplied by the client at the time of the survey.

Anticipated areas for contractor parking have not been identified and as such an assessment has not been made of the potential to cause impacts to trees by soil compaction (root damage) and tree strike from plant machinery.

Where tree group assets are recorded the average stem diameter is taken and the TAP displays the canopy spread plus 1.0m. Further assessments may be required if the development impacts individual trees within the group.

No formal assessment of the site soils has taken place as part of this report. The British Standard states that a soil assessment should be carried out by a competent person to establish the structure, clay content and potential for volume change of the soil if tree removal is necessary. A survey of this

nature is considered outside the scope of this Arboricultural Impact Assessment. For guidance on soil structure in relation to construction, advice should be sought from an engineering consultant.

1.4 Site location and description

The proposed development site is situated adjacent to the existing hospital, which is west of the A47 and to the south of the main town of Great Yarmouth.

The site is within the district of Great Yarmouth Borough Council.

The existing ground levels are considered uneven throughout the site, with multiple spoil heaps within the centre of the site indicating previous earth works. The spoil heaps are approximately 2.0m in height.

1.5 Drawings and associated documents

The following drawings and documents were supplied to NWS by the client to assist with the impact assessment and to facilitate the production of a Tree Asset Plan (TAP).

- Topographical drawing Ref: 47088NOLS-01_07

The TAP Ref: 2022.261.1_NWS TAP_JPUH – site 5 is supplied as a separate document.

1.6 Statutory checks

Under the UK planning system the local planning authority has a statutory duty to consider the protection and planting of trees when granting planning permission for a proposed development.

A Tree Preservation Order (TPO) is an order made to protect trees which bring significant amenity benefit to an area. A TPO can be placed on a single tree or a group of trees if they are under threat from removal due to a development. It is a criminal offence to cut down, top, lop, uproot, willfully damage or willfully destroy a tree protected by that order.

It has been confirmed using the Great Yarmouth Borough Council's interactive map service[1] (6th March 2023) that no relevant trees are subject to a TPO. TPOs can be applied at any time if a tree is suspected of being under threat from development. It is advised to carry out a further check on trees before any tree work occurs.

The development site is not within the Gorleston Conservation Area.

No hedgerows have been identified as important.

Section 15 paragraph 180 of the National Planning Policy Framework (NPPF) makes reference to 'Veteran' and 'Ancient' trees, and to the habitat value and irreplaceable loss if they are removed for construction. A search using the Woodland Trust's Ancient Tree Inventory[2] showed no site trees previously being identified as veteran or ancient trees, and none of the trees surveyed are considered to be classed in this category.

[1] Tree Preservation Orders (arcgis.com)
[2] Tree Search - Ancient Tree Inventory (woodlandtrust.org.uk)

2. Methodology

2.1 Surveying of trees

Site visits were carried out by Jeremy Splude (Level 4 Arboriculture (ABC) of Norfolk Wildlife Services on 20th February 2023 to collect relevant data, this report is prepared by James Allitt (TechArborA). All trees which could be affected by, or have an effect on, the proposal have been inspected and their details are listed in Appendix 1.

Trees were surveyed at ground level and no climbing inspection was undertaken.

The survey was based upon the information collected and the conditions on that day. The survey details quantitative data on the following:

- Tree species
- Tree height
- Stem diameter
- Height and direction of first significant branch
- Crown spread
- Age class
- Brief qualitative assessment on tree condition and future potential

The brief qualitative assessment focuses on physiological and structural condition giving an indication between, good, fair and poor. Preliminary management recommendations have been made where applicable.

The term 'group' is intended to describe trees and shrubs that form a cohesion of arboricultural attributes and woody vegetation as a collective. Trees growing together where their canopies may touch, trees that provide companion shelter, visually (avenues or screens), culturally, including biodiversity (parkland or wood pasture) are included.

Appendix 4 gives a full explanation of the survey terminology.

2.2 Tree assets

An assessment of the trees present was carried out following the guidance in BS 5837:2012. Trees were classified as category A, B, C or U. Tree categories are indicated on the Tree Asset Plan (TAP) by the colour of the crown spread. A calculation in meters (m) is made for each theoretical Root Protection Area (RPA).

A TAP is presented, with the tree numbers on the TAP corresponding to the numbers in the Tree Survey Schedule (TSS).

The TAP was used as a basis for the assessment of the potential impact to trees and the constraints they pose with the proposed layout. They are represented in two areas:

- *Below ground constraints:* The TAP shows the theoretical RPA for the trees as a circle. The RPA informs the closest positions of any future developments in relation to the protection of the minimum rooting area the tree requires to function.
- *Above ground constraints:* The TAP shows the crown spreads to allow their consideration as a direct constraint in design. The branch spreads were measured for this survey as per BS 5837:2012, but these measurements are estimates only and should not be taken as definitive. Where the crown spread exceeds the RPA in dimensions, the crown spread will be taken as the minimum area to protect.

Where the TAP displays grouped trees, the extent of the canopy spread is shown plus 1.0m buffer for the RPA. In certain instances, trees within the group have been singled out for clarity to display the potential impact. Where this occurs, further assessment of individual trees may be necessary to confirm the potential impact and required mitigation.

3. Results and Evaluation

3.1 Summary of tree categories within the site

A schedule of results is given in Appendix 1, which contains all the information specified in section 4.4.2.5 of BS 5837:2012.

Data collected for 6 tree groups is included in this report. Trees running along Woodfarm Lane (tree group G5 and G6) are considered the highest category (Category A). These trees provide screening adjacent to properties as well as having the potential to deliver long-term benefits to the landscape and environment.

A tree belt grows in the southwest corner of the site (tree group G2) with a mixed species, semi-mature selection of trees. They hold a higher value as a group and have the potential to deliver a long term benefit to the landscape and environment.

Other tree groups within the development site (tree groups G3 and G4) are considered to hold lower arboricultural attributes based on their size, growing conditions and potential to provide longevity into the future.

All tree groups are considered to be semi-mature but for one group being in the young age class. The tree groups hold a higher collective value and with the main attribute being that of landscape interest.

No preliminary management work to trees has been observed during the survey.

A summary of tree categories is listed in Table 1 below.

Table 1: Summary of tree categories

Category	Description	Tree group / numbers	Totals
A	Trees of high quality which should, where possible, be retained throughout any proposed development	G5, G6	2 tree groups
B	Trees of moderate quality which should, where possible, be retained throughout any proposed development.	G1, G2	2 tree groups
C	Trees of low quality which should not be considered a constraint to development.	G3, G4	2 tree groups
U	Trees which should be removed for sound management reasons, regardless of proposals.	n/a	0 trees

4. Arboricultural Impact Assessment

4.1 Background

The Arboricultural Impact Assessment sets out the potential impacts that the proposed new development and site entrance may have on trees. The assessment will require updating with more precise impact predictions once a final design has been agreed.

The theoretical RPAs of the boundary trees and groups are expected to extend out into the adjacent ground; however, the radial spread of roots may be affected by a number of factors including previous land use, ditches, tracks and roads.

Most roots grow within the top 600mm of soil, so provisioning adequate space for construction, landscaping (ground level change) and utility service runs must be considered, and appropriate measures taken to avoid the RPAs of the retained trees. Incursion from construction activities into an RPA will damage the roots through root severance or soil compaction. This will inhibit the tree's ability to take up the amount of water and nutrients needed in order to remain healthy. The anticipated impact from incursion into an RPA would be a decline in the tree's health, potentially resulting in premature death.

Details of appropriate barrier installation to prevent incursion into an RPA (where advised) can be seen in Appendix 5.

4.2 Analysis

Impact to trees from construction activities

Site access

There is existing access to the west of Woodfarm Lane. The access is not constrained by vegetation and the existing surface is concrete or asphalt.

Utility and service connections

No information has been provided for utility and service runs at this stage. It is important to factor in this aspect at an early stage, to avoid excavation for underground facilities within or close to the RPA of retained trees.

Underground drainage and SuDS need to be considered in the design stage. Any excavation for attenuation tanks or storm water management systems has the potential to impact retained trees and should avoid entering into RPAs.

Impacts to trees from development

The main impacts from any development is likely to be from ground level change close to trees, in particular tree groups G2 and G4. Tree group G4 is considered to be a category C group and, if applicable, can be replaced with mitigation planting. Tree group G2 holds a higher category B classification, and as such should be considered to be retained to enhance the development by giving the area an established feel, reducing the amount spent on landscape planting, and overall promoting a better development that can provide a benefit to people by improving both health and well-being standards. Wildlife and local biodiversity values also increase when trees are incorporated into a development.

Trees can suffer long-term health impacts from construction activities, where there is plant machinery work conducted within the RPA of retained trees. The RPA is the minimum rooting area a tree needs to survive, and as such should be protected by installing barrier fencing to the edge of the RPA to create a construction exclusion zone (CEZ).

Manoeuvring plant machinery requires sufficient space to turn and swing long booms. A minimum space between the edge of the RPA and any excavation is recommended to be 3.0m distance. This will allow sufficient space without interfering with barrier fencing and requiring extra protective measures such as temporary ground protection.

If partial removal of a tree group(s) is required to allow any development, the protection of the retained trees must be considered. This may require a further tree assessment once the area is identified to establish the RPA of the retained tree group.

The proposed position of any structures, such as buildings or car parking, should consider the future pressure to remove the nearest trees if they are to grow into maturity and beyond. Future pressure may come from direct damage from roots or branches. Pressure to remove trees also comes from seasonal nuisances, such as leaf and seed drop. The proximity of structures and features should allow for trees to grow into maturity without impacting the structure or feature.

Additional planting and landscaping

Opportunities to incorporate landscape planting within the site must consider the species, positions and ultimate heights and spreads the trees will grow to.

Additional planting areas must be identified early in the design process and protected from soil degradation and construction activities using appropriate fencing. Areas that are not possible to protect within the site must undergo soil amelioration prior to planting trees.

5. Conclusions

- The impact assessment will require an update once a final design has been agreed.
- There are no TPO trees that are relevant to the development area. The proposed area does not enter into a Conservation Area.
- Tree groups G2 and G4 are considered susceptible to ground level change and impact from construction activities.
- An assessment of proposed utilities has not been made in this report. Once proposed utility routes have been confirmed an update to this report may be required to assess potential impacts.
- All tree groups are considered semi-mature except one group being in the young age class. The tree groups hold a higher collective value with their main attribute being of landscape interest.
- The final development design should allow for sufficient working space between the edges of all RPA / CEZ and any excavations or ground level changes.
- Overall, the anticipated impacts to trees are considered to be of low magnitude in the short term, which can be compensated by a detailed schedule for replacement planting with suitable species.

6. Recommendations

Some tree loss is anticipated. However, any development design should take account of the existing tree population (tree categories) and try to incorporate the higher category trees to enhance the development by giving the area an established feel, reducing the amount spent on landscape planting, and overall promoting a better development that can provide a benefit to people by improving both health and well-being standards.

Allow sufficient space for plant machinery to manoeuvre where excavation is required in close proximity to retained trees. This applies to areas close to tree groups G2 and G4. Adequate space for plant machinery to manoeuvre is suggested at 3.0m between the edge of the RPA/CEZ and the excavation or ground level change.

Design the utility and service runs to avoid entering the RPA of retained trees. Surface water run-off and any SuDS should be designed with enough space to avoid a negative impact to tree roots and branches.

The proposed new entrance will impact trees within TG48. Where partial removal of trees within groups is necessary, account should be taken for the protection of retained trees with further assessment required.

Issues to be addressed by an Arboricultural Method Statement:

- The positions of the Construction Exclusion Zone (CEZ) fencing will be taken from the TSS in Appendix 1 (the positions are also displayed on the TPP), and shall extend to the edge of the calculated RPA radius or the edge of the canopy spread – whichever is the greatest.
- The material storage area and contractors parking will be identified and constructed away from retained trees and hedges prior to plant and materials being delivered to site.
- Tree work and removal will be specified and must be completed by an appropriately trained arborist that works to high standard and follows guidance in BS3998:2010 Tree Work – Recommendations.
- A sequence of events and key actions that the principle contractor must adhere to ensure construction can safely proceed without any long term impacts to retained trees.
- A method of arboricultural monitoring throughout the construction phase, particularly where construction is in close proximity to retained trees.
- The principle contractor and arboricultural specialist responsibilities will be addressed and adhered to throughout the construction phase.

Signed: 

Date: 29/03/2023

Appendix 1: Tree Survey Schedule – NWS 2022.261.1 James Paget University Hospital – site 5

Surveyor: J. Splude
Date: 20.02.2023
Table 2: Tree survey schedule

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch Dir	RPA Radius (m)	RPA Area (m^2)
G1	Silver Birch x20 *(Betula pendula)* Common Beech x20 *(Fagus sylvatica)*	10.0	200	Semi Mature	40+ Years	Mixed planted woodland	B1,2	N:5 E:5 S:5 W:5	1.0	East	2.4	3424
G2	Scots Pine x5 *(Pinus sylvestris)* Silver Birch x5 *(Betula pendula)* Sycamore x10 *(Acer pseudoplatanus)*	10.0	300	Semi Mature	40+ Years	Mixed scrubby woodland,	B2,3	N:4 E:4 S:4 W:4	2.0	East	3.6	10077
G3	Leyland Cypress x20 *(Cupressocyparis leylandii X)*	6.0	250	Semi Mature	30+ Years	Crowns browning, inside fenceline	C1,2	N:2.5 E:2.5 S:2.5 W:2.5	2.0	North	3.0	293
G4	Sycamore x3 *(Acer pseudoplatanus)*	5.0	100	Young	20+ Years	Coppiced self sets	C3	N:4 E:4 S:4 W:4	2.0	West	1.2	244

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch Dir	RPA Radius (m)	RPA Area (m^2)
G5	Pine *(Pinus sp.)* Sycamore x5 *(Acer pseudoplatanus)* Common Birch *(Betula alba)* Field Maple x5 *(Acer campestre)* Ash x5 *(Fraxinus sp.)* Common Lime x5 *(Tilia x vulgaris)*	13.0	200	Semi Mature	40+ Years	Landscape planting	A1,2	N:4 E:4 S:4 W:4	1.0	West	2.4	1814
G6	Common Lime x5 *(Tilia x vulgaris)* Ash x5 *(Fraxinus sp.)* Sycamore x5 *(Acer pseudoplatanus)* Field Maple x5 *(Acer campestre)* Common Birch	12.0	200	Semi Mature	40+ Years	Landscape planting	A1,2	N:4 E:4 S:4 W:4	1.0	East	2.4	554

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch Dir	RPA Radius (m)	RPA Area (m^2)
	(Betula alba) Alder *(Alnus sp.)*											

Appendix 3: Photographs

Photo 1: Trees within G2

Photo 2: Trees within G2

Photo 3: Trees within G3

Appendix 4: Explanations of Tree Survey Schedule headings

Reference # (Ref.).: This number identifies the trees and corresponds with the provided plans. Trees are prefixed T, groups G and hedges H. Where stumps are identified the suffix S will be used.

Species: The common and Latin name is given for each tree.

Height: Overall current height of the tree estimated in metres.

Stem Diameter (Stem Diam.): Measured at 1.5m above ground level as per Figure C1a) of BS 5837, or at an appropriate height, as per Figures C1b) to C1f) of BS 5837. Estimated stem diameter recorded in millimetres.

Life Stage: This refers to the age of the individual tree relating to the average life expectancy of each species in a similar environment.

Newly planted (NP) – a tree within 3 years after planting

Semi-mature (SM) – a tree within its first one third of life expectancy

Early-mature (EM) – a tree within its second third of life expectancy

Mature (M) – a tree in its final one third of life expectancy

Over-mature (OM) – a tree having reached its maximum lifespan and is declining in health and size due to old age

Veteran (V) – a tree that is of interest biologically, aesthetically or culturally because of its age, size and condition

Estimated Remaining Contribution (Rem. Contrib.): Has been estimated by subtracting the current age from the life expectancy of a tree in same location and condition. Each tree is given a retention category according to BS 5837:2012: <10 yrs; 10+ yrs; 20+yrs; 40+yrs

General Observations: Various comments relating to the tree's previous and possible future management e.g. the tree's physiological and/or structural condition that may affect their estimated life expectancy; nearby structures and services where trees and their future growth may have an impact; previous pruning history.

Retention Category: Based upon the categories in Table 1 of BS 5837: 2012 regarding tree quality assessment and suitability for retention.

Crown Spread: Estimated in metres and given at cardinal compass points.

Crown Clearance: Existing height of the canopy from ground level, measured in metres.

Lowest Branch: Existing height above ground level of the first significant branch, recorded in metres. Direction of growth may be given as a cardinal compass point, e.g. 3N.

RPA Radius (m): Calculation of the radius the Root Protection Areas based on the stem diameter(s), to inform the scheme designer of each tree/group's area of sufficient rooting volume that should be retained and protected. See section 4.6 of BS 5837: 2012 for details of the calculation.

RPA Area (m^2): A calculation derived from the single stem diameter taken from BS 5837:2012 Annex D, table D.1 Root Protection Areas

Appendix 5: Protective Barriers – Installation Methods

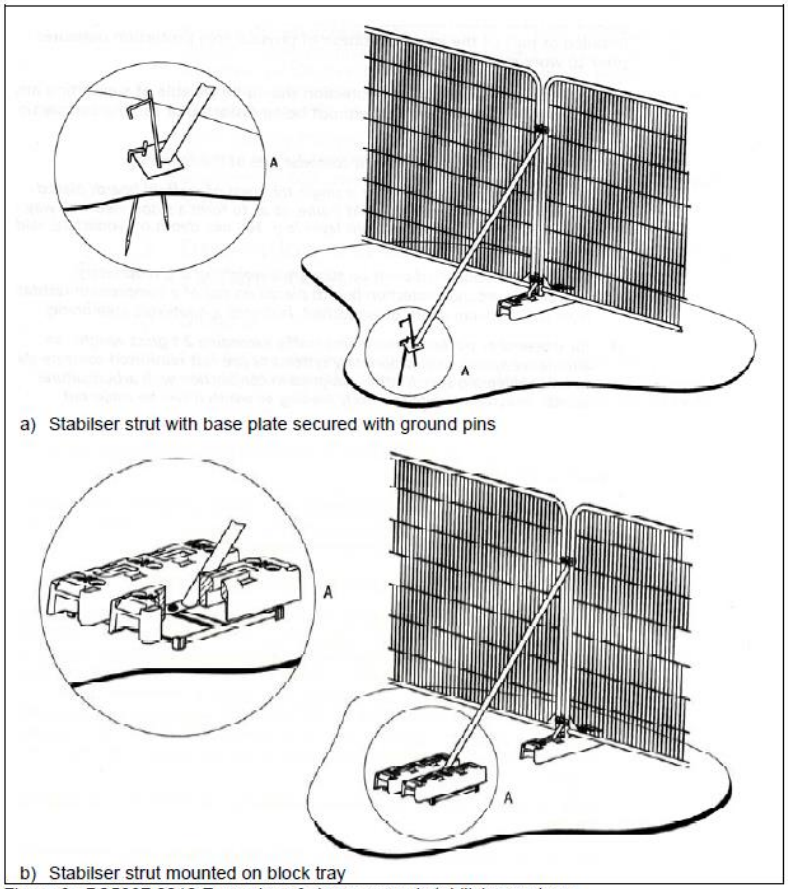

Figure 3: BS5837:2012 Examples of above-ground stabilising systems

Photo 5: Heras fencing with base plate & sign.

Photo 6: Block plate and stabiliser strut (pinned)

Norfolk Wildlife Services supports the Norfolk Wildlife Trust
by providing funds for nature conservation

Tree Survey Schedule
NWS 2024.100_Appendix 1_TSS JPUH

SURVEY DATE(S): 20th February 2023 / 16th July 2024

SURVEYOR(S): J. Splude (*TechArborA)* / J. Allitt BSc L6 Dip Arb *MArborA*

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Table1: Tree survey schedule – Preferred helipad site

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
T1	Oak *(Quercus sp.)*	12.0	980	Early Mature	40+ Years	Good overall Physiological and Structural condition. Dense ivy at base extending to lower canopy.	A1,2	N:6 E:6 S:6 W:6	4.0	4(S)	Radius: 11.8m. Area: 437 sq m.
H1	Common beech *(Fagus sylvatica)*	3.0	200	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A2,3	N:1 E:1 S:1 W:1	0.0	0(S)	Radius: 2.4m. Area: 193 sq m.
T2	Oak *(Quercus sp.)*	9.0	840	Mature	40+ Years	Good overall Physiological and Structural condition. <1.0m from edge of road.	A1,2	N:6 E:6 S:6 W:6	5.0	3(S)	Radius: 10.1m. Area: 320 sq m.
T3	Oak *(Quercus sp.)*	15.0	1,250	Mature	40+ Years	Good overall Physiological and Structural condition. <1.0m from edge of road. Damage to base on roadside.	A1,2	N:7 E:7 S:7 W:7	5.0	3(S)	Radius: 15.0m. Area: 707 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
T4	Oak *(Quercus sp.)*	9.0	830	Mature	40+ Years	Fair overall Physiological and Structural condition. <1.0m from edge of road. Heavy bias canopy to south.	A1,2	N:1 E:4 S:7 W:4	5.0	3(S)	Radius: 10.0m. Area: 314 sq m.
T5	Oak *(Quercus sp.)*	12.0	1,030	Mature	40+ Years	Good overall Physiological and Structural condition. <1.0m from edge of road.	A1,2	N:6 E:6 S:6 W:6	5.0	3(S)	Radius: 12.4m. Area: 483 sq m.
T6	Oak *(Quercus sp.)*	14.0	1,140	Mature	40+ Years	Good overall Physiological and Structural condition. <1.0m from edge of road.	A1,2	N:6 E:6 S:6 W:6	5.0	3(S)	Radius: 13.7m. Area: 590 sq m.
T7	Oak *(Quercus sp.)*	14.0	1,200	Mature	40+ Years	Good overall Physiological and Structural condition. <1.0m from edge of road.	A1,2	N:7 E:7 S:7 W:7	5.0	3(S)	Radius: 14.4m. Area: 651 sq m.
T8	Oak *(Quercus sp.)*	14.0	1,080	Mature	40+ Years	Good overall Physiological and Structural condition. <1.0m from edge of road.	A1,2	N:6 E:6 S:6 W:6	5.0	3(S)	Radius: 13.0m. Area: 531 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
T9	Oak *(Quercus sp.)*	14.0	1,140	Mature	40+ Years	Good overall Physiological and Structural condition. <1.0m from edge of road.	A1,2	N:6 E:6 S:6 W:6	5.0	3(S)	Radius: 13.7m. Area: 590 sq m.
T10	Oak *(Quercus sp.)*	10.0	720	Mature	40+ Years	Heavily reduced previously. Regrowth to 10m. Open cavity on roadside 2m.	B1,2	N:6 E:6 S:6 W:6	5.0	3(S)	Radius: 8.6m. Area: 232 sq m.
T11	Sycamore *(Acer pseudoplatanus)*	12.0	300,320,340	Early Mature	20+ Years	Fair overall Physiological and Structural condition. Multi stem at 1. 0m.	B1,2	N:5 E:5 S:5 W:5	4.0	2(S)	Radius: 6.7m. Area: 141 sq m.
T12	Sycamore *(Acer pseudoplatanus)*	12.0	250,250,220,170,170	Early Mature	20+ Years	Fair overall Physiological and Structural condition. Multi stem at 1. 0m.	B1,2	N:4 E:4 S:4 W:4	4.0	2(S)	Radius: 5.8m. Area: 106 sq m.
T13	Oak *(Quercus sp.)*	10.0	1,100	Mature	40+ Years	Heavily reduced previously. Regrowth to 10m. Open cavity on roadside 2m.	B1,2	N:6 E:6 S:6 W:6	5.0	3(S)	Radius: 13.2m. Area: 547 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
T14	Oak *(Quercus sp.)*	10.0	1,100	Mature	40+ Years	Heavily reduced previously. Regrowth to 10m. Open cavity on roadside 2m.	B1,2	N:6 E:6 S:6 W:6	5.0	3(S)	Radius: 13.2m. Area: 547 sq m.
T15	Oak *(Quercus sp.)*	10.0	1,100	Mature	40+ Years	Heavily reduced previously. Regrowth to 10m. Open cavity on roadside 2m.	B1,2	N:6 E:6 S:6 W:6	5.0	3(S)	Radius: 13.2m. Area: 547 sq m.
T16	Oak *(Quercus sp.)*	10.0	1,100	Mature	40+ Years	Heavily reduced previously. Regrowth to 10m. Open cavity on roadside 2m.	B1,2	N:6 E:6 S:6 W:6	5.0	3(S)	Radius: 13.2m. Area: 547 sq m.
H2	Common hawthorn *(Crataegus monogyna)*	3.0	200	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1	N:1 E:1 S:1 W:1	0.0	0(N)	Radius: 2.4m. Area: 840 sq m.
T17	Common walnut *(Juglans regia)*	9.0	400	Early Mature	40+ Years	Good overall Physiological and Structural condition. Estimated.	A1	N:5 E:5 S:5 W:5	2.0	2(N)	Radius: 4.8m. Area: 72 sq m.
T18	Common walnut *(Juglans regia)*	9.0	400	Early Mature	40+ Years	Good overall Physiological and Structural condition. Estimated.	A1	N:5 E:5 S:5 W:5	2.0	2(N)	Radius: 4.8m. Area: 72 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
T19	Oak *(Quercus sp.)*	15.0	1,020	Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:7 E:7 S:7 W:7	3.0	4(N)	Radius: 12.2m. Area: 468 sq m.
T20	Oak *(Quercus sp.)*	15.0	900	Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:7 E:7 S:7 W:7	3.0	4(N)	Radius: 10.8m. Area: 366 sq m.
T21	Oak *(Quercus sp.)*	10.0	500	Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:2 E:7 S:7 W:5	3.0	4(S)	Radius: 6.0m. Area: 113 sq m.
T22	Oak *(Quercus sp.)*	12.0	600	Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:7 E:7 S:7 W:7	3.0	4(N)	Radius: 7.2m. Area: 163 sq m.
T23	Oak *(Quercus sp.)*	12.0	600	Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:5 E:5 S:5 W:5	3.0	4(N)	Radius: 7.2m. Area: 163 sq m.
H3	Mixed species *(Mixed species)*	3.0	200	Semi Mature	40+ Years	Mixed species native hedgerow	B2,3	N:2 E:2 S:2 W:2	0.0	0	Radius: 2.4m. Area: 766 sq m.
G1	Common birch *(Betula alba)*	6.0	90	Semi Mature	40+ Years	Self sown trees.	C1,2	N:2 E:2 S:2 W:2	1.0	1(N)	Area: 784 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
G2	Leyland cypress *(X Cuprocyparis leylandii)*	12.0	350	Early Mature	20+ Years	Good overall Physiological and Structural condition. Screen to adjacent land.	B1	N:3 E:3 S:3 W:3	0.0	0(S)	Area: 605 sq m.
G3	Mixed species *(Mixed species)*	10.0	320	Semi Mature	40+ Years	Good overall Physiological and Structural condition. Set along boundary fence.	A1,2	N:4 E:4 S:4 W:4	3.0	2(S)	Area: 386 sq m.
H4	Common beech *(Fagus sylvatica)*	3.0	200	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A2,3	N:1 E:1 S:1 W:1	0.0	0(S)	Radius: 2.4m. Area: 171 sq m.

Table 2: Existing / New hospital site

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
G5	Mixed species *(Mixed species)*	5.0	100	Early Mature	20+ Years	Good overall Physiological and Structural condition.	B2	N:2 E:2 S:2 W:2	2.0	2(N)	Area: 202 sq m.
T24	Oak *(Quercus sp.)*	9.0	240	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:3 E:3 S:3 W:3	2.0	2(N)	Radius: 2.9m. Area: 26 sq m.
G4	Pine *(Pinus sp.)* Common alder *(Alnus glutinosa)* Hazel *(Corylus avellana)*	11.0	260	Semi Mature	40+ Years	Good overall Physiological and Structural condition. Mixed planted woodland.	A2,3	N:4 E:4 S:4 W:4	3.0	3(E)	Area: 9370 sq m.
G6	Mixed species *(Mixed species)*	12.0	350	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:6 E:6 S:6 W:6	5.0	3(N)	Area: 1168 sq m.
G7	Goat willow *(Salix caprea)*	9.0	300	Semi Mature	20+ Years	Fair overall Physiological and Structural condition.	B1,2	N:5 E:5 S:5 W:5	2.0	2(N)	Area: 324 sq m.
G8	Goat willow *(Salix caprea)*	9.0	300	Semi Mature	20+ Years	Fair overall Physiological and Structural condition.	B1,2	N:5 E:5 S:5 W:5	2.0	2(N)	Area: 290 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
G9	Holm oak *(Quercus ilex)*	9.0	300	Semi Mature	20+ Years	Fair overall Physiological and Structural condition.	B1,2	N:5 E:5 S:5 W:5	2.0	2(N)	Area: 694 sq m.
G10	Oak *(Quercus sp.)* Common ash *(Fraxinus excelsior)* Sycamore *(Acer pseudoplatanus)*	14.0	400	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:6 E:6 S:6 W:6	3.0	3(S)	Area: 2022 sq m.
G11	Sycamore *(Acer pseudoplatanus)* Common ash *(Fraxinus excelsior)* Oak *(Quercus sp.)*	14.0	400	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:6 E:6 S:6 W:6	3.0	3(S)	Area: 783 sq m.
G12	Mixed species *(Mixed species)*	12.0	300	Early Mature	40+ Years	Fair overall Physiological and Structural condition. Planted woodland.	A1,2	N:4 E:4 S:4 W:4	2.0	2(S)	Area: 5667 sq m.

Table 3: Alternative helipad site

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
T25	Oak *(Quercus sp.)*	14.0	400	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:4 E:4 S:4 W:4	1.0	1(W)	Radius: 4.8m. Area: 72 sq m.
T26	Oak *(Quercus sp.)*	14.0	400	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:4 E:4 S:4 W:4	1.0	1(W)	Radius: 4.8m. Area: 72 sq m.
T27	Oak *(Quercus sp.)*	14.0	400	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:4 E:4 S:4 W:4	1.0	1(W)	Radius: 4.8m. Area: 72 sq m.
G13	Mixed species *(Mixed species)*	12.0	300	Early Mature	40+ Years	Fair overall Physiological and Structural condition. Planted woodland.	A1,2	N:4 E:4 S:4 W:4	2.0	2(S)	Area: 2049 sq m.
T28	Cherry *(Prunus sp. 'Cherry')*	6.0	200	Semi Mature	10+ Years	Good overall Physiological and Structural condition.	C1	N:3 E:3 S:3 W:3	2.0	2(N)	Radius: 2.4m. Area: 18 sq m.
H5	Mixed species *(Mixed species)*	2.0	200	Semi Mature	20+ Years	Mixed native species hedgerow. Gaps in hedge	B2,3	N:1 E:1 S:1 W:1	0.0	0	Radius: 2.4m. Area: 915 sq m.
T29	Italian alder *(Alnus cordata)*	15.0	700	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:6 E:6 S:6 W:6	5.0	2(S)	Radius: 8.4m. Area: 222 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
T30	Italian alder *(Alnus cordata)*	15.0	700	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:6 E:6 S:6 W:6	5.0	2(S)	Radius: 8.4m. Area: 222 sq m.
T31	Italian alder *(Alnus cordata)*	15.0	700	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:6 E:6 S:6 W:6	5.0	2(S)	Radius: 8.4m. Area: 222 sq m.
T32	Italian alder *(Alnus cordata)*	15.0	700	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:6 E:6 S:6 W:6	5.0	2(S)	Radius: 8.4m. Area: 222 sq m.
G14	Cypress *(Cupressus sp.)*	11.0	650	Semi Mature	10+ Years	Poor overall Physiological and Structural condition.	C1,2	N:4 E:4 S:4 W:4	2.0	2(W)	Area: 230 sq m.
G15	Eucalyptus *(Eucalyptus sp.)*	11.0	650	Semi Mature	10+ Years	Poor overall Physiological and Structural condition.	C1,2	N:4 E:4 S:4 W:4	2.0	2(W)	Area: 308 sq m.
T33	Oak *(Quercus sp.)*	11.0	300	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A1	N:4 E:4 S:4 W:4	2.0	2(S)	Radius: 3.6m. Area: 41 sq m.
T34	Oak *(Quercus sp.)*	11.0	300	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A1	N:4 E:4 S:4 W:4	2.0	2(S)	Radius: 3.6m. Area: 41 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
T35	Common birch *(Betula alba)*	11.0	300	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A1	N:4 E:4 S:4 W:4	2.0	2(S)	Radius: 3.6m. Area: 41 sq m.
T36	Common birch *(Betula alba)*	11.0	300	Semi Mature	40+ Years	Good overall Physiological and Structural condition.	A1	N:4 E:4 S:4 W:4	2.0	2(S)	Radius: 3.6m. Area: 41 sq m.
G16	Sycamore *(Acer pseudoplatanus)*	12.0	430	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1	N:5 E:5 S:5 W:5	3.0	3(S)	Area: 131 sq m.
T37	Sycamore *(Acer pseudoplatanus)*	10.0	600	Early Mature	10+ Years	Good overall Physiological and Structural condition.	C1	N:4 E:4 S:4 W:4	5.0	3(S)	Radius: 7.2m. Area: 163 sq m.
T38	Tree of heaven *(Ailanthus altissima)*	10.0	600	Early Mature	10+ Years	Good overall Physiological and Structural condition.	C1	N:4 E:4 S:4 W:4	5.0	5(S)	Radius: 7.2m. Area: 163 sq m.
T39	Norway maple *(Acer platanoides)*	10.0	630	Early Mature	10+ Years	Good overall Physiological and Structural condition.	C1	N:4 E:4 S:4 W:4	5.0	4(S)	Radius: 7.6m. Area: 181 sq m.
G17	Italian alder *(Alnus cordata)*	12.0	430	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1	N:5 E:5 S:5 W:5	3.0	3(S)	Area: 340 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
T40	Norway maple *(Acer platanoides)*	10.0	600	Early Mature	10+ Years	Good overall Physiological and Structural condition.	C1	N:4 E:4 S:4 W:4	5.0	3(S)	Radius: 7.2m. Area: 163 sq m.
T41	Hybrid Cockspur thorn *(Crataegus x lavallei 'Carrierei')*	6.0	300	Semi Mature	40+ Years	Good overall Physiological and Structural condition. Growing within residential area.	A1	N:4 E:4 S:4 W:4	3.0	3(N)	Radius: 3.6m. Area: 41 sq m.
T42	Apple *(Malus sp.)*	6.0	300	Semi Mature	40+ Years	Good overall Physiological and Structural condition. Growing in residential area.	A1	N:4 E:4 S:4 W:4	2.0	2(S)	Radius: 3.6m. Area: 41 sq m.
T43	Apple *(Malus sp.)*	6.0	300	Semi Mature	40+ Years	Good overall Physiological and Structural condition. Growing in residential area.	A1	N:4 E:4 S:4 W:4	2.0	2(S)	Radius: 3.6m. Area: 41 sq m.
G19	Pine *(Pinus sp.)*	14.0	500	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:5 E:5 S:5 W:5	3.0	2(S)	Area: 215 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
G20	Hornbeam *(Carpinus betulus)*	14.0	500	Early Mature	40+ Years	Good overall Physiological and Structural condition.	A1,2	N:5 E:5 S:5 W:5	3.0	2(N)	Area: 107 sq m.
T44	Sycamore *(Acer pseudoplatanus)*	14.0	700	Semi Mature		Good overall Physiological and Structural condition. Growing within private garden with roots and branches extending within survey area. Estimated measurements.	A1	N:6 E:6 S:6 W:6	3.0	3(S)	Radius: 8.4m. Area: 222 sq m.
G21	Mixed species *(Mixed species)*	12.0	300	Early Mature	40+ Years	Fair overall Physiological and Structural condition. Planted woodland.	A1,2	N:4 E:4 S:4 W:4	2.0	2(S)	Area: 4334 sq m.
G22	Mixed species *(Mixed species)*	12.0	300	Early Mature	40+ Years	Fair overall Physiological and Structural condition. Planted woodland.	A1,2	N:4 E:4 S:4 W:4	2.0	2(S)	Area: 1107 sq m.

Ref.	Species	Height (m)	Stem diameter(s) (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA
G23	Mixed species *(Mixed species)*	12.0	300	Early Mature	40+ Years	Fair overall Physiological and Structural condition. Planted woodland.	A1,2	N:4 E:4 S:4 W:4	2.0	2(S)	Area: 1661 sq m.

Table 4: Previous survey data for main site – Ref: NWS 2022.261.1

Text within table 4 that is greyed out consists of collected tree data not thought to be relevant due to a change in design but is retained for consistency with the associated drawing and tree reference numbers.

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
T001	Common Hawthorn *(Crataegus monogyna)*	5.0	2510	Semi Mature	30+ Years	Outside fence x2 trees. Good overall physiological and structural condition.	B1,3	N:5 E:5 S:5 W:5	1.0	1(S)	15.0	707
T002	Lombardy Poplar *(Populus nigra italica)*	25.0	450	Semi Mature	30+ Years	Outside fence. Good overall physiological and structural condition.	B1,2	N:3.5 E:3.5 S:3.5 W:3.5	5.0	1(S)	7.6	181
T003	Common Hawthorn *(Crataegus monogyna)*	3.5	150	Semi Mature	40+ Years	Fair overall physiological and structural condition.	C1	N:2.5 E:2.5 S:2.5 W:1.5	1.5	1(S)	3.1	30
T004	Sycamore *(Acer pseudoplatanus)*	21.0	550	Semi Mature	40+ Years	Crown lifted to 4m over roadway. Good overall physiological and structural condition.	B1,2	N:6 E:6 S:6 W:6	2.5	2(NE)	6.6	137
TG005	Apple x5 *(Malus sp.)*	3.5	100	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C2,3	N:1.5 E:1.5 S:1.5 W:1.5	0.5	0.5(W)	1.2	24

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
T006	Cherry *(Prunus sp. 'Cherry')*	4.0	250	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C3	N:4 E:4 S:4 W:4	0.0	0.5(E)	3.0	28
T007	Sycamore *(Acer pseudoplatanus)*	15.0	400	Semi Mature	40+ Years	Good overall physiological and structural condition.	B1	N:5 E:5 S:5 W:4	2.0	2(SW)	4.8	72
T008	Sycamore *(Acer pseudoplatanus)*	15.0	400	Semi Mature	40+ Years	Multi stemmed at 2m. Good overall physiological and structural condition.	B1	N:6 E:6 S:5 W:4	2.5	2(SW)	4.8	72
T010	Fig *(Ficus carica)*	2.0	50	Newly planted	20+ Years	Assorted fruit trees small less than 70mm. Fair overall physiological and structural condition.	C1,3	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	3
TG011	Cherry x2 *(Prunus sp. 'Cherry')*	4.0	160	Newly planted	20+ Years	Heavily pruned, some stem bleeds. Poor overall physiological and structural condition.	C1	N:2.5 E:2.5 S:2.5 W:2.5	1.0	0.5(NW)	1.9	13
TG012	Cherry x3 *(Prunus sp. 'Cherry')*	5.0	80	Newly planted	20+ Years	Fair overall physiological and structural condition.	C1	N:2 E:2 S:2 W:2	1.0	1(E)	1.0	13

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
TG013	Cherry x3 *(Prunus sp. 'Cherry')*	5.0	50	Newly planted	20+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	25
T014	Norway Spruce *(Picea abies)*	9.0	200	Semi Mature	40+ Years	Fair overall physiological and structural condition.	B1,3	N:3 E:3 S:3 W:3	0.5	0.5(S)	2.4	18
TG015	Cherry x3 *(Prunus sp. 'Cherry')*	4.0	50	Newly planted	20+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	39
TG016	Cherry x3 *(Prunus sp. 'Cherry')*	5.0	60	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	45
TG017	Cherry x3 *(Prunus sp. 'Cherry')*	3.0	50	Newly planted	20+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	5
T018	Cherry *(Prunus sp. 'Cherry')*	4.0	50	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C1,3	N:1 E:1 S:1 W:1	1.5	1.5(N)	1.0	1
T019	Apple *(Malus sp.)*	5.0	300	Semi Mature	20+ Years	Heavily pruned, long stubs. Fair overall physiological and structural condition.	C3	N:3.5 E:3.5 S:3.5 W:3.5	2.0	0.5(W)	3.6	41

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
TG020	Cherry x3 *(Prunus sp. 'Cherry')*	5.0	50	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	94
T021	Cherry *(Prunus sp. 'Cherry')*	4.0	250	Early Mature	10+ Years	Cushion fungus on pruning wounds, decay to stem. Poor overall physiological and structural condition.	C2,3	N:3 E:3 S:3 W:3	0.5	0.5(E)	3.0	28
T022	Cherry *(Prunus sp. 'Cherry')*	6.0	400	Semi Mature	10+ Years	Heavily pruned	C2,3	N:5 E:5 S:5 W:5	2.0	2(E)	4.8	72
T023	Cherry *(Prunus sp. 'Cherry')*	3.0	200	Semi Mature	10+ Years	Heavily pruned	C2,3	N:3 E:3 S:3 W:3	1.0	1(S)	2.4	18
TG024	Cherry x3 *(Prunus sp. 'Cherry')*	4.0	70	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C1	N:2 E:1 S:1 W:1	1.0	1(E)	1.0	61
TG025	Cherry x3 *(Prunus sp. 'Cherry')*	3.0	70	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C1	N:1 E:1 S:1 W:1	0.0	0(E)	1.0	157
T026	Apple *(Malus sp.)*	5.0	250	Semi Mature	10+ Years	Heavily pruned	C3	N:3 E:3 S:3 W:1	1.0	1(N)	4.2	55

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
TG027	Lombardy Poplar x20 *(Populus nigra italica)* Cherry Plum x6 *(Prunus cerasifera)* Sycamore x3 *(Acer pseudoplatanus)* Common Lime *(Tilia x vulgaris)*	24.0	630	Mature	40+ Years	Crown clearance higher over allotments. Fair overall physiological and structural condition.	A1,3	N:4 E:4 S:4 W:4	4.0	3(N)	7.6	1535
TG028	Oak x4 *(Quercus sp.)* Common Ash *(Fraxinus excelsior)* Cherry x2 *(Prunus sp. 'Cherry')*	10.0	300	Semi Mature	40+ Years	Cherry bleeds, crown lifted to 2m. Fair overall physiological and structural condition.	B1,2	N:4 E:4 S:4 W:4	2.0	1(N)	3.6	203

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
TG029	Common Beech x16 *(Fagus sylvatica)* Willow x11 *(Salix sp.)* Oak x20 *(Quercus sp.)* Pine x4 *(Pinus sp.)* Hazel x8 *(Corylus avellana)* Cherry x11 *(Prunus sp. 'Cherry')* Alder x10 *(Alnus sp.)*	15.0	300	Semi Mature	40+ Years	Landscape planting. Good overall physiological and structural condition.	A1,2	N:4 E:4 S:4 W:4	4.0	3	3.6	1001

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
TG030	Cherry x11 *(Prunus sp. 'Cherry')* Willow x11 *(Salix sp.)* Hazel x8 *(Corylus avellana)* Oak x20 *(Quercus sp.)* Common Beech x16 *(Fagus sylvatica)* Alder x10 *(Alnus sp.)* Pine x4 *(Pinus sp.)*	15.0	300	Semi Mature	40+ Years	Landscape planting. Good overall physiological and structural condition.	A1,2	N:4 E:4 S:4 W:4	4.0	3	3.6	1616
TG031	Scots Pine x3 *(Pinus sylvestris)*	22.0	590	Semi Mature	40+ Years	Within scrub group. Good overall physiological and structural condition.	A1,2	N:4 E:4 S:4 W:4	2.0	3(N)	7.0	349
TG032	White Willow x10 *(Salix alba)* Lombardy Poplar x3 *(Populus nigra italica)*	14.0	200	Semi Mature	30+ Years	Within patchy bramble, willow coppiced stems. Fair overall physiological and structural condition.	C1,2	N:3 E:3 S:3 W:3	0.0	1	2.4	992

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
TG033	Common Hawthorn x10 *(Crataegus monogyna)* Lombardy Poplar x14 *(Populus nigra italica)*	8.0	80	Semi Mature	20+ Years	Fair overall physiological and structural condition.	C2	N:2 E:2 S:2 W:2	0.0	0	1.0	1978
TG034	Pine *(Pinus sp.)* Birch x2 *(Betula sp.)* Goat Willow x18 *(Salix caprea)*	8.0	100	Semi Mature	20+ Years	Mixed group, willow typical tight multiple unions. Fair overall physiological and structural condition.	C2	N:2 E:2 S:2 W:2	0.0	0	1.2	615
T035	Willow *(Salix sp.)*	11.0	260	Semi Mature	20+ Years	Heavily pruned	C1	N:6 E:6 S:6 W:6	2.0	2(W)	8.8	243
T036	Willow *(Salix sp.)*	11.0	200	Semi Mature	20+ Years	Heavily pruned, historic stem torn out to S at base	C1	N:6 E:6 S:1 W:6	1.0	1(W)	5.9	109
T037	Willow *(Salix sp.)*	11.0	400	Semi Mature	30+ Years	Fair overall physiological and structural condition.	B1	N:6 E:6 S:6 W:6	1.0	2(W)	8.3	216
T038	Willow *(Salix sp.)*	11.0	400	Semi Mature	20+ Years	Decay at base, previously failed stem stumps	C1	N:6 E:6 S:2 W:6	2.0	2(W)	4.8	72

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
T039	Willow *(Salix sp.)*	10.0	250	Semi Mature	20+ Years	Multiple stems from base	C1	N:5 E:5 S:5 W:5	2.0	2(E)	7.9	196
T040	Common Hawthorn *(Crataegus monogyna)*	5.0	70	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C1	N:3 E:3 S:3 W:3	0.0	0	1.9	11
T041	Willow *(Salix sp.)*	5.0	100	Semi Mature	20+ Years	Heavily pruned. Fair overall physiological and structural condition.	C1	N:4 E:4 S:4 W:4	0.0	0	1.7	9
TG043	Oak *(Quercus sp.)* Willow *(Salix sp.)* Hornbeam *(Carpinus betulus)* Scots Pine *(Pinus sylvestris)* Common Birch *(Betula alba)* Swedish Whitebeam *(Sorbus intermedia)*	10.0	200	Semi Mature	40+ Years	Mixed woodland, planted 2mx2m spacing's, good health	B2	N:4 E:4 S:4 W:4	0.5	0.5	2.4	4373
T044	Elder *(Sambucus nigra)*	6.0	100	Semi Mature	10+ Years	Fair overall physiological and structural condition.	C2	N:4 E:4 S:4 W:4	1.0	1(E)	1.7	9

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
T045	Willow *(Salix sp.)* Cherry *(Prunus sp. 'Cherry')*	5.0	80	Semi Mature	20+ Years	Coppiced. Fair overall physiological and structural condition.	C2	N:1 E:2 S:2 W:3	0.0	0	1.0	38
T046	Buddleia *(Buddleia sp.)*	5.0	90	Mature	10+ Years	Fair overall physiological and structural condition.	C2	N:5 E:5 S:5 W:5	0.0	0	2.2	15
T047	Buddleia *(Buddleia sp.)*	5.0	90	Mature	10+ Years	Fair overall physiological and structural condition.	C2	N:5 E:5 S:5 W:5	0.0	0	2.2	15
TG048	Oak *(Quercus sp.)* Willow *(Salix sp.)* Hornbeam *(Carpinus betulus)* Scots Pine *(Pinus sylvestris)* Common Birch *(Betula alba)* Swedish Whitebeam *(Sorbus intermedia)*	10.0	200	Semi Mature	40+ Years	Mixed woodland, planted 2mx2m spacing's, good health	B1,2		0.5	0.5	2.4	2541
TG049	Kapuka *(Griselinia littoralis)*	4.0	50	Semi Mature	10+ Years	Shrubs bounded by hedges.	C2		0.0	0	1.0	2948

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
T050	Cherry *(Prunus sp. 'Cherry')*	5.0	80	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C2	N:3 E:1 S:3 W:3	1.0	1(N)	1.4	6
T051	Cherry *(Prunus sp. 'Cherry')*	5.0	100	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C1	N:3 E:3 S:3 W:3	1.5	1.5(N)	1.2	5
T052	Cherry *(Prunus sp. 'Cherry')*	5.0	70	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C1	N:3 E:3 S:3 W:3	1.5	1.5(N)	0.8	2
T053	Birch *(Betula sp.)*	9.0	200	Semi Mature	30+ Years	Fair overall physiological and structural condition.	B1	N:3 E:3 S:3 W:3	4.0	1.5(N)	2.4	18
T054	Cherry *(Prunus sp. 'Cherry')*	5.0	100	Semi Mature	30+ Years	Fair overall physiological and structural condition.	C1	N:2 E:2 S:2 W:2	1.0	1.5(S)	1.2	5
TG055	Cherry x4 *(Prunus sp. 'Cherry')* Hawthorn x2 *(Crataegus sp.)*	7.0	200	Early Mature	20+ Years	Poorly pruned	C1	N:4 E:3 S:2 W:3	3.0	2(N)	2.4	118

Ref.	Species	Height (m)	Stem Diam (mm)	Life Stage	Rem. Contrib.	General Observations	Retention Category	Spread	Crown Clearance (m)	Lowest Branch	RPA Radius (m)	RPA Area (m^2)
TG056	Pine x4 *(Pinus sp.)* Hazel x2 *(Corylus avellana)* Common Ash x2 *(Fraxinus excelsior)* Birch x3 *(Betula sp.)* Cherry x5 *(Prunus sp. 'Cherry')*	10.0	250	Semi Mature	30+ Years	Good overall physiological and structural condition.	B1,2		1.0	0.5	3.0	628

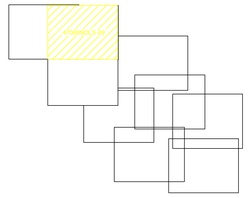
APPENDIX 4
TREE CONSTRAINTS PLANS

LEGEND

- Tree Position with canopy spread, Category A
- Tree Position with canopy spread, Category B
- Tree Position with canopy spread, Category C
- Tree Position with canopy spread, Category U
- Tree(s) to be removed for construction
- Root Protection Area (RPA) according to BS5837:2012
- Location of Protective Fencing
- Location of Protective Fencing - Set back
- Construction Entrance
- Material Storage / Contractors Parking
- Construction Exclusion Zone (CEZ)

NORTH
Indicative

SHEET LAYOUT



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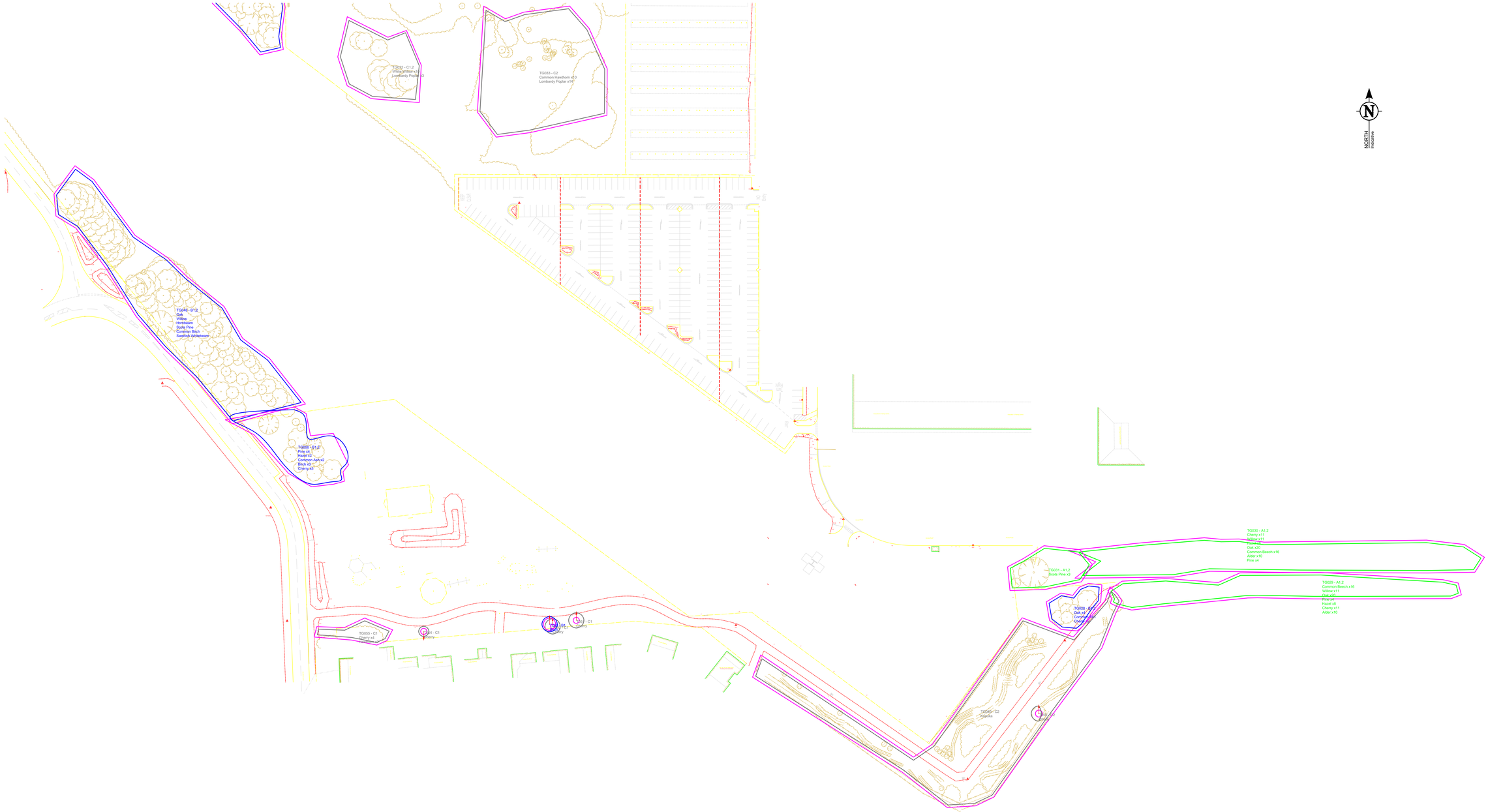

LEGEND

- Tree Position with canopy spread, Category A
- Tree Position with canopy spread, Category B
- Tree Position with canopy spread, Category C
- Tree Position with canopy spread, Category U
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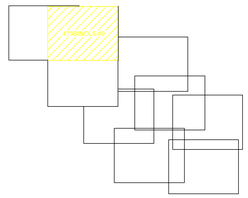

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LEGEND

- Tree Position with canopy spread, Category A
- Tree Position with canopy spread, Category B
- Tree Position with canopy spread, Category C
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NORTH Indicative

T001 - B1,3
Common Hawthorn

T002 - B1,2
Lombardy Poplar

T003 - C1
Common Hawthorn

T004 - B1,2
Sycamore

T005 - C3
Cherry

TG005 - C2,3
Apple x5

T007 - B1
Sycamore

T008 - B1
Sycamore

T010 - C1,3
Fig

T011 - C1
Cherry x2

TG012 - C1
Cherry x3

TG013 - C1
Cherry x3

T021 - C2,3
Cherry

T022 - C2,3
Cherry

T023 - C2,3
Cherry

TG015 - C1
Cherry x3

TG016 - C1
Cherry x3

T014 - B1,3
Norway Spruce

TG024 - C1
Cherry x3

TG027 - A1,3
Lombardy Poplar x20
Cherry Plum x6
Sycamore x3
Common Lime

TG020 - C
Cherry x3

T019 - C3
Apple

T018 - C1,3
Cherry

SHEET LAYOUT

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TG015 - C1
Cherry x3

Apple

T018 - C1,3
Cherry

T014 - B1,3
Norway Spruce

TG016 - C1
Cherry x3

TG017 - C1
Cherry x3

T026 - C3
Apple

TG045 - C2
Willow
Cherry

T044 - C2
Elder

TG043 - B2
Oak
Willow
Hornbeam
Scots Pine
Common Birch
Swedish Whitebeam

T046 - C2
Buddleia

T047 - C2
Buddleia

LEGEND

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- Tree Position with canopy spread, Category B
- Tree Position with canopy spread, Category C
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TG032 - C1,2
White Willow x10
Lombardy Poplar x3

TG048 - B1,2
Oak
Willow
Hornbeam
Scots Pine
Common Birch
Swedish Whitebeam

KEEP CLEAR

LEGEND

- Tree Position with canopy spread, Category A
- Tree Position with canopy spread, Category B
- Tree Position with canopy spread, Category C
- Tree Position with canopy spread, Category U
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NORTH Indicative

SHEET LAYOUT

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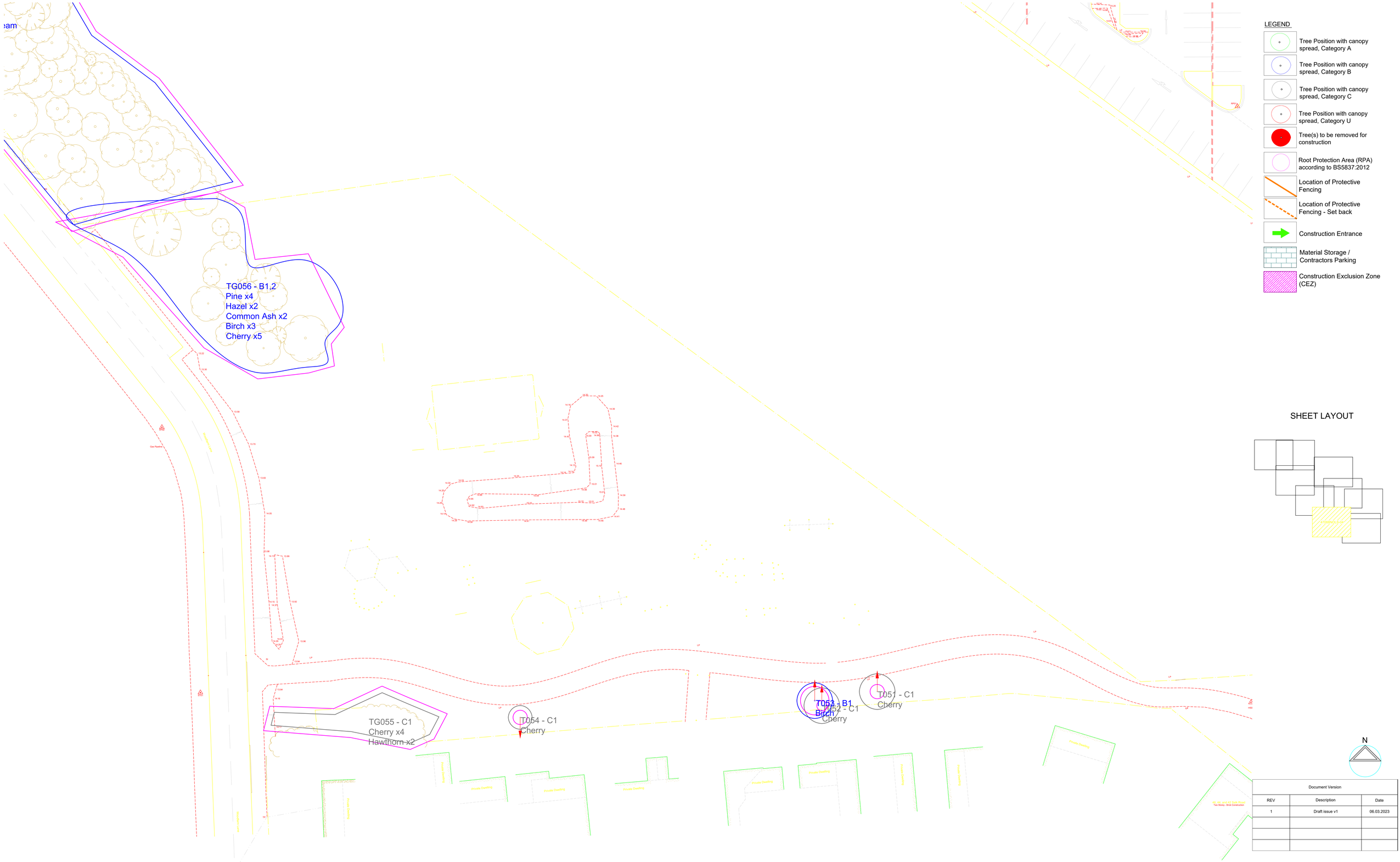

LEGEND

- Tree Position with canopy spread, Category A
- Tree Position with canopy spread, Category B
- Tree Position with canopy spread, Category C
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NORTH
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SCALE:
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NORFOLK WILDLIFE SERVICES
Norfolk Wildlife Services
22 Thorpe Road,
Bewick House
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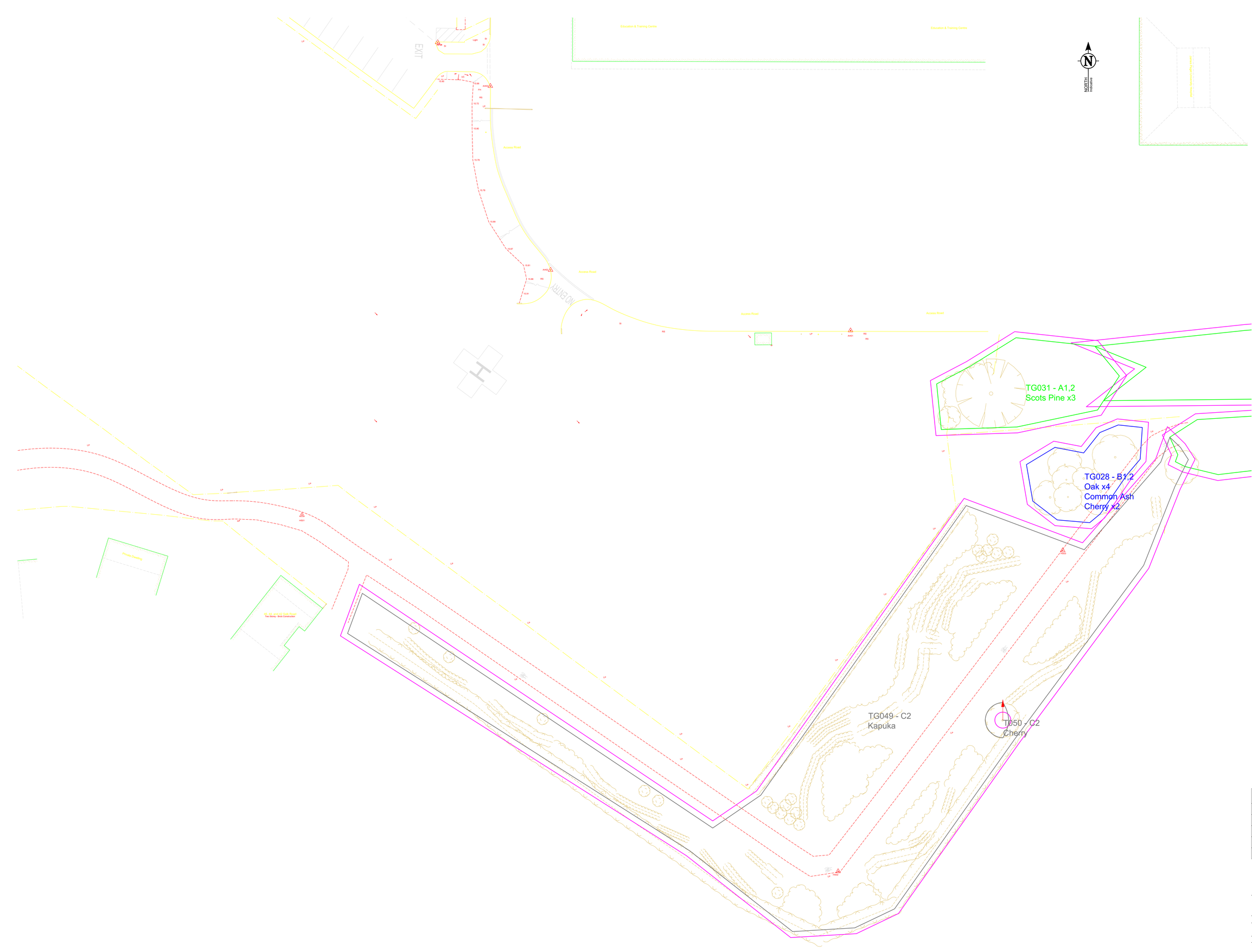
NR1 1RY
office@norfolkwildlifeservices.co.uk
01603625540



Document Version		
REV	Description	Date
1	Draft issue v1	06.03.2023

PROJECT:
James Paget University Hospital

DRAWING TITLE / SHEET No:
Tree Asset Plan

DATE:	DRAWN BY:
06.03.2023	JA
PROJECT REF:	DRAWING NO.
2022.261.1	5 of 11

SCALE:
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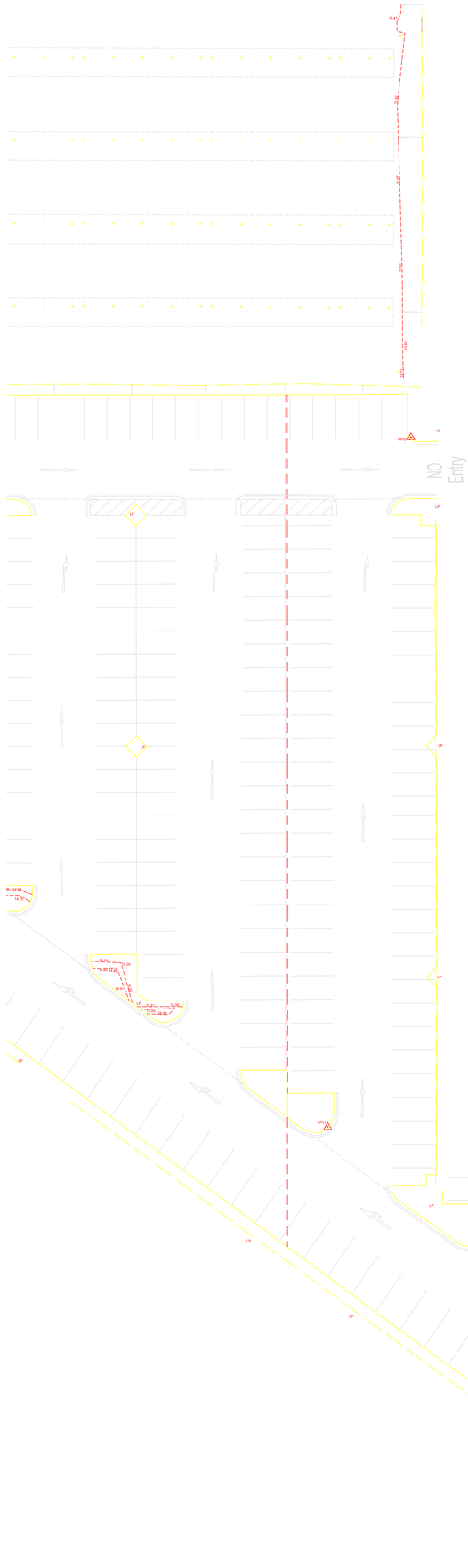

LEGEND

- Tree Position with canopy spread, Category A
- Tree Position with canopy spread, Category B
- Tree Position with canopy spread, Category C
- Tree Position with canopy spread, Category U
- Tree(s) to be removed for construction
- Root Protection Area (RPA) according to BS5837:2012
- Location of Protective Fencing
- Location of Protective Fencing - Set back
- Construction Entrance
- Material Storage / Contractors Parking
- Construction Exclusion Zone (CEZ)

NORTH Indicative

SHEET LAYOUT

N

Document Version		
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PROJECT REF:	DRAWING NO.
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SCALE:
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T037 - B1
Willow

TG032 - C1,2
White Willow x10
Lombardy Poplar x3

TG033 - C2
Common Hawthorn x10
Lombardy Poplar x14

KEEP CLEAR

NO Entry

LEGEND

- Tree Position with canopy spread, Category A
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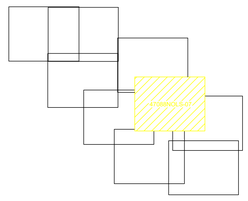
N
NORTH
Indicative

SHEET LAYOUT



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1	Draft issue v1	06.03.2023

PROJECT:
James Paget University Hospital

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SCALE:
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T040 - C1
Common Hawthorn

T041 - C1
Willow

T039 - C1
Willow

T038 - C1
Willow

T035 - C1
Willow

T036 - C1
Willow

T037 - B1
Willow

TG034 - C2
Pine
Birch x2
Goat Willow x18

LEGEND

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NORTH Indicative

SHEET LAYOUT

N

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SCALE:
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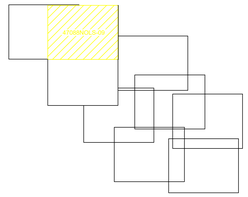
NORTH
Indicative

SHEET LAYOUT



N

TG027 - A1,3
Lombardy Poplar x20
Cherry Plum x6
Sycamore x3
Common Lime

TG024 - C1
Cherry x3

C2,3

2,3

TG020 - C1
Cherry x3

TG025 - C1
Cherry x3

Private Dwelling

Private Dwelling

TG015 - C1
Cherry x3

T019 - C3
Apple

T018 - C1,3
Cherry

T014 - B1,3
Norway Spruce

TG016 - C1
Cherry x3

TG017 - C1
Cherry x3

TG045 - C2
Willow
Cherry

T044 - C2
Elder

T026 - C3
Apple

Document Version		
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1	Draft issue v1	06.03.2023

PROJECT:
James Paget University Hospital

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Tree Asset Plan

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06.03.2023	JA

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SCALE:
1:200

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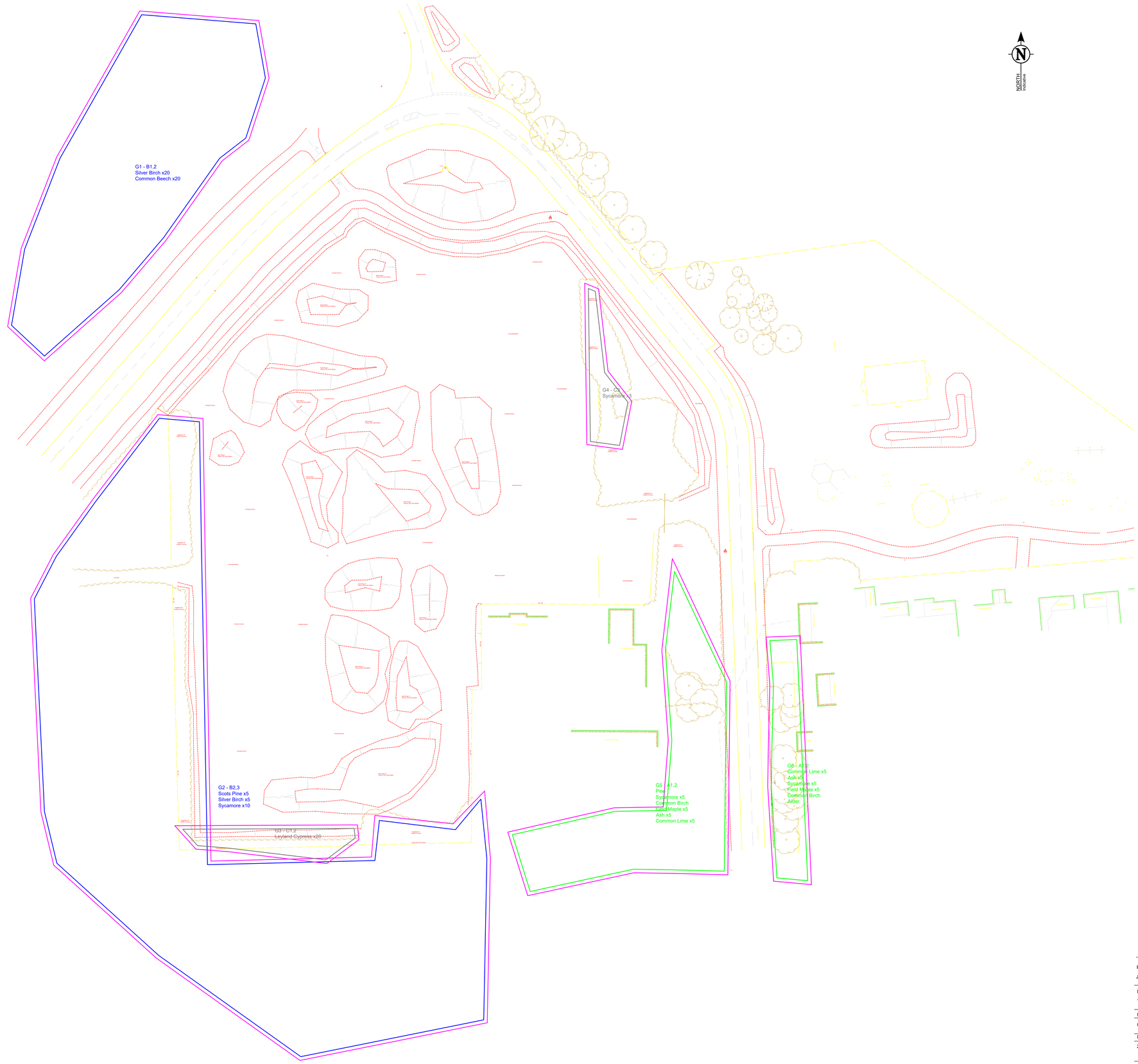

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NORTH Indicative

N

PROJECT:
James Paget University Hospital

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Tree Asset Plan

DATE:	DRAWN BY:
06.03.2023	JA
PROJECT REF:	DRAWING NO.
2022.261.1	10 of 11

SCALE:
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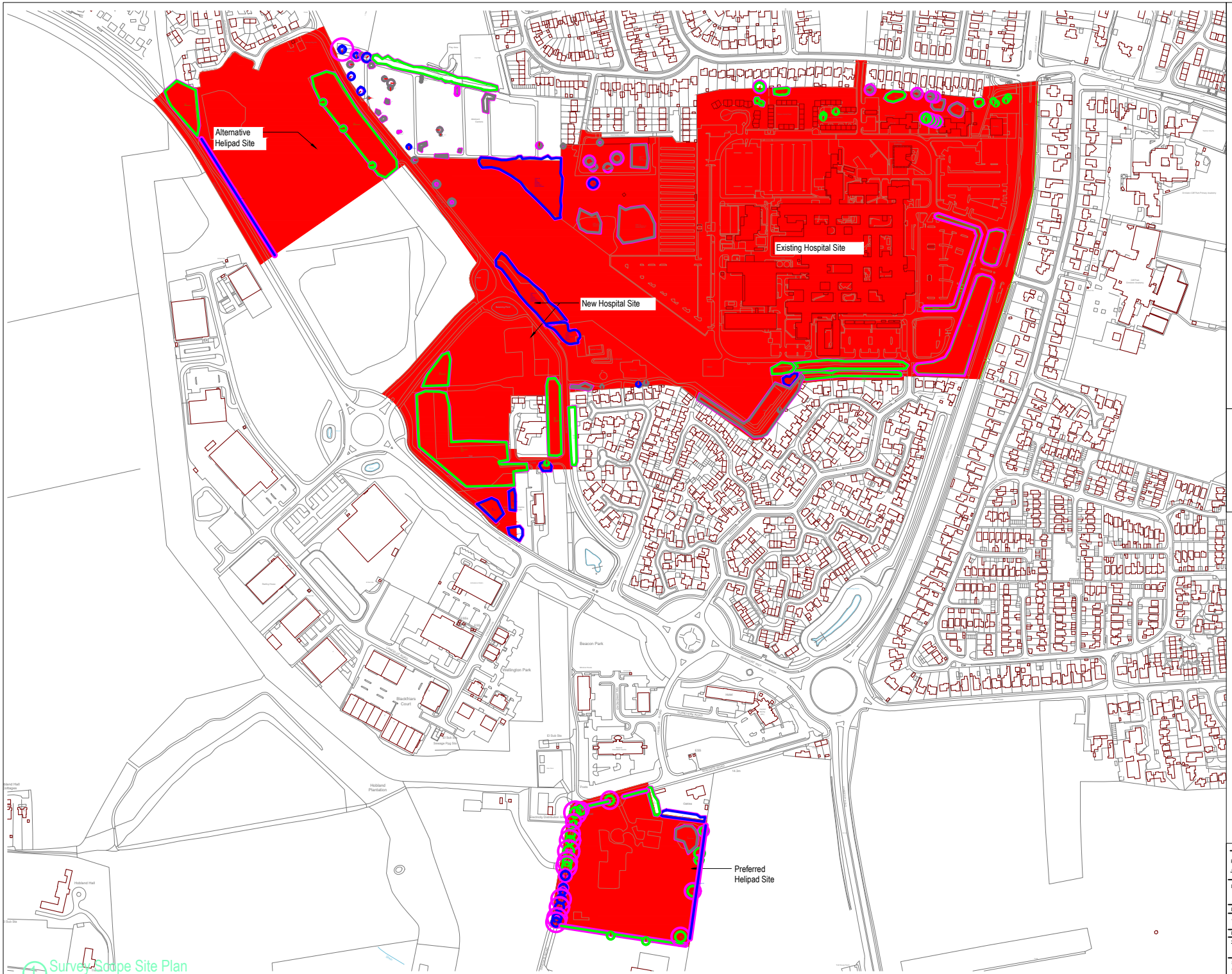

LEGEND

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- Material Storage
- Construction Entrance

Document Version		
REV	Description	Date
1	Draft issue v1	17.07.2024

Survey Scope Site Plan
1 : 2500

PROJECT:
James Paget University Hospital

DRAWING TITLE

DATE: 17.07.2024
DRAWN BY: JA

PROJECT REF: 2024.100
DRAWING NO.

SCALE: 1:2500

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APPENDIX 5
PRELIMINARY ECOLOGICAL APPRAISAL

Norfolk Wildlife Services supports the Norfolk Wildlife Trust by providing funds for nature conservation

Preliminary Ecological Appraisal: James Paget University Hospital, Gorleston-on-Sea

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Norfolk Wildlife Services supports the Norfolk Wildlife Trust by providing funds for nature conservation

Client	James Paget University Hospitals NHS Foundation Trust
Site address	Lowestoft Road, Gorleston-on-Sea, Great Yarmouth NR31 6LA
Survey scope	Preliminary Ecological Appraisal
Survey date(s)	17/02/2023
Report reference	2022.261
Principal author(s)	Seth Lambiase MCIEEM, Ben Moore ACIEEM
Quality checked by	John Harris MCIEEM

Document history	**Issued by and date**
Draft v1	BM - 17/03/2023
Final	SL – 21/03/2023

Declaration of Compliance

This report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct and British Standard Institution's BS 42020:2013 Biodiversity – Code of practice for planning and development. We confirm that the opinions expressed within this document are our bona fide professional opinions.

The information which is being provided is a true representation of the survey methods used and the results assembled, with respect to the stated dates of survey and assessment. The future validity of this report is conditional on any changes which occur to the assessment site, and in any case will be limited by professionally accepted survey lifespans[1,2].

Third Party Disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Norfolk Wildlife Services Ltd on behalf of the client named above. It does not in any way constitute advice to any third party who is able to access it by any means.

[1] https://cieem.net/wp-content/uploads/2019/04/Advice-Note.pdf

[2] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). The Bat Conservation Trust London. Section 2.6.3 Age of survey data (pg 20).

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Company Registration No: 3957786 VAT No. 876 3225 06

Table of Contents

1. Non-Technical Summary

Norfolk Wildlife Services was commissioned to undertake a site survey, Preliminary Ecological Appraisal and baseline biodiversity metric measurement of properties surrounding the James Paget University Hospital, Lowestoft Road, Gorleston-on-Sea, Great Yarmouth NR31 6LA. It is proposed to construct a new core hospital building and associated wards, an administration building, an energy centre, a multi-storey car park and surface car parking areas.

The survey area was inspected on 17/02/2023 by Ben Moore ACIEEM (Natural England bat survey licence registration 2019-39352-CLS-CLS, great crested newts survey licence registration 2019-43385-CLS-CLS) and Seth Lambiase MCIEEM (Natural England bat survey licence registration #s 2015-11812-CLS-CLS and 2015-11813-CLS-CLS, great crested newt survey licence registration # 2015-19173-CLS-CLS).

The proposed development area is to the west of the existing James Paget University Hospital facilities, and there are playing fields and residential development to the north and more residential development to the south.

The proposed development presents no credible risk of negative impacts to any statutory or non-statutory designated nature conservation sites; the only two designated sites within 2km are marine sites. Because the proposed development site is separated from all designated sites by urban development and is not residential in nature, a requirement for a Habitat Regulation Assessment with respect to the Southern North Sea SAC, Outer Thames Estuary SPA or Breydon Water SPA/Ramsar is not expected.

The proposed development area includes buildings, sealed surfaces, allotments, introduced shrub, modified grassland, other neutral grassland, bramble scrub, mixed scrub, other broadleaved woodland and native hedgerows. All of these habitats have potential to be impacted by the proposed development. From an ecological impact perspective, the habitats considered most important (and feasible) to be retained in the final development plan are other broadleaved woodland and native hedgerows.

A neutral impact to local bat populations is expected with respect to roosting, but there is potential for a minor-moderate negative impacts to local populations from foraging habitat loss/displacement.

There is a potential for minor-moderate negative impacts to a local hedgehog population from habitat loss and mortality during site preparations.

Minor-moderate negative impacts to local bird populations are possible from nesting habitat loss and nest destruction during site preparations.

A portion of the proposal site shows a low but conceivable reptile potential, particularly for slow-worms. Further survey is advised to determine reptile presence/absence.

Because of an absence of waterbodies within 250m of the proposal site, a neutral impact to amphibians (including great crested newts) is expected.

The baseline Biodiversity Units of the proposed development site have been calculated at 54.64 Area Habitat Biodiversity Units and 2.22 Hedgerow Biodiversity Units.

2. Introduction

2.1. Description of the project

Norfolk Wildlife Services was commissioned to undertake a site survey, Preliminary Ecological Appraisal (PEA) and baseline biodiversity metric measurement of properties surrounding the James Paget University Hopsital, Lowestoft Road, Gorleston-on-Sea, Great Yarmouth NR31 6LA (grid reference TG 5170 0253).

It is proposed to construct a new core hospital building and associated wards, an administration building, an energy centre, a multi-storey car park and surface car parking areas.

The ecological survey area is shown in Figure 1 and an indicative planning proposal is shown in Figure 2.

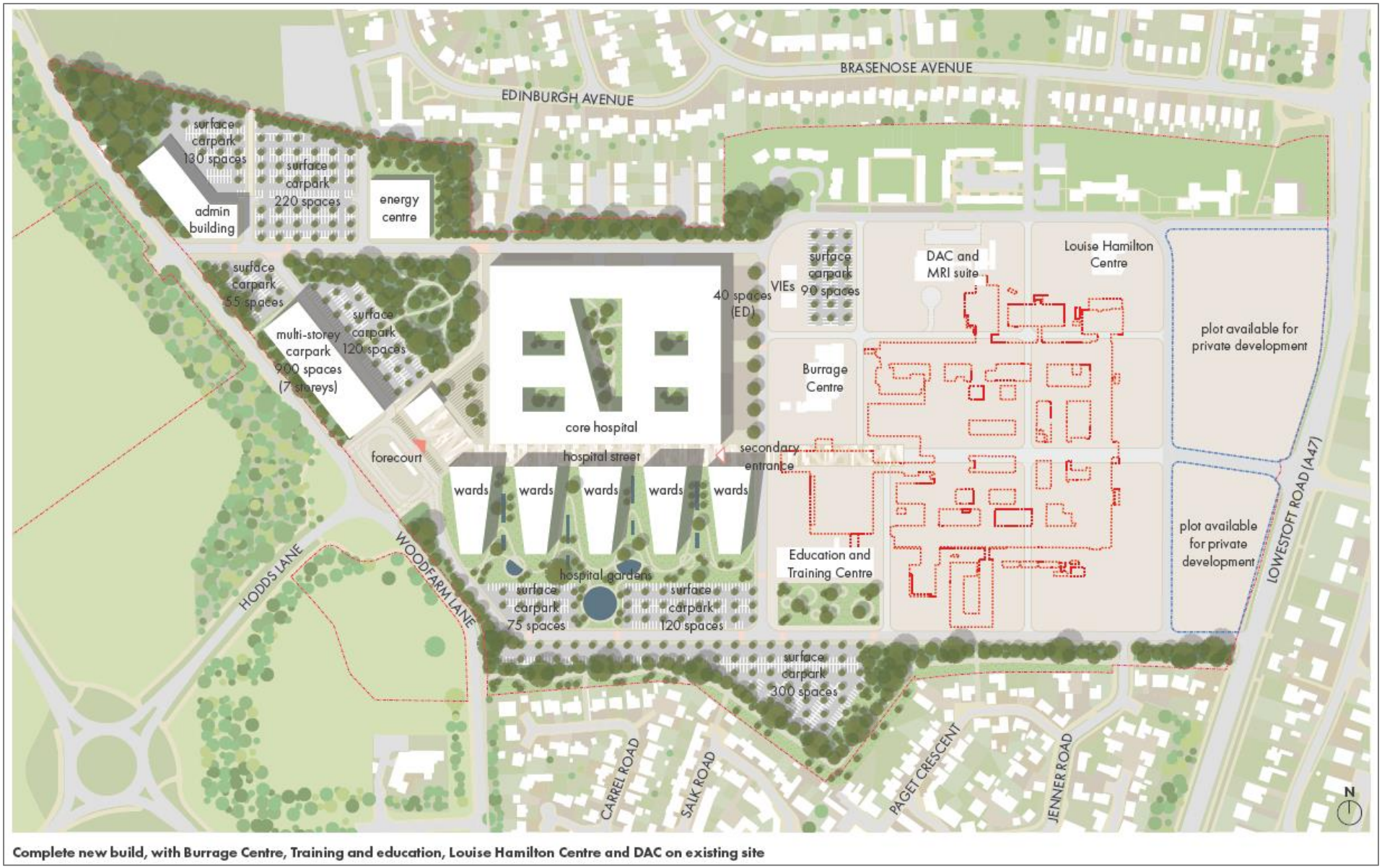
2.2. Purpose of this report

The purpose of this PEA report is to:

- describe the observed ecological baseline of the survey area;
- evaluate the habitats within the survey area for their ecological value in a geographic context;
- to the extent possible from the preliminary investigation, identify and describe potentially significant ecological effects as a result of the proposal;
- outline appropriate avoidance or mitigation measures for significant effects as a result of the proposal and how these could be secured;
- clearly identify requirements to ensure compliance with nature conservation legislation;
- identify potential ecological enhancement measures beyond avoidance or mitigation;
- set out any potential requirement for post-development monitoring.

Figure 1: James Paget University Hospital development site ecological survey area (within solid red line)

Figure 2: Indicative development plan; SOC Preferred Way Forward (option 3) as provided



Complete new build, with Burrage Centre, Training and education, Louise Hamilton Centre and DAC on existing site

3. Methods

3.1. Zone of Influence

The Zone of influence (ZoI) is defined by the CIEEM Guidelines for Ecological Impact Assessment (2018)[3] as: *"The areas/resources that may be affected by the biophysical changes caused by activities associated with a project".*

The ZoI for this project considers multiple areas for the potential changes to ecological features as a result of the proposed development. The extents of these areas are:

- Within the application site boundaries and immediately adjacent habitats for direct impacts to valued ecological features (e.g. habitats and protected species).
- Within a 2km radius of a roughly central grid reference (TG 5170 0253) for designated nature conservation sites which may be directly or indirectly impacted as a result of the proposed development.
- Within 250m of the proposed development site for water-bodies (potential amphibian breeding sites).

3.2. Desktop study

A detailed desktop study was made of the survey area using the search criteria and sources described in the Table below. It should be noted that an absence of records is likely to reflect an absence of survey data and cannot be taken as confirmation that a particular species is not present in the site or surrounding area.

Table 1: Desktop study searches

Search	Sources
A 2km search radius for statutory designated sites and non-statutory designated sites.	Natural England Magic Map Application (www.magic.gov.uk) Norfolk Biodiversity Information Service
A 2km search radius for records of protected or otherwise notable species.	Norfolk Biodiversity Information Service (16/02/2023)
A 1km radius for European Protected Species mitigation licences and great crested newt licence return records	Natural England Magic Map Application (www.magic.gov.uk)
A 250m radius for extant waterbodies	Natural England Magic Map Application (www.magic.gov.uk) Google Earth Pro

3.3. Field survey and establishment of baseline ecological conditions

The survey area was inspected on 17/02/2023 by Seth Lambiase MCIEEM (Natural England bat survey licence registration 2015-11812-CLS-CLS/2015-11813-CLS-CLS, great crested newts survey licence registration # 2015-19173-CLS-CLS) and Ben Moore ACIEEM (Natural England bat survey licence

[3] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

registration 2019-39352-CLS-CLS, great crested newts survey licence registration 2019-43385-CLS-CLS).

Photographs of the surveyed site are referenced within the Results section and are shown in Appendix 2.

3.3.1. Habitats

A basic Phase 1 habitat assessment was completed based on JNCC 2010 methods[4] and UK Habitat Classification[5] terminology.

3.3.2. Species

Mammals

The proposed development area and its adjacent surrounds was evaluated for its potential value for protected or otherwise conservation concern mammal species, particularly roosting bats.

Birds

An assessment was made of the features likely to support breeding birds within the survey area.

Reptiles

An assessment was made of the features likely to support reptiles within the survey area.

Amphibians

A desktop search for ponds within 250m of the survey area was conducted using the Natural England Magic Map Application (Magic Maps) and Google Earth Pro, and an assessment was made of the features likely to support great crested newts within the survey area.

3.4. Assessment of impact potential / risk

Potential impacts on ecological features are characterized using the following criteria.

Positive or Negative
The definition of a positive or negative impact/effect is as per the CIEEM (2018) Guidelines for Ecological Impact Assessment:

- "*Positive – a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality. This may also include halting or slowing an existing decline in the quality of the environment.*
- *Negative – a change which reduces the quality of the environment e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution*."

Spatial Extent
The spatial extent of an impact's predicted effects is estimated according to the following categories: international and European; national; regional / river basin district; county; local planning authority district; local (≈ parish); site (within the proposed development boundaries).

[4] Joint Nature Conservation Committee (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit. JNCC, Peterborough, UK.

[5] UK Habitat Classification Working Group (2018). UK Habitat Classification – Habitat Definitions V1.0. https://ecountability.co.uk/ukhabworkinggroup-ukhab/

Magnitude

- *Major* – an impact which is predicted to have a crucial effect (positive or negative) on a designated conservation site, habitat or species population within a specified spatial extent. Normally the effect will be considered either long-term (potentially reversible) or permanent.
- *Moderate* – an impact which is predicted to have a modest effect (positive or negative) on a designated conservation site, habitat or species population within a specified spatial extent. Normally the effect will be considered temporary in either the short- or medium-term, and reversible.
- *Minor* – an impact which is predicted to result in a slight but unimportant effect (positive or negative) on a designated conservation site, habitat or species population within a specified spatial extent. Normally the effect will be considered to be short-term and reversible.
- *Neutral* – a 'non-impact', with no appreciable effects on a designated conservation site, habitat or species population.

Duration

The duration of an impact's predicted effect may be quantified, or else broadly defined as either short-term, medium-term, long-term or permanent.

4. Results

4.1. Local context

The proposed development area is to the west of the existing James Paget University Hospital facilities, and there are playing fields and residential development to the north and more residential development to the south. The western boundary of the proposed development area borders Woodfarm Lane. Further to the west of Woodfarm Lane are areas of plantation woodland, grassland and derelict hard-standing.

OS maps indicate no waterbodies within 250m of the proposed development site.

4.2. Desktop study results

4.2.1. Designated nature conservation sites

There are two statutory designated nature conservation sites within 2km of the proposed development site (see Table 2 and Figure 3).

There are no non-statutory County Wildlife Sites within 2km.

Table 2: Desktop search results – designated sites

Site name	Details	Source
Southern North Sea Special Area of Conservation	The Southern North Sea SAC boundary is located 1.4km east of the survey area and extends offshore. This SAC is designated for harbour porpoise.	NBIS
Outer Thames Estuary Special Protection Area	The Outer Thames Estuary SPA is located 1.4km east of the survey area and extends offshore. This SPA is designated for non-breeding red-throated diver and breeding common tern and little tern.	NBIS

The Breydon Water SPA, Ramsar and Site of Special Scientific Interest (SSSI) is located outside of the NBIS search area at 4.4km northwest (there are no other SAC/SPA/Ramsar/SSSI within 5km). These designation cover a range of qualifying features, including its wintering, passage and breeding bird assemblages, estuary habitats (intertidal mudflats saltmarsh, reedbeds and brackish water), botanical interest and invertebrate fauna.

4.2.2. Species of conservation interest

The following species records were reported within the area of search.

Table 3: Desktop search results – species

Species	Location details	Source
Badger	Zero records of badger.	NBIS
Bats	Numerous records of bats (brown long-eared, common pipistrelle, Daubenton's, Nathusius' pipistrelle, noctule, serotine and soprano pipistrelle), the nearest from 0.8km north east of the survey area between 1992 and 2019.	NBIS
Water vole and otter	Zero records of water vole. A single otter records from 2017, 1.4km southeast of the survey area.	NBIS

Species	Location details	Source
Hedgehog and brown hare	42 records of hedgehog between 2001 and 2022. Three historic records of brown hare from the 1990s.	NBIS
Birds	Numerous species of bird have been recorded within 2km of the survey area. Those considered to have some potential to nest within the site include black redstart, blackbird, blue tit, coal tit, collared dove, dunnock, goldcrest, great tit, grey partridge, house martin, house sparrow, mistle thrush, quail, robin, skylark, starling, swift and wren. Seven records of barn owl within 2km between 2007 and 2015.	NBIS
Reptiles	Three records of common lizard from 2006, 1.3km southeast of the survey area. Two historic records of slow-worm from the 1980s, 1.5km northwest of the survey area.	NBIS
Amphibians	Zero records of great crested newt.	NBIS, Magic.gov

No previously granted European Protected Species mitigation licences were discovered within 2km of the survey area.

4.2.3. Other relevant local developments

Numerous planning applications were discovered within close proximity to the proposed development site. Many applications were by householders for small-scale house extensions. Several applications were associated with the James Paget University Hospital:

- Decant Inpatient Ward (reference 06/22/0576/F). Ecology assessment report concluded the development site comprising hardstanding and amenity grassland had low ecological value.
- Diagnostic Assessment Centre (reference 06/22/0256/F). No ecology assessment found.
- PV Solar Panel Array (reference 06/14/0002/F). Ecology assessment report (dated 2009) had no significant concerns other than a potential for impact to reptiles, for which further survey was advised.

Other nearby developments included applications for larger scale residential development:

- 80 new residential dwellings 50m northwest of the survey area at Emerald Park Football Ground, Woodfarm Lane (reference 06/22/0987/D). No ecology assessment found.
- 93 residential dwellings 0.7km west of the survey area on Land West of Woodfarm Lane (reference 06/22/0827/D). No ecology assessment found.
- Full planning for 150 residential dwelling and outline planning for 700 dwellings at Wheatcroft Farm, Bradwell, 0.2km northwest of the survey area (reference 06/13/0652/O, 06/22/0350/CD). The ecology chapter of the Environmental Statement (2014) assessed the arable development site as having low ecological interest, with mainly neutral residual impacts predicted after mitigation measures.

4.3. Field survey results

4.3.1. Habitats

Site 1A

- Dominated by a large grassy field – *modified grassland g4, 64, 720*. The sward is 90+% homogenous short grass with scattered common herbaceous species (*Taraxacum* sp., *Geranium molle*, *Plantago lanceolate*, *Bellis perennis*, *Cirsium vulgare*).
- Children's play-ground at southwest end – *modified grassland g4, 64*; *Suburban/ mosaic of developed/ natural surface u1d, 610*.
- Small semi-mature broadleaved plantation woodland on west boundary north of the play-ground – *other lowland mixed deciduous woodland w1f7, 36, 47*. Tree species include field maple, alder, oak, willow and Scot's pine.
- Larger semi-mature broadleaved plantation woodland on northeast boundary between Site 3 and Site 2 – *other lowland mixed deciduous woodland w1f7, 36, 47*. Tree species include field maple, beech, oak, silver birch, holly, cherry, willow, hazel, hawthorn, buddleia and Scot's pine. A considerable quantity of bird droppings indicate that the woodland is used as a roost. A number of the trees are dead or ailing, but no trees with bat roost potential were observed. The only evident ground flora was *Smyrnium olusatrum*.
- A thick, dense bramble (with some buddleia throughout, plus a small number of gorse) hedgerow along the western boundary from the small woodland to the southwest corner of Site 3 – *other hedgerows h2b*. Mammal runs and a high level of songbird activity noted.
- A thick, dense bramble hedgerow along the northern boundary (adjacent Site 3) up to the larger woodland – *other hedgerows h2b, 47 (mostly)*.
- Chain-link / barbed wire fencing around the full site perimeter – *built linear feature u1e, 69*.
- 60m laurel hedge at the far southeast end – *other hedgerows h2b, 48.*
- Helicopter pad – *Developed land; sealed surface u1b*.
- Landscaped road verge – *Suburban/ mosaic of developed/ natural surface u1d, 1150, 1160*.
- Very small portion of mostly broadleaved woodland at the far southeast corner of the site, east of the helicopter pad – *other woodland; mixed; mainly broadleaved w1h5.*

Site 1B

- Roughly the northern half is a solar panel array over mowed grassland – *modified grassland g4, 66*, *114*.
- Southern half is asphalt carpark with small grassy islands – *Developed land; sealed surface, 89, 431*.
- Chain-link fencing around the full site perimeter – *built linear feature u1e, 69*.
- Weedy margin to the fencing on the east side of the solar array, with some scattered hawthorns (one with observed bird nest remains) and common herbaceous species. Also, rabbit burrows and droppings noted.

Site 2

- Approximately a third of this site is made up of allotments – *Built up areas and gardens u1, 910*. Amongst which there were numerous piles of stored materials and compost heaps.

- *Mixed scrub h3h* consisting of *Rubus fruticosus, Rosa canina, Prunus spinosa, Crateagus monogyna* and *Salix* spp. is located along the western site boundary.
- The remainder of the site consists of grassland with scattered scrub and trees – *other neutral grassland g3c, 10, 11.*
- A long, single-storey brick building with flat roof is present along the edge of the Potters Field road – *buildings u1b5*.

Site 3

- Predominantly made up of allotments – *built up areas and gardens u1, 910*.
- A small area of *other neutral grassland g3c* at the western edge of this site.
- Bounded by chain-link fencing – *built linear feature u1e, 69*.
- A small area of bramble scrub overgrowing a single allotment to the east of the site – *bramble scrub h3d.*

4.3.2. Species

Mammals

The trees within the proposal site are not very old and none were observed to show potential bat roosting features. The building in Site 2 was rated as not having bat roost potential.

Close attention was paid to finding to potential badger evidence, but none was observed. Rabbit activity is widespread and believed to account for all observed diggings and burrows.

Numerous hedgehog records have been recorded locally and the site has both refuge and foraging potential.

Current brown hare activity within the proposal boundaries is judged as very unlikely because of the proximity of dense human development.

Birds

There is good nesting bird potential across the proposed development site within the woodlands, assorted hedges, and areas of scrub. Given the site location and habitat types, the expectation is for relatively common species. Nevertheless, this could still include species that are present on BoCC[6] Amber and Red lists (e.g. dunnock, house sparrow and starling).

Reptiles

Site 2 (grassland and scrub) and Site 3 (allotments) are rated as having low but conceivable reptile potential, particularly for slow-worm. The ecological assessment of Site 1B prior to development in 2009, reached a similar conclusion.

Amphibians

The absence of identifiable waterbodies within 250m of all portions of the site points to a predicted absence of amphibians including great crested newts.

4.4. Limitations

The Site 1B solar panel array site was fenced off and inaccessible, but was quite convincingly surveyed by viewing it from the east boundary.

[6] Stanbury, A., et al. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747.

The winter timing of the survey likely prevented the observation/recognition of some plant species, but there is considered to be no consequential influence of that on the habitat classifications.

4.5. Further survey recommendations

Reptile surveys are advised for Sites 2 and 3. Slow-worms are considered to be the most likely reptile species. The survey methodology is deploying arrays of artificial refugia (typically 1m x 0.5m size sheets of bitumastic roofing felt) within potential reptile habitats, and the refugia are then checked on seven different occasions under suitable weather conditions.[7] The surveys are much more effective if carried out under specific weather conditions, and such conditions are more likely to occur in East Anglia though April, May and September.

[7] Froglife (1999). Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

Figure 3: NBIS map of local designated sites

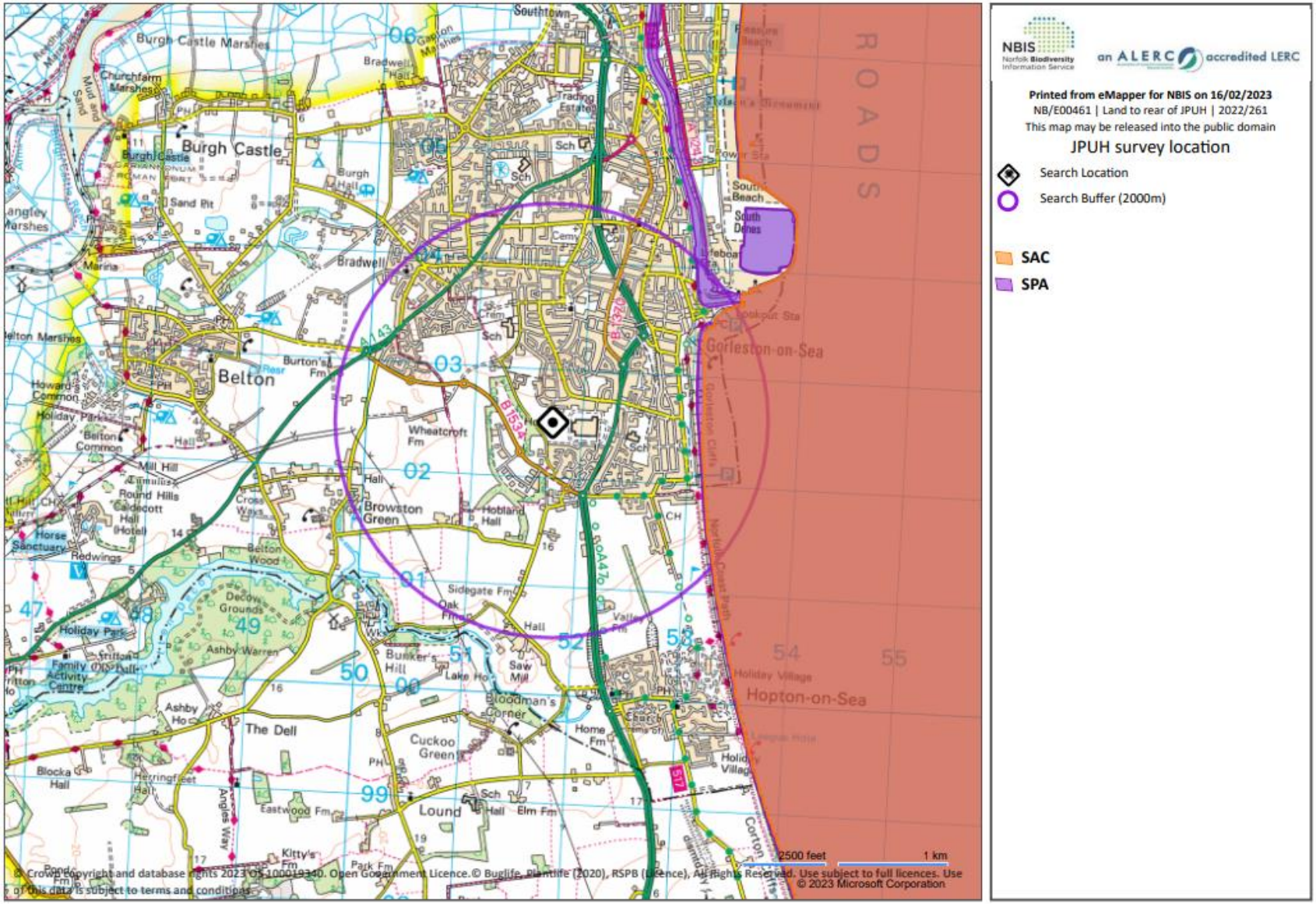


Figure 4: Habitat map

5. Ecological Impact Risk Assessment

5.1. Potential impacts

5.1.1. Designated nature conservation sites

The proposed development presents no credible risk of negative impacts to any statutory or non-statutory designated nature conservation sites, and so a *neutral* impact is certain.

Because the proposed development site is separated from designated sites by urban development and is not residential in nature, a requirement for a Habitat Regulation Assessment with respect to the Southern North Sea SAC, Outer Thames Estuary SPA or Breydon Water SPA/Ramsar is not expected.

5.1.2. Habitats

The habitats anticipated to be affected by the proposed development are:

- Allotments (2.47ha) – *minor/moderate negative* impact on a local scale
- Buildings – *neutral* impact
- Developed land; sealed surface – *neutral* impact
- Introduced shrub (0.23ha) – *minor negative* impact on a site scale
- Modified grassland (6.84ha) – *minor negative* impact on a local scale
- Other neutral grassland (0.15ha) – *minor negative* impact on a local scale
- Bramble scrub (0.06ha) – *minor negative* impact on a local scale
- Mixed scrub (0.59ha) – *minor/moderate negative* impact on a local scale
- Other woodland; broadleaved (0.73ha) – *minor/moderate negative* impact on a local scale depending on the degree of retention
- Native hedgerow (0.36km) – *minor/moderate negative* impact on a local scale depending on the degree of retention

5.1.3. Protected species

Mammals

The proposed development is predicted to have a *neutral* impact on bat roosting. However, bat foraging and commuting may be *minor/moderate negatively* impacted on a local scale by natural habitat losses and additional lighting associated with the new facilities.

Minor negative impacts to a local hedgehog population are conceivable during the construction phase of the development. There is also potential for a permanent *negative* impact on a local population as a result of refuge and foraging habitat loss, the magnitude of which will depend on the final development plan.

Birds

There is potential for permanent *minor to moderate negative* impacts to local breeding populations of relatively common species from nesting habitat loss.

Removing any trees/hedgerow/scrub within the main breeding season (March to end August) could conceivably result in active nest disturbance and/or destruction. This is likely to result in *minor negative* impact to the affected local population, but the legal protection afforded to bird nests obliges precautionary measure.

Reptiles

The impact potential uncertain and dependent on reptile presence/absence determination.

Amphibians

Neutral impact predicted.

5.2. Cumulative effects

The other local developments discussed in section 4.2.3. have had either undetermined ecological impact or predicted minor ecological impact. The high level of development with the local area is undoubtedly having a negative cumulative impact on local natural habitats and species, but assessments have concluded that the impacts are of low significance.

5.3. Mitigation measures

5.3.1. Habitats

From an ecological impact perspective (not necessarily Biodiversity Net Gain units) the habitats for which it is most important to maximize the level of retention in the final development plan are considered to be:

- Other woodland; broadleaved – the two woodlands present in Site 1A
- Native hedgerow – particularly the bramble hedgerow along the western Site 1A boundary

Any planting of new trees/shrubs will provide a level of compensation for natural habitat losses during the construction (site preparation) phase.

5.3.2. Protected species

Mammals

The planned hospital facilities will require a level of outdoor lighting to provide safety and security. However, it should be feasible to avoid or else significantly limit the illumination of boundary hedgerows and retained woodlands.

Construction impacts to hedgehog and other animals may be mitigated by barricading wet/drying concrete and fitting any open excavations with escape ramps. Excavations will need to be checked for animals before being filled. Demolition waste and green waste will need be taken from site or loaded into skips as soon as possible to minimise the chance of being used as a refuge by an animal that could be injured/killed during the eventual removal. Building materials stores should be kept on hard-standing or on pallets.

Any planting of new trees/shrubs will provide a level of compensation for habitat losses during the construction (site preparation) phase.

Birds

Tree/hedgerow/scrub removal must either avoid the main nesting season (March through August) or undertake a prior watching brief(s) by a qualified ecologist to check for bird nesting activity prior to clearance (maximum 72hrs prior). Any identified active nests must be left undisturbed (i.e. tree not felled and buffered from active work areas) until the nesting attempt reaches a natural conclusion.

Any planting of new trees/shrubs will provide a level of compensation for habitat losses during the construction (site preparation) phase.

Reptiles

Appropriate mitigation to be determined.

5.4. Mitigation licensing for European Protected Species

Desk study and site survey results conclude that there is no reasonable expectation of impacts to roosting bats or great crested newts. As such, there is no expected requirement for mitigation licensing.

5.5. Residual impact assessment

Table 4: Residual impact risk assessment

Receptor	Potential impact	Advised mitigation	Residual impact
Habitats	Minor to moderate negative impacts to site or local abundances.	On-site targeted habitat retention and new plantings; potentially also off-site provisions/enhancements.	TBC
Bats	Minor to moderate negative impact to the foraging resources of local populations.	On-site targeted retention and new plantings; wildlife sensitive lighting scheme; potentially also off-site provisions/enhancements.	TBC
Hedgehogs	Minor to moderate negative impact to the refuge and foraging resources of local populations. Minor negative impact to local population from mortality during construction phase.	On-site targeted habitat retention and new plantings; potentially also off-site provisions/enhancements. Precautions to be taken with excavations, fresh concrete and vegetation/debris clearance.	TBC
Birds	Minor to moderate negative impact to the nesting resources of local populations. Minor negative impact to local populations as a result of nest disturbance/ destruction.	On-site targeted habitat retention and new plantings; potentially also off-site provisions/enhancements. Timing any tree/hedgerow/scrub removal outside the main nesting season or else completing a qualified watching brief prior to commencing.	TBC
Reptiles	Uncertain	TBC	TBC

6. Biodiversity Net Gain

6.1. Habitat Units calculations

The Biodiversity Metric 3.1 is the only currently approved method for calculating the habitat values pre- and post-development. The Biodiversity Metric 3.1 is used for the calculation of Biodiversity Units (BU) and the assessment of Biodiversity Net Gain (BNG) in this report.

Baseline BNG calculations were undertaken on 13/03/2023 by Ben Moore ACIEEM, based on the proposal site Habitat Map (Figure 4).

6.1.1. Condition assessment

Habitat condition was assigned using the 'Biodiversity Metric 3.1 habitat condition assessment' Excel spreadsheet (Appendix 3 provides the criteria for all assessed habitats) and following guidance from the 'Biodiversity Metric 3.1 Technical Supplement' document[8] which accompanies the Biodiversity Metric 3.1. Assessment criteria were followed for each broad habitat type, to determine the condition of each habitat for all areas surveyed.

6.1.2. Strategic significance

The strategic significance was assessed by determining if habitat areas within the site occur within any strategic locations for biodiversity, form part of a designated site for nature conservation or are identified within local plans such as Ecological Networks or stepping stone features.

6.1.3. Measurement of habitats

Baseline and proposed habitat areas have been measured as distinct habitat parcels using QGIS 3.22.4 Geographical Information System with overlaid georeferenced Google Earth Pro imagery.

6.2. Baseline habitats

The following tables detail the calculations for BNG.

The baseline biodiversity units of a pre-development site are influenced by the size of the site and the Area Habitat Biodiversity Units (AHBU) and Hedgerow Biodiversity Units (HBU) within it (see Tables 5 and 6). The pre-development site at land to the rear of the James Paget University Hospital is defined/used here as the whole red-line boundary area (see Figure 1).

Table 5: Baseline Area Habitat Biodiversity Units (AHBU) of the proposed development area

UK Habitat Type	Secondary Code	Distinctiveness Score	Condition Score	Strategic significance	Area (ha)	AHBU
Allotments	910	Low	Good	Low	2.47	14.82
Developed land; sealed surface	89, 431, 580, 610,	V.Low	N/A - Other	Low	1.56	0.00
Introduced shrub	1160	Low	Condition Assessment N/A	Low	0.23	0.46
Modified grassland	64, 114, 610, 720	Low	Moderate	Low	6.84	27.36
Other neutral grassland	10, 11, 16	Medium	Moderate	Low	0.15	1.20

[8] Panks *et al.*, (2022). Biodiversity metric 3.1: Auditing and accounting for biodiversity – User Guide. Natural England.

UK Habitat Type	Secondary Code	Distinctiveness Score	Condition Score	Strategic significance	Area (ha)	AHBU
Bramble scrub	-	Medium	Condition Assessment N/A	Low	0.06	0.24
Mixed scrub	47	Medium	Moderate	Low	0.59	4.72
Other woodland; broadleaved	36, 47	Medium	Moderate	Low	0.73	5.84
Total					**12.63**	**54.64**
Additional AHBU required for total site 10% BNG						**5.464**

Table 6: Baseline Hedgerow Biodiversity Units (HBU) of the proposed development site

UK Hedgerow Type	Hedgerow reference	Distinctiveness Score	Condition Score	Strategic significance	Length (km)	HBU
Native Hedgerow	Other hedgerow 'h2b', 47	Low	Good	Low	0.36	2.16
Non-native hedgerow	Other hedgerow 'h2b', 48	V.low	Poor	Low	0.06	0.06
Total					**0.41**	**2.22**
Additional HBU required for total site 10% BNG						**0.222**

Tables 5 and 6 show that a further 5.464 AHBU and 0.222 HBU will need to be created to achieve a minimum 10% BNG. These values are in addition to the need to fully compensate the units lost by the development.

7. Conclusions

A Preliminary Ecological Appraisal of the proposed construction of a new core hospital building and associated wards, an administration building, an energy centre, a multi-storey car park and surface car parking areas on property west of the James Paget University Hospital has predicted:

- A neutral impact to all designated nature conservation sites.
- A potential for minor-moderate negative impacts on habitats including allotments, introduced shrub, modified grassland, other neutral grassland, bramble scrub, mixed scrub, other broadleaved woodland and native hedgerows.
- A neutral impact to local bat populations with respect to roosting, but a potential for a minor-moderate negative impacts to local populations from foraging habitat loss/displacement.
- A potential for a minor-moderate negative impacts on a local hedgehog population from habitat loss and mortality during site preparations.
- A potential for a minor-moderate negative impacts to local bird populations from nesting habitat loss and nest destruction during site preparations.
- An indeterminate potential for impacts on reptiles; further survey is advised.
- A neutral impact to amphibians including great crested newts.

The baseline Biodiversity Units of the proposed development site have been calculated at 54.64 Area Habitat Biodiversity Units and 2.22 Hedgerow Biodiversity Units.

Appendix 1: Relevant Legislation and Policy Guidance

Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981, Section 9, states protections from intentional or reckless actions upon the certain animal species that are listed in Schedule 5 and the plant species listed in Schedule 8. The Schedule 5 listed species have different types of safeguards depending on whether they are protected by Section 9.1, 9.2, 9.4 and/or 9.5.

- Section 9.1 – protection from killing or injury; includes water vole, grass snake, common lizard, slow-worm and adder.
- Section 9.4a – protection from intentional damage or destruction to any structure or place used for shelter or protection; includes water vole.
- Section 9.4b – protection from intentional disturbance while occupying a structure or place used for shelter or protection; includes all bat species, hazel dormouse, otter, water vole and great crested newt.
- Section 9.4c – protection from access to any structure or place used for shelter or protection being obstructed; includes all bat species, hazel dormouse, otter, water vole, great crested newt and natterjack toad.

All wild birds are protected from destruction of their nests (with minor exceptions) under the Wildlife and Countryside Act 1981. A higher level of disturbance protection is extended to Schedule 1 species, such as barn owls, and their active nest sites.

Plants listed under Schedule 9 of the act are invasive and generally need controlling on a development site. It is an offence to "plant or otherwise cause to grow in the wild", the invasive species listed on this schedule. Disposal of the plants or soil contaminated by them may need to be to a controlled waste site.

Conservation of Habitats and Species Regulations 2017 (as amended)

The Conservation of Habitats and Species Regulations 2017, as amended by the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019, broadly retains the habitat and species protections that are required under the European Habitats Directive (EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) and the Birds Directive (Council Directive 2009/147/EC on the Conservation of Wild Birds). The statutory protection for European Protected Species and Natura 2000 sites (now referred to as 'National Site Network' sites) remains unchanged for now.

The UK legislation affords very strict protection to Annex IV listed species (e.g. all species of bats, hazel dormouse, otter, great crested newt and natterjack toad). Developments that are likely to have a significant impact upon Annex IV listed species (e.g. bats and great crested newts) require a European Protected Species mitigation license from Natural England in order for the development to legally proceed.

Natural Environment and Rural Communities Act 2006

The Natural Environment and Rural Communities Act 2006 (NERC) came into force on 1 October 2006. Under Section 40 of the Act, all public bodies (including planning authorities) now have a legal duty to consider biodiversity in their work (i.e. a material consideration for planning applications). As such, in order to increase the likely success of any planning application, consideration should be given to enhancing the biodiversity value of the site following redevelopment. Section 41 lists priority (Principal Importance) habitats and species which are to be particularly considered with respect to potential impacts, and may include species which are not otherwise protected by UK legislation.

Appendix 2: Photographs

Photograph 1: Site 1A looking southeast towards the hospital, taken from a position at the northwest end of the site.

Photograph 2: The larger woodland in the northeast corner of Site 1A

Photograph 3: Bramble hedgerow along the northern boundary of Site 1A.

Photograph 4: Bramble hedgerow along the Site 1A western boundary.

Photograph 5: Smaller woodland on Site 1A western boundary.

Photograph 6: Site 1A children's play area.

Photograph 7: Site 1B eastern fence and solar panel array.

Photograph 8: Site 1B car park.

Photograph 9: Site 2.

Photograph 10: Site 3 northern boundary (left of fence).

Photograph 11: Site 3 allotments.

Photograph 12: Site 3 other neutral grassland area

APPENDIX 6

MAJOR ACCIDENTS AND DISASTERS ASSESSMENT

Major Accidents and Disasters

Introduction

This appendix considers the vulnerability of the Proposed Development to major accidents and disasters (MA&D) during its construction, operation and maintenance, and decommissioning, caused by natural hazards or manmade hazards (including operational failure), and any potential significant effects. It also considers impacts to receptors arising from MA&D affecting the Proposed Development.

This chapter sets out the proposed methodology for the MA&D assessment and identifies those MA&D categories and types that can be scoped out of the assessment. Where necessary, further assessment will be presented in the Environmental Statement (ES). For the ES, the vulnerability of the Proposed Development to an MA&D event during decommissioning/demolition is anticipated to be no worse than that for the construction phase following the implementation of risk management plans for decommissioning as required by the Construction (Design and Management) Regulations 2015 (CDM). Construction and decommissioning/demolition are therefore considered together.

Based on professional judgement, MA&D are events or situations that have the potential to affect the Proposed Development and to go on to cause immediate or delayed serious damage to one or more of the following: human health; welfare; cultural heritage; and the environment.

The list of MA&D categories and types to which the Proposed Development may be vulnerable during construction and operation and maintenance phases are listed in **Table 1-1**.

Table 1-1: MA&D Categories and Types

Category	Type
Natural	Geophysical
	Hydrological
	Climatological and meteorological
	Space
	Biological
Technological or manmade hazards	Societal
	Industrial and urban accidents
	Transport accidents
	Pollution accidents
	Utility failures
	Malicious attacks

	Engineering accidents and failures

This appendix should be read in conjunction with the environmental aspect chapters (Chapter 5: Air Quality to Chapter 17: Waste) to provide a broader environmental context of the risks associated with these MA&D events/situations. These chapters also include examples of the measures that may be used to prevent or mitigate significant effects and details of the preparedness for, and proposed response to emergencies.

The definitions of key terms used in this appendix are given in **Table 1-2**. These definitions have been developed by reference to the definitions used in EU and UK legislation and guidance relevant to MA&D, as well as professional judgement in the context of the Proposed Development.

Table 1-2: MA&D Key Terms and Definitions

Term	Definition
(Major) Accident	In the context of the Proposed Development, an event that threatens immediate or delayed serious damage to human health, welfare and/or the environment and requires the use of resources beyond those of the Applicant or their contractor(s) to respond. Serious damage includes the loss of life or permanent injury, and/or permanent or long-lasting damage to a receptor that cannot be restored through minor clean-up and restoration efforts. The significance of this effect will consider the extent, severity and duration of harm and the sensitivity of the receptor.
ALARP	"ALARP" stands for "as low as reasonably practicable". Reasonably practicable involves weighing a risk against the trouble, time and money needed to control it. Thus, ALARP describes the level to which the Health & Safety Executive (HSE) expect to see workplace risks controlled.
Adaptive Capacity	The capacity of receptors to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.
Consultation Zone	The Office for Nuclear Regulation (ONR) and the HSE set consultation distances around nuclear installations, major hazard sites and major accident hazard pipelines after assessing the risks and likely effects of major accidents at the nuclear installation/major hazard site/pipeline. The area enclosed within the consultation distance is referred to as the Consultation Zone (CZ). The local planning authority is notified of this consultation distance and has a statutory duty to consult the ONR/HSE on certain proposed developments within that CZ.
Disaster	In the context of the Proposed Development, a naturally occurring phenomenon such as an extreme weather event (for example storm, flood, temperature) or ground-related hazard events (for example subsidence, landslide, earthquake) with the potential to cause an event or situation that meets the definition of a (major) accident, as defined above.

Term	Definition
External Influencing Factor	A factor that occurs beyond the Site that may present a risk to the Proposed Development, e.g. if an external major event occurred (e.g. fire or a Control of Major Accident Hazards (COMAH) site major accident) it would increase the risk of serious damage to a receptor associated with the Proposed Development.
Hazard	Anything with the potential to cause harm, including ill-health and injury, damage to property or the environment; or a combination of these.
Internal Influencing Factor	A factor which occurs within the Site that may present a risk to the Proposed Development.
Magnitude of Impact	The magnitude of an impact is typically defined by the following factors: ▪ Extent – the area over which an effect occurs; ▪ Duration – the time for which the effect occurs; ▪ Frequency – how often the effect occurs; and ▪ Severity – the degree of change relative to existing conditions.
MA&D Group	A MA&D which can be grouped as either a natural hazard (disaster) or technological or manmade hazard (major accident).
MA&D Category	A set of values used to categorise events within a related parent MA&D group.
MA&D Type	A set of values used to sub-categorise events within a MA&D category.
Risk	The likelihood of an impact occurring, combined with effect or consequence(s) of the impact on a receptor if it does occur.
Risk Event	An identified, unplanned event, which is considered relevant to the Proposed Development and has the potential to be a MA&D subject to assessment of its potential to result in a significant adverse effect on a receptor.
Sensitivity	The sensitivity of a receptor is a function of its value, and capacity to accommodate change reflecting its ability to recover if it is affected. It is typically defined by the following factors: ▪ Adaptability – the degree to which a receptor can avoid, adapt to or recover from an effect. ▪ Tolerance – the ability of a receptor to accommodate temporary or permanent change. ▪ Recoverability – the temporal scale over and extent to which a receptor will recover following an effect.
Vulnerability	In the context of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (on the assessment of the effects of certain public and private projects on the environment) the term refers to the 'exposure and resilience' of the Proposed Development to the risk of a MA&D. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact.

Baseline Conditions

DATA SOURCES

The baseline conditions for MA&D described in this section has been informed by the following data sources:

- National Risk Register;
- British Geological Survey (BGS) GeoIndex Onshore;
- Tsunamis Hazard Map;
- The International Disaster Database;
- Health and Safety Executive's (HSE) Planning Advice Web App;
- HSE's COMAH 2015 Public Information Search;
- Google aerial and street view maps; and
- Environmental aspect chapters (Chapter 5: Air Quality to Chapter 17: Waste).

BASELINE

The baseline relevant to MA&D comprises:

- Features external to the Proposed Development that contribute a potential source of hazard to the Proposed Development;
- Sensitive environmental receptors at risk of significant effect; and
- Current (without the Proposed Development) MA&D risks for the existing locality.

Baseline conditions for MA&D are presented in **Table 1-3**.

Approach and Method

DESCRIPTION OF POTENTIAL VULNERABILITY TO MAJOR ACCIDENT AND DISASTER RISKS

There is no published guidance for the application of the legal requirements to the assessment of MA&D. However, selected relevant guidance for risk assessment methodologies has been adopted and is summarised as follows:

- IEMA (2020) Major Accidents and Disasters in EIA: A Primer;
- Defra (2011) 'Guidelines for Environmental Risk Assessment and Management;
- Chemical and Downstream Oil Industries Forum, (2013), Guideline – Environmental Risk Tolerability for COMAH Establishments; and
- The International Standards Organization's ISO 31000: 2018 Risk Management – principles and guidelines.

In addition, the following have been consulted to support the identification of a potential MA&D:

- The Cabinet Office National Risk Register. This document is the unclassified version of the National Risk Register and it identifies the main types of civil emergencies that could affect the UK in the next five years. It is recognised, however, that this document does not provide an all-encompassing list of all potential accidents and disasters and its timescales are short term.
- The International Federation of Red Cross & Red Crescent Societies Early Warning, Early Action. This guidance looks to other countries including those in warmer climates, thereby identifying risks that the UK may encounter in the future in light of climate change and global warming.

- The International Disaster Database. This online source contains data covering over 22,000 mass disasters in the world since 1900 to the present day and aims to “rationalise decision making for disaster preparedness, as well as provide an objective base for vulnerability assessment and priority setting”.

SCOPING METHODOLOGY

Likelihood and Consequence Events

Low likelihood and low consequence events will be scoped out as these events are unlikely to result in significant adverse effects as they do not fall into the definition of a MA&D. Highly likely and low consequence events are also scoped out as they will not lead to significant adverse effects. Furthermore, high likelihood and high consequence events are scoped out, as it is assumed that existing legislation and regulatory controls (including the Health and Safety at Work etc. Act 1974 and the CDM Regulations) would not permit the project to be progressed under these circumstances.

A four-stage process will be used to identify the MA&D categories and types that require further assessment:

- The first stage is in accordance with emerging EIA practice, whereby health and safety is scoped out of this topic as it is covered by detailed health and safety legislation; this includes risks to employees;
- The second stage of the scoping process is the development of a long list of potential MA&D types for consideration;
- The third stage is the review of the long list to rule out any potential accidents and disasters that are considered not to be relevant to location; and
- The fourth stage is to rule out those which are unlikely to result in a MA&D event, e.g. there is no pathway or receptor.

STUDY AREA

MA&D types would be considered both within and outside the Proposed Development boundary along with potential internal and external influencing factors. The following factors and associated distances were adopted for setting the Study Area:

- Manmade features:
  - Airports and airfields within 13km (the legal distance of the safeguarding zone for licensed airports in the UK);
  - COMAH facilities within 500m (distance to furthest COMAH installation centre point whose CZ overlaps the Proposed Development);
  - MAH pipelines within 500m (distance to furthest MAH pipeline whose CZ overlaps the Proposed Development);
  - Fuel retail sites (including Liquified Natural Gas, Liquified Petroleum Gas) within 500m;
  - Rail infrastructure within 100m; and
  - Transmission lines (gas, electrical, oil/fuels) crossing the Proposed Development boundary.
- Natural features with the potential to create risks within:
  - 3km (chiefly hydrological and geological, for example dam failure and seismic activity respectively); and

- 1km (chiefly hydrological and geological, for example flood risk and unstable ground conditions respectively).

RECEPTORS

In line with Regulation 14 of the EIA Regulations the scoping study will consider the following receptors:

- members of the public and local communities;
- infrastructure and the built environment;
- the natural environment, including ecosystems, land and soil quality, air quality, surface and groundwater resources and landscape;
- the historic environment, including archaeology and built heritage; and
- the interaction between the factors above.

The environmental receptors of the Proposed Development are described in detail in the technical chapters (Chapters 6 to 17) and so are not repeated here.

Consultation

Consultation has not been undertaken to inform this chapter for MA&D as no external influencing factors which could have a significant impact on the Proposed Development have been identified.

Impacts Scoped In or Out of Further Assessment

A review of the MA&D event groups, categories and types identified in the Study Area, has been undertaken to inform the scoping process, which is reported in **Table 1-3**. This table shows the potential vulnerability of the Proposed Development to the risk of a MA&D event at the type level. The ES will provide greater assessment and justification for the topic areas scoped in and for those that are scoped out no further assessment is considered necessary in the EIA.

Table 1-3: Elements Scoped In or Out of Further Assessment

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
Natural Hazards	Geophysical	Earthquakes	Do not occur in Britain of a sufficient intensity owing to the motion of the Earth's tectonic plates causing regional compression. In addition, uplift from the melting of the ice sheets that covered many parts of Britain thousands of years ago can also cause movement. The BGS acknowledges that on average, a magnitude 4 earthquake happens in Britain roughly every two years and a magnitude 5 earthquake occur around every 10 to 20 years. As such the Cabinet Office National Risk Register of Civil Emergencies states that "Earthquakes in the UK are moderately frequent but rarely result in large amounts of damage. An earthquake of sufficient intensity (determined based on the earthquake's local effect on people and the environment) to inflict severe damage is unlikely". There are no recorded historical earthquakes close to the Proposed Development area. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Geophysical	Volcanic Activity	The Proposed Development is not in an active area, and it is highly unlikely that an ash cloud could significantly impact on any aspect of the Proposed Development. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Geophysical	Landslides	The Site is underlain by the superficial deposits of the Corton Formation (sand, sandy clay and gravel), which overlies the Crag group (sand and gravel) bedrock therefore ground stability issues may be present in relation to foundations, and this will be taken into account in the detailed design. According to the BGS	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			GeoIndex Onshore map viewer there are no records of landslides within the Study Area. The Proposed Development's topography is relatively flat, and the Proposed Development does not involve the formation of deep cuts/high embankments. In designing the Proposed Development to applicable standards, resources and receptors would not be put at a greater risk because of the Proposed Development. Therefore, this MA&D event type has been scoped out from further assessment.	
Natural Hazards	Geophysical	Sinkholes	The bedrock geology that underlies the Proposed Development includes sand and gravel of the Crag Group rather than limestone. Therefore, the geology is unlikely to be prone to the natural formation of sinkholes. There are no examples of naturally occurring sinkholes in the locality of the Proposed Development. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Geophysical	Tsunamis	The Proposed Development is not located in a tsunamis risk zone. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Hydrological	Coastal Flooding	The Proposed Development is located sufficiently inland, outside a coastal flooding risk zone. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Hydrological	Fluvial Flooding	There are no surface water features within 500m of the Proposed Development. The Environment Agency's Flood Map for Planning (rivers and sea) indicates that the Proposed Development is located in the low-risk Flood Zone 1 where the risk of flooding from fluvial sources is less than 1 in 1,000 (0.1%) in any year. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Hydrological	Pluvial Flooding	The Environment Agency's Flood Map for Planning indicates that the highest risk of flooding within the study area of Proposed	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			Development is from surface water. The flood map indicates that the annual chance of pluvial flooding is 'Low', between 0.1% and 1% chance of a flood each year. The risk of pluvial flooding affecting the Proposed Development during operation will be mitigated through 'Sustainable Drainage Strategy and Design (SuDS)' which would be implemented by the appointed contractor. This will aim to manage surface water runoff in line with the drainage hierarchy. Therefore, this MA&D event type has been scoped out from further assessment.	
Natural Hazards	Hydrological	Groundwater Flooding	The Environment Agency's Flood Map for Planning indicates that flooding from groundwater is unlikely in this study area. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Hydrological	Avalanches	Not considered relevant given the geographical location of the Proposed Development. The Proposed Development's topography is relatively flat and therefore an avalanche will not occur. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Climatological and Meteorological	Cyclones, hurricanes, typhoons, storms and gales	Cyclones, hurricanes and typhoons do not occur in the UK. The winter of 2015/2016 was the second wettest winter on record and a series of storms (including 'Desmond' and 'Eva') resulted in heavy and sustained rainfall. 17,600 UK properties were flooded, and several bridges collapsed, disrupting access to and from local communities. In January 2024, Storm Isha brought widespread strong winds which gusted at 69 mph in Norfolk. Storm Isha caused power outages, damaged buildings and fallen trees. There was also widespread transport disruption to road and rail. In the event of a storm during the construction phase, works would be temporarily suspended, and equipment secured. The risks associated with adverse weather conditions will be considered in the CDM Risk Register.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			During the operational phase, storms and gales could result in damage to buildings. Their design takes into account environmental conditions including exposure to UK weather conditions. The risk is not significantly different to other similar buildings in the locality. It is therefore considered that this MA&D event type can be scoped out from further assessment	
Natural Hazards	Climatological and Meteorological	Thunderstorms	This type of event could result in lightning strikes to temporary elevated structures during construction (e.g. tower cranes) however, the risk is no different to other construction projects in the locality. In addition, the risks associated with adverse weather conditions will be considered in the CDM Risk Register. It is therefore considered that this MA&D event type can be scoped out from further assessment.	No
Natural Hazards	Climatological and Meteorological	Wave surges	The Proposed Development is located sufficiently inland, and therefore is not subject to wave surges. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Climatological and Meteorological	Extreme temperatures: Heatwaves Low (sub-zero) temperatures and heavy snow	This type of event could give rise to changes in climatic conditions, with building infrastructure being exposed to greater heat intensity and exposure to sunlight. Heavy snow could cause workers and public to be trapped in the hospital. In August 1990, the UK experienced heatwave conditions with temperatures reaching what was then a record 37.1°C in Cheltenham, England. In August 2003 a UK heatwave lasted 10 days and resulted in over 2,000 deaths. Temperatures reached what was then a record 38.5°C in Faversham, England and 33°C in Anglesey, Wales. In July 2022 40.3°C was recorded at Coningsby (Lincolnshire), setting a new UK and England temperature record High temperature records are now being broken with increasing frequency.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			The most widespread and prolonged low temperatures in recent years occurred in December 2022 causing disruption to power supplies and transport. The UK experienced a prolonged spell of low temperatures accompanied by snowfalls as an Arctic Maritime airmass brought hard frosts, with freezing daytime temperatures and widespread lying snow (although generally not deep). Daily minimum temperatures fell widely to between -5°C and -10°C across the UK on several nights, with hard frosts even in cities and coastal areas and some locations recorded temperatures below -10°C. In late February and early March 2018, the UK experienced a spell of severe winter weather with very low temperatures and significant snowfall. This led to widespread impacts across the UK, including disruption to transport services, school closures and power cuts. During December 2009 and January 2010 daytime temperatures were mostly sub-zero across the UK. At night, temperatures in England regularly fell to -5°C to -10°C. Snowfall across the UK lasted for some time, allowing 20cm to 30cm of snow to build up, closing schools and making it very difficult to travel. Between 1981 and 2010, there were 0 occurrences where summer mean temperatures exceeded 24.7°C on five or more consecutive days. To overcome the adverse impacts, the UK Health Security Agency (UKHSA) in association with the Met Office has provided the 'Heatwave Plan' - guidelines to protect people from prolonged exposure of severe heat. Between 1981 and 2010, there have been 2,654 days with a maximum minimum temperature below zero degrees Celsius. As a preventive measure, the UKHSA collaborated with the Met office and introduced a Cold Weather Plan and an Alert system. Between 1981 and 2010, there were 826.71 days with snow lying at 0900 however, there are no records from the Met Office of the depth of snow.	

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			The construction time is envisaged to be of short term (2027-2031), the risks associated with adverse weather conditions will be considered in the CDM Risk Register and a Code of Construction Practice (CoCP) will be developed which will include measures for managing extreme weather-related events. The risk is no different to similar infrastructure in the locality. Specific measures are therefore not considered to be required as part of the Proposed Development. Therefore, this MA&D event type has been scoped out from further assessment.	
Natural Hazards	Climatological and Meteorological	Droughts	The UK has experienced several severe droughts in recent years, with water shortages in 1995-1997, 2010-2012, 2018-2019 and 2022. Summer 2022 was the joint hottest (with 2018) and fifth driest since the 1890s. The drought affected large parts of the country and was the worst in some areas since 1976. It was part of wider European drought, believed to be the worst on the continent in 500 years. The prolonged and extensive exceptional heat, dry soils and low river flows had impacts across much of the UK including water use restrictions and restrictions on waterways navigation. Agriculture was severely impacted with low crop and milk yields, as well as dying grass in grazing fields that forced farmers to use winter food stores. During the summer, there were nearly 25,000 wildfires which spread easily across dry fields and also affected urban areas. A Level 4 heat health alert was issued for the first time since its introduction in 2004, and there was an estimated 2,800 excess deaths of over 65s due to heat between June and August. During the 2010-12 drought, parts of eastern England recorded their lowest 18-month rainfall total in over 100 years. There are statutory duties to plan and manage the supply and demand of water. The drought response framework by the	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			'Environment Agency' collaborates Government, water companies and others to manage water resources during a drought. There is an availability of around 25% of groundwater supply in the Study Area of the Proposed Development supported by the lower greensand aquifer. Lower greensand is classified as principal aquifer and is capable of supporting high storage of water supplies, providing steady groundwater head. Prolonged periods of drought can impact infrastructure as drying out and cracking of soils may affect structural stability and prolonged dry periods can lead to cracking of surfaces and more rapid deterioration of materials. Decreased rainfall combined with an increase in the average temperature can also increase subsidence. The Proposed Development should not be vulnerable to drought as water is not an essential service during the construction, use or maintenance phases. The design of the Proposed Development will be resilient to ground shrinkage, and this risk should remain in the design risk register until designed out. Therefore, this MA&D event type has been scoped out from further assessment.	
Natural Hazards	Climatological and Meteorological	Severe Space Weather: Solar Flares	Solar flare events are known to interrupt radio and other electronic communications. Records from solar storms in 1921 and 1960 describe widespread disruption of radio systems, and satellites and impacts on railway signalling and switching systems. During the solar storm in May 2024, reportedly there were power grid irregularities and Global Positioning System (GPS) and high-frequency radio communications were impacted. Some aerial drone users flying during the storm experienced difficulty maintaining a stable hover, disruption of GPS signals, and in some cases a sudden loss of control. There were no reported significant impacts to the population.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			There is a reliance on technology however, it is anticipated that the risk of vulnerability to a MA&D event for the Proposed Development would be comparable to that for other hospitals in the UK. Specific measures are therefore not considered to be required as part of the Proposed Development. Therefore, this MA&D event type has been scoped out for further assessment.	
Natural Hazards	Climatological and Meteorological	Severe Space Weather: Solar Energetic Particles	Solar energetic particles which cause solar radiation storms, but only in outer space, therefore this MA&D event type can be scoped out.	No
Natural Hazards	Climatological and Meteorological	Severe Space Weather: Coronal Mass Ejections	Coronal mass ejections (CME) cause geomagnetic storms. The geomagnetic storm in 2003 caused the UK aviation sector to lose some GPS functions for a day, however no known significant impact on infrastructure. The geomagnetic storm in 2024 caused some disruption however, there was no known significant impact on infrastructure in the UK. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Climatological and Meteorological	Fog	Fog is one of the most common weather conditions in the UK, particularly throughout autumn and winter. Severe disruption to transport occurs when the visibility falls below 50m over a wide area. It is only during the construction phase when fog may impact the Proposed Development. There would be a risk to construction workers travelling to the Site, but this risk would not be significantly different from the baseline. Workers' health and safety is also managed by Occupational Health and Safety legislation. During the construction phase, works would be paused during poor visibility conditions. It is therefore considered that this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Climatological and Meteorological	Wildfires:	The Proposed Development is not located in, or surrounded by, areas of woodland that could be at risk of wildfire events during	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
		Forest fire, Bush/brush, pasture	hot, dry periods and/or fires initiated by construction related activities. Therefore, this MA&D event type has been scoped out from further assessment.	
Natural Hazards	Climatological and Meteorological	Poor Air Quality	In 2006 the UK experienced two periods of extended hot weather with associated elevated ozone and harmful airborne particles. In the spring of 2015, two particle pollution episodes caused widespread poor air quality throughout the UK, with multiple areas measuring 'High' on the Daily Air Quality Index and resulted in around 1,100 deaths due to exacerbation of pre-existing ill-health conditions. Summer 2015 also contained two elevated ozone episodes. Construction: Construction effects would be temporary for the duration of the construction phase. Increased dust emissions from construction activities and combustion related emissions from on-site plant and vehicles could affect local air quality at nearby sensitive receptors (residential receptors). Provided mitigation measures are in place during the construction phase, the changes in local air quality are not expected to be significant. Operation: The Proposed Development has the potential to impact on existing air quality as a result of road traffic exhaust emissions such as NO_2, PM10 and PM2.5, associated with vehicles travelling to and from the Proposed Development. In addition, the Proposed Development also includes a number of diesel-powered standby generators. These generators will only be used for an emergency (e.g. loss of power from the main power supply) and will be regularly tested. Testing of the back-up generators will be minimal at less than 50 hours per year and therefore should not cause concern for air quality. A detailed air quality assessment will be undertaken as part of the ES and if necessary, appropriate mitigation measures identified. Therefore, it is considered that this MA&D event type can be scoped out from further assessment.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
Natural Hazards	Biological	Disease epidemics: Viral; Bacterial; Parasitic; Fungal; and Prion.	The Proposed Development is located in a developed country where the population is in general good health. Furthermore, the use of the Proposed Development (hospital) is not going to give rise to any disease epidemics. The most recent disease epidemic in England was COVID-19, the first cases of which were identified in February 2020. Although no longer considered a global health emergency by The World Health Organisation, the vulnerability of the Proposed Development to a MA&D event caused by COVID-19 during construction and operation should be mitigated by the occupational health and safety processes that are implemented by both the contractor and government rules and guidelines on the control of spread of COVID-19. The UK Health Security Agency, the executive agency of the Department of Health is responsible for protecting the nation from public health hazards, preparing for and responding to public health emergencies. One of the UK Health Security Agency's functions is to protect the public from infectious disease outbreaks and the Agency has produced a document providing operational guidance for the management of outbreaks of communicable disease, 'Communicable Disease Outbreak management: Operational Guidance'. Therefore, this MA&D event type has been scoped out from further assessment.	No
Natural Hazards	Biological	Animal Diseases: Avian influenza; West Nile virus; Rabies; Foot and mouth; and Swine fever.	Low and highly pathogenic avian influenza has been recorded in poultry in the UK several times in the last 10 years, most recently in the winter of 2021/22 and 2022/23, although with no human cases reported. There was a devastating foot and mouth outbreak in 2001. However, there are no recorded foot and mouth burial pits in the Study Area. The use of the Proposed Development (hospital) is not going to be the source of any animal disease epidemics. Spread would be controlled through containment of infected animals including	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			prohibition of transportation. Therefore, this MA&D event type has been scoped out from further assessment.	
Natural Hazards	Biological	Plants	Should invasive plant species be identified during ecological survey works or during construction, standard control measures will be implemented by the appointed contractor during construction to handle and dispose of any diseased plants and/or injurious weeds and prevent their spread. It is therefore considered that this MA&D event type can be scoped out from further assessment.	No
Technological or Manmade Hazards	Societal	Extensive public demonstrations which could lead to violence and loss of life.	The Proposed Development is located in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts. The Proposed Development is not considered highly controversial and should not lead to high profile public demonstrations. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Societal	Widespread damage to societies and economies.	The Proposed Development is located in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Societal	The need for large-scale multi-faceted humanitarian assistance.	The Proposed Development is located in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Societal	The hindrance or prevention of humanitarian assistance by political and military constraints.	The Proposed Development is located in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts. Therefore, this MA&D event type has been scoped out from further assessment.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
Technological or Manmade Hazards	Societal	Significant security risks for humanitarian relief workers in some areas.	The Proposed Development is located in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Societal	Famine	The Proposed Development is located in a developed country that produces its own crops and imports food. It is politically stable and not subject to hyperinflation and therefore food is available, whether produced within the UK or imported. Famine is also not relevant to the use of the Proposed Development (hospital). Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Societal	Displaced population	There will be no displacement of populations as part of the Proposed Development. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Industrial and Urban Accidents	Major Accident Hazard Chemical sites	There are two COMAH sites within a 5km of the Proposed Development. Origin UK Operations Limited (Lower Tier), approximately 1.7km north-east and ASCO UK Limited (Lower Tier), approximately 3.1km north-east. The consultation distances associated with these COMAH facilities do not overlap the Proposed Development boundary. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Industrial and Urban Accidents	Major Accident Hazard (MAH) Pipelines	There are no MAH pipelines identified within 500m of the Proposed Development. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Industrial and Urban Accidents	Nuclear	Nuclear sites are designed, built and operated so that the chance of accidental releases of radiological material in the UK is extremely low. The last historical major accident in the UK was Windscale in 1957. There are no nuclear sites within a 5km of the Proposed Development, the nearest nuclear power plant is Sizewell,	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			approximately 46km south of the Proposed Development. Therefore, this MA&D event type has been scoped out from further assessment.	
Technological or Manmade Hazards	Industrial and Urban Accidents	Fuel storage	In December 2005 Europe's largest peacetime fire occurred at the Buncefield Oil Storage Terminal in Hemel Hempstead, England. The surrounding area was temporarily evacuated, and some local businesses experienced long-term disruption to operations. There are no bulk fuel storage sites within 500m of the Proposed Development. Diesel will be stored at the Proposed Development to power the emergency backup generators however this will only be stored in small quantities in appropriately bunded tanks. Therefore, this MA&D event types has been scoped out from further assessment.	No
Technological or Manmade Hazards	Industrial and Urban Accidents	Dam breaches	Dam breaches in the UK are rare; the last major breach was at the Cwm Eigiau dam in 1925, which caused 17 fatalities and widespread flooding. The Environment Agency Flood Risk from Reservoirs map indicates that there is no risk of flooding from reservoirs in the Proposed Development's boundary. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Industrial and Urban Accidents	Mines and storage caverns	The Proposed Development is not within an area affected by coal or non-coal (e.g. gypsum, brine, clay) extraction. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Industrial and Urban Accidents	Fires	The Proposed Development is located in a predominantly residential area. Fires could be initiated by construction related activities which impact areas adjacent to the construction activities. During construction, standard control measures would be implemented by the appointed contractor to manage the risk of fire. During the operational phase there will be small quantities of diesel stored on Site for the emergency backup generators	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			however, the risk of fires affecting the Proposed Development during operation is no greater than risks for the existing hospital. Therefore, this MA&D event type has been scoped out from further assessment.	
Technological or Manmade Hazards	Transport accidents	Road	Significant transport accidents occur across the UK on a daily basis, mainly on roads, and involving private and/or commercial vehicles. During construction there will be an increase in heavy construction plant and equipment on local road network which may increase the risk of accidents. Construction traffic will be routed via prescribed roads that are considered to be the most suitable for the volume and composition of traffic likely to be required to construct the Proposed Development. During operation the potential risk of road traffic accidents will be no greater than the risk associated with the existing hospital. A detailed traffic assessment will be undertaken as part of the ES and the environmental risks posed by spillages of hazardous loads as a result of road accidents will be considered in the ES therefore, it is considered that this MA&D event type can be scoped out from further assessment from a MA&D perspective.	No
Technological or Manmade Hazards	Transport accidents	Rail	There are no railways within 100m of the Proposed Development. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Transport accidents	Waterways	The River Yare is the closest waterway used for both pleasure craft and commercial vessels. However, the River Yare is located approximately 1.2 km north-east of the Proposed Development. Thus, a waterway accident is unlikely to have a significant impact on the Proposed Development. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Transport accidents	Aviation	There have been no major air accidents in the UK since the Kegworth incident in 1989.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			There are no working airfields within the Study Area other than the helipad associated with the existing hospital which is located in the south-west corner of the existing hospital, within the new hospital development area. The Proposed Development includes the provision of a new helipad which will be designed in accordance with the UK Civil Aviation Authority's CAP1264: Standards for helicopter landing areas at hospitals. During operation the potential risk of aviation accidents will be no greater than the risk associated with the existing hospital. Therefore, this MA&D event type has been scoped out from further assessment.	
Technological or Manmade Hazards	Pollution accidents	Air	Construction activities may cause dust emissions which may contribute to poor air quality albeit on a temporary basis especially due to the use of fossil fuelled mobile plant and equipment during the construction phase. However, emissions from mobile plant and equipment covered under H&S and environmental legislation. Emissions associated with vehicles travelling as part of the Proposed Development may contribute to events associated with poor air quality. The potential for this event will be considered in detail as part of the air quality assessment in the ES, and it is therefore not considered a requirement to evaluate this further from a MA&D perspective. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Pollution accidents	Land	The Ground Conditions chapter identifies that there is the potential to mobilise historical pollution during construction activities; and to mobilise existing contamination in groundwater as a result of ground disturbance which could impact sensitive receptors including surface waters and underlying aquifers. The risks associated with potentially mobilising contamination will be assessed in the ES and considered in the CDM Risk Register with appropriate mitigation measures identified.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			During the construction phase there may also be an increase in the risk of leaks and spillages of hazardous materials associated with the construction activities. However, standard control measures would be implemented by the appointed contractor to manage the risk of spillages and leaks. It is therefore considered that this MA&D event type can be scoped out from further assessment in the ES from a MA&D perspective.	
Technological or Manmade Hazards	Pollution accidents	Water	The superficial deposits of the Corton Formation are classed by the Environment Agency as a Secondary (A) Aquifer, and the underlying Crag Group bedrock is classified as a Principal Aquifer. The Site is not situated within a groundwater source protection zone (SPZ) and there are no groundwater or surface water abstractions within 500m of the Proposed Development. During construction there may be an increase in the risk of leaks and spillages of hazardous materials associated with the construction activities. During construction, standard control measures would be implemented by the appointed contractor to manage the risk of spillages and leaks. The Proposed Development has been designed to take account of any accidental spillages through modern drainage and treatment systems. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Utilities failures	Electricity	Instances of electricity failure (also referred to as power loss or blackout) can be caused by a number of things, such as severe weather (e.g. very strong winds, lightning and flooding) which damage the distribution network. These tend to be mainly specific place, local (e.g. metropolitan area) and less frequently regional (e.g. Northeast) as a result of severe winter storms and consequent damage to the distribution overhead line network.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			Underground electrical transmission lines are present across the Proposed Development's Order Limits, the responsibilities of which lie with the relevant local operator or company should this infrastructure fail. Information regarding diversion works would be considered in the Environmental Impact Assessment. The potential risk of construction-related incidents when undertaking diversion works as part of the Proposed Development would be covered by existing legislation. Therefore, this MA&D event type has been scoped out from further assessment.	
Technological or Manmade Hazards	Utilities failures	Gas	Natural gas transmission pipelines are present across the Proposed Development, the responsibilities of which lie with the relevant local operator or company should this infrastructure fail. Information regarding diversion works would be considered in the Environmental Impact Assessment. The potential risk of construction-related incidents when undertaking diversion works as part of the Proposed Development would be covered by existing legislation. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Utilities failures	Water supply	There is water use associated with the construction and operation of the Proposed Development. In the event of mains water supply failure, water could be supplied through water tanker trucks during the construction phase. During the operational phase the local operator would pump water into the water supply network as required. In addition, the risk will be no greater than the risk associated with the existing hospital. Therefore, this MA&D event type has been scoped out for further assessment.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
Technological or Manmade Hazards	Utilities failures	Sewage system	The Proposed Development does involve the use of the sewage system. During the construction phase temporary portable systems will be in place covered by H&S welfare requirements. During the operational phase, failure of the sewage system would be managed by the local operator. In addition, the risk will be no greater than the risk associated with the existing hospital. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Malicious Attacks	Unexploded Ordnance	The Zetica Risk Maps for the area indicated that the Proposed Development is located in a high UXO risk area. According to the Ground Conditions chapter "A detailed UXO risk assessment was undertaken which identified the risk on Site 1a, 1b and 2 as moderate risk and site 23 as low risk." MACC International Limited conducted a non-intrusive UXO survey of Site 1A in February 2022 and concluded that an anomaly investigation should be undertaken. They also recommended that "all intrusive works within the Site footprint that have not received prior UXO clearance are supervised by a suitably qualified explosive ordnance engineer." In 2023 an Anomaly Investigation and UXO Clearance was undertaken on Site 1A during which no items relating to UXO were identified. Therefore, it can be assumed that the risk posed by UXO to personnel during intrusive works to a depth not exceeding 4m below ground level within Site 1A is low. The report concluded that the remainder of sites 1A, 1B, 2 and 3 were considered to be medium risk and additional mitigation measures should be implemented. The risks associated with potentially encountering UXO will be considered in the CDM Risk Register. Measures would be undertaken during construction to brief operatives to raise awareness of this issue, and to define appropriate response strategies should this be discovered during the works.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			There would be a limited risk of UXO affecting the Proposed Development, once operational but no greater than the existing hospital. It is therefore considered that this MA&D event type can be scoped out from further assessment.	
Technological or Manmade Hazards	Malicious Attacks	Attacks: Chemical; Biological; Radiological; and Nuclear.	Extremists remain interested in Chemical, Biological, Radiological and Nuclear (CBRN) materials, however alternative methods of attack such as employing firearms or conventional explosive devices remain far more likely. Historical use has been in closed densely occupied structures (underground, buildings) or targeted at specific individuals. The Proposed Development is unlikely to be a target for this type of event due to the low number of exposed targets vulnerable to malicious attacks. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Malicious Attacks	Transport systems	Potential systems would include (but are not limited to) railways, buses, passenger ferries, cargo vessels and aircraft. The Proposed Development is unlikely to be a target for this type of event due to the low number of exposed targets vulnerable to malicious attacks. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Malicious Attacks	Crowded places	The Proposed Development does not fall within the definition of a crowed place, i.e. pedestrian routes and other thoroughfares as well as sports arenas, retail outlets and entertainment spaces. The Proposed Development is unlikely to be a target for this type of event due to the low number of exposed targets vulnerable to malicious attacks. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Malicious Attacks	Cyber	Cyber-attacks occur almost constantly on key national and commercial electronic information, control systems and digital	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			industries. The Proposed Development is not considered to be more vulnerable to cyber-attacks as the UK government ensures cyber resilience through the 'Government Cyber Security Strategy (2022 - 2030)' and 'National Cyber Strategy' comprising various aspects including detection and management of malicious attacks, and mitigating the impacts caused by these attacks. In addition, the risk will be no greater than the risk associated with the existing hospital. Therefore, this MA&D event type has been scoped out from further assessment.	
Technological or Manmade Hazards	Malicious Attacks	Infrastructure	Terrorists in the UK have previously attacked, or planned to attack, national infrastructure. Attempts were made to attack electricity substations in the 1990s. Bishopsgate, in the City of London, was attacked in 1993 and South Quay in London's Docklands in 1996. These attacks resulted in significant damage and disruption but relatively few casualties. The Proposed Development would have minimal impact on local infrastructure or be considered a high-profile attack. In addition, the risk will be no greater than the risk associated with the existing hospital. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Engineering accidents and failures	Bridge failure	There are no bridges or bridge works proposed as part of the Proposed Development, and there are no bridges within the Study Area. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Engineering accidents and failures	Flood defence failure	There are no rivers or streams within 1km of the Proposed Development. Hence, the Proposed Development does not benefit from flood defences or flood storage areas. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Engineering accidents and failures	Mast and tower collapse	There are no towers or masts in close proximity to the Proposed Development or being built as part of the Proposed Development.	No

MA&D Group	MA&D Category	MA&D Type	Basis of Decision to Scope In/Out	Scope In?
			Therefore, this MA&D event type has been scoped out from further assessment.	
Technological or Manmade Hazards	Engineering accidents and failures	Property or bridge demolition accidents	The Proposed Development involves demolition works to take down existing hospital buildings and structures. The risks of accidents occurring during these works would be taken into account by the appointed contractor and considered as part of their detailed methodology and risk assessments in advance of these works as required under the Construction Design Management Regulations 2015. Surveys would be undertaken prior to the demolition of properties and structures to confirm whether any potential harmful substances (e.g. asbestos) are present, and to determine the risk to people. Therefore, this MA&D event type has been scoped out from further assessment.	No
Technological or Manmade Hazards	Engineering accidents and failures	Tunnel failure/fire	There are no tunnel structures proposed as part of the Proposed Development or within the Study Area. Therefore, this MA&D event type has been scoped out from further assessment.	No

To summarise, all of the MA&D types have been scoped out from further assessment in the ES.

Potential Impacts

The assessment did not identify any MA&D event types to which the Proposed Development may be vulnerable during the construction or operational and maintenance phases.

Assumptions and Limitations

To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- The design of the Proposed Development will be subject to relevant hazard identification studies and actions identified will be integrated into the final design, to reduce risks to ALARP;
- The construction phase of the Proposed Development will be managed through the implementation of the construction phase plan required under the CDM Regulations 2015 and a CoCP;
- The Proposed Development is being designed, and its implementation guided by other industry standards and codes, many of which are mandatory. These require infrastructure and systems to be designed so that risks to people and the environment are either eliminated or reduced to levels that are ALARP;
- Environmental effects associated with unplanned events that do not meet the definition of a MA&D (e.g. minor leaks and spills that may be contained within the construction sites) are addressed in other environmental aspect chapters as appropriate and not in this chapter; and
- It is recognised that the management framework for the Proposed Development is not fully defined at this stage; however, a presumption of standard practice and regulatory compliance within the adopted management framework has been assumed and will be developed following the appointment of the principal contractor.

References

British Geological Survey (2020), '*Geo Index Onshore*'. Available online at: http://mapapps2.bgs.ac.uk/geoindex/home.html.

Centre for Research on the Epidemiology of Disasters (2009), '*The International Disaster Database*'. Available online at: https://www.emdat.be/.

Chemical and Downstream Oil Industries Forum (2013), '*Guideline - Environmental Risk Tolerability for COMAH Establishments'*. Available online at: https://www.sepa.org.uk/media/219154/cdoif_guideline__environmental_risk_assessment_v2.pdf.

Department for Environment, Food & Rural Affairs (2011), '*Guidelines for Environmental Risk Assessment Green Leaves III*'. Available online at: https://www.gov.uk/government/publications/guidelines-for-environmental-risk-assessment-and-management-green-leaves-iii.

Google (2024), Aerial and street view maps covering Study Area. Available online at: https://www.google.com/maps/.

Health and Safety Executive (2024), '*Planning Advice Web App'*. Available online at: https://pa.hsl.gov.uk/.

Health and Safety Executive (2024), '*COMAH 2015 Public Information Search'*. Available online at: https://notifications.hse.gov.uk/COMAH2015/Search.aspx.

HM Government (1974), '*Health and Safety at Work etc. Act 1974*'. Available online at: https://www.legislation.gov.uk/ukpga/1974/37/contents.

HM Government (2025), '*National Risk Register 2025 edition'*. Available online at: https://assets.publishing.service.gov.uk/media/6787ea8e1124a2c3ceb646bf/National_Risk_Register_2025.pdf.

HM Government (2015), '*The Construction (Design and Management) Regulations 2015*'. Available online at: https://www.legislation.gov.uk/uksi/2015/51/contents/made.

HM Government (2017), '*The Town and Country Planning (Environmental Impact Assessment) Regulations 2017*'. Available online at: https://www.legislation.gov.uk/uksi/2017/571/contents.

Institute of Environmental Management & Assessment (2020), '*Major Accidents and Disasters in EIA: A Primer'*. Available online at: https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer.

International Federation of Red Cross and Red Crescent Societies (2008), '*What is a Disaster?*' Available online at: http://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/what-is-a-disaster/.

International Standards Organisation (2018), '*ISO 31000:2018 Risk management – Guidelines*'. Available online at: https://www.iso.org/standard/65694.html.

Prevention Web Europe (2005), '*Tsunamis Hazard Map'*. Available online at: https://www.preventionweb.net/english/professional/maps/v.php?id=3831.

APPENDIX 7
PRELIMINARY LANDSCAPE AND VISUAL APPRAISAL

James Paget Hospital, Gorleston-on-Sea, Norfolk

Preliminary Landscape and Visual Appraisal

for

James Paget University Hospitals NHS Foundation Trust

Appendix 02: Figures

Design development | Rev 03 | December 2024

To be printed at A3 in colour and duplex

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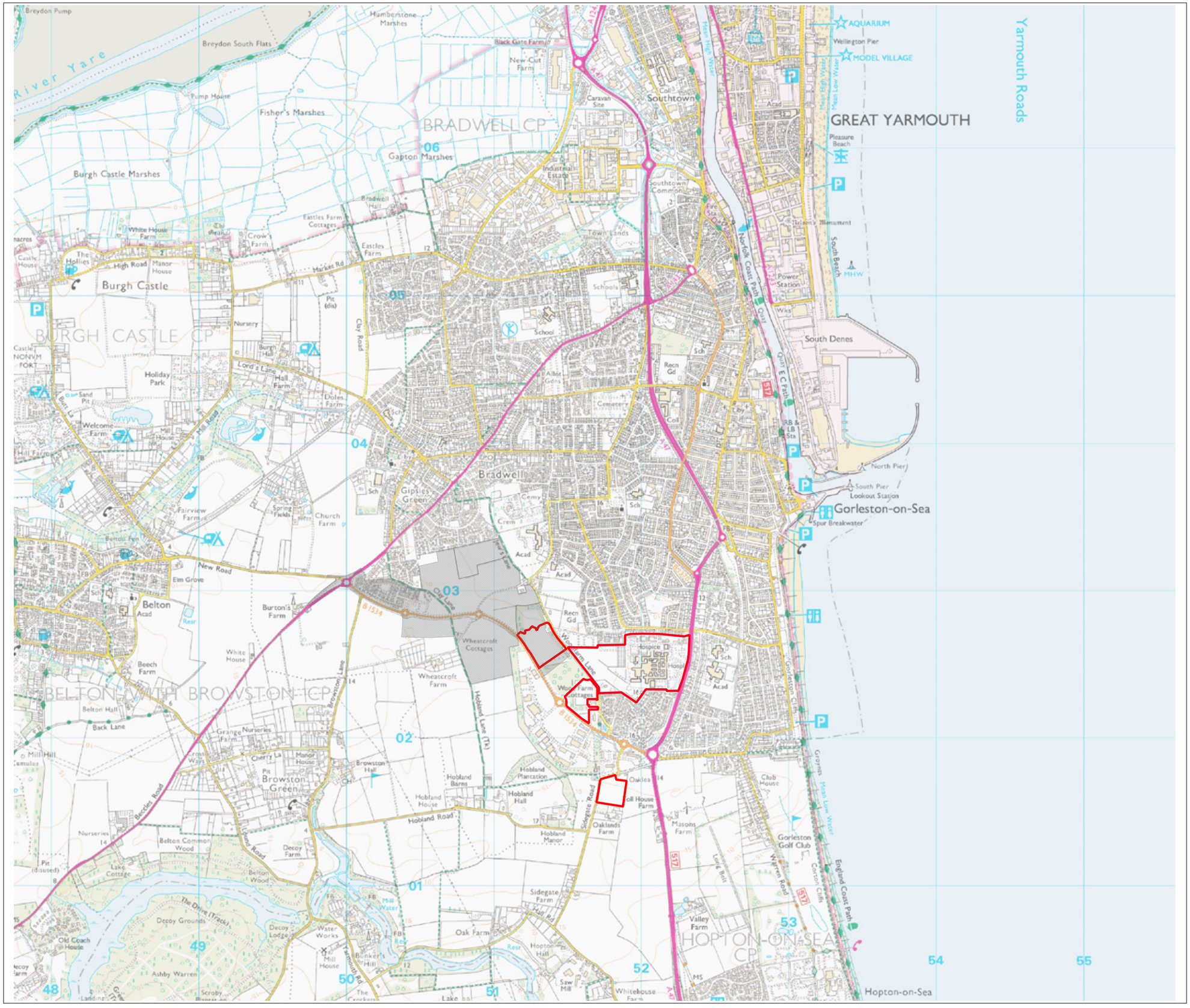

Key

- Site boundary
- Development site

E23816 James Paget Hospital

Site Location

Figure 01

Scale: 1:25,000 at A3

December 2024

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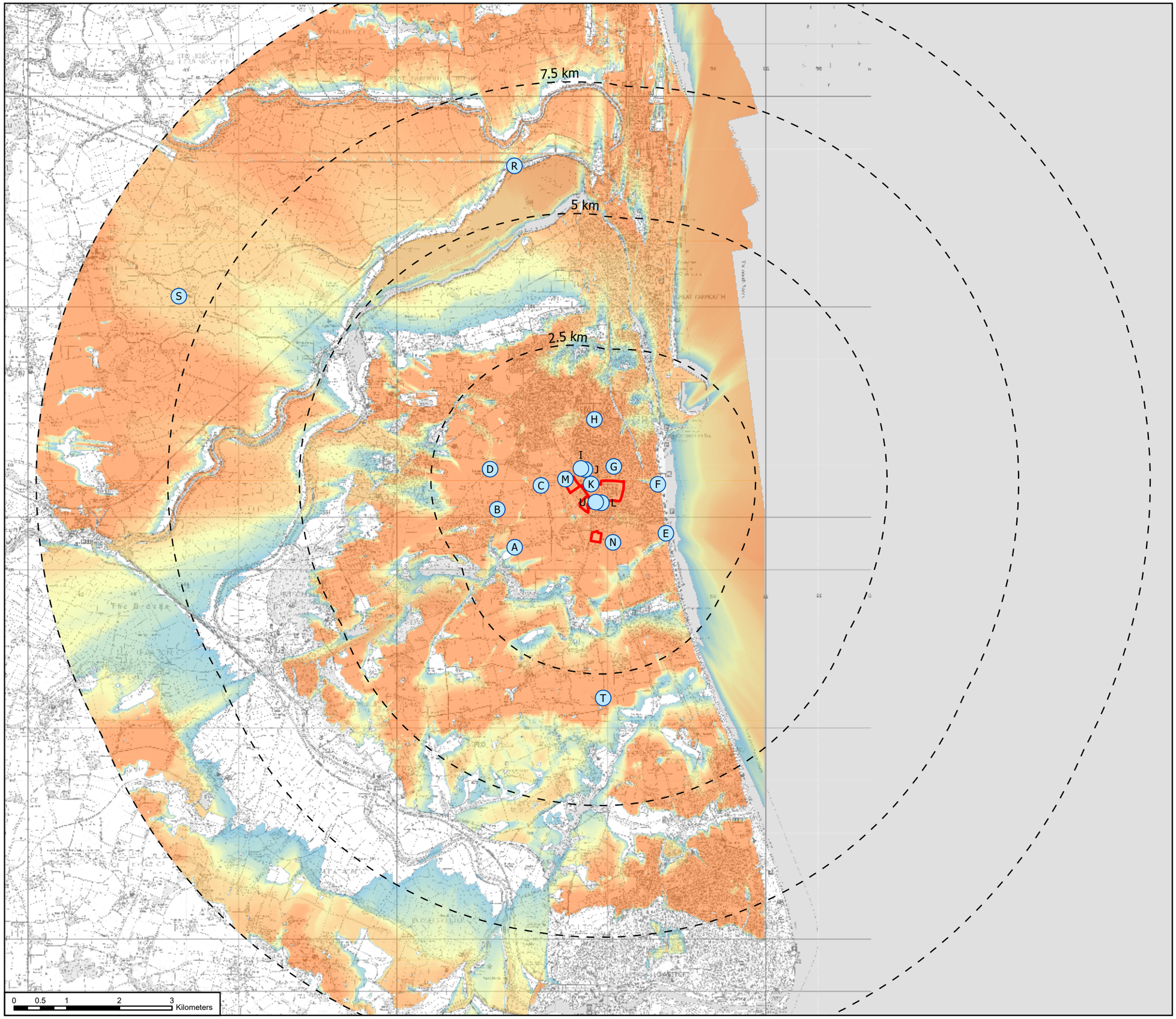

Key

- Site Boundary
- 1km radii steps from the Site Boundary

Zone of Theoretical Visibility

- Greatest visibility of proposals (100% of proposals visible)
- Approx. 50% of proposals visible
- Lowest visibility of proposals (~1% of proposals visible)

Visibility calculated using 1m resolution LiDAR data (Contains public sector information licensed under the Open Government Licence v3.0.).

ZTV calculated using ArcGIS Pro 3.2.2 Viewshed tool with observer eye height 1.6m and varying building heights obtained from Perkins&Will; Drawing: JPUH Parameter Plan - Maximum Development Heights; Sheet number: JPU-PWA-ZZ-ZZ-DR-A-0013. Hospital building at 50m high and Surrounding area at 30m high. Corrections for earth curvature and atmospheric refraction applied.

The areas shown identify the maximum extent of theoretical visibility taking into account topography. Other above ground features not captured within the LiDAR DTM may further limit theoretical visibility. Actual visibility on the ground may therefore be less than that suggested by this map.

E23816 - James Paget Hospital, Gorleston

Zone of Theoretical Visibility - Bare Ground
Hospital at 50m + Surrounding Area at 30m

Figure 02

Scale: 1:70,000
December 2024
Drawn: BV Checked: SN

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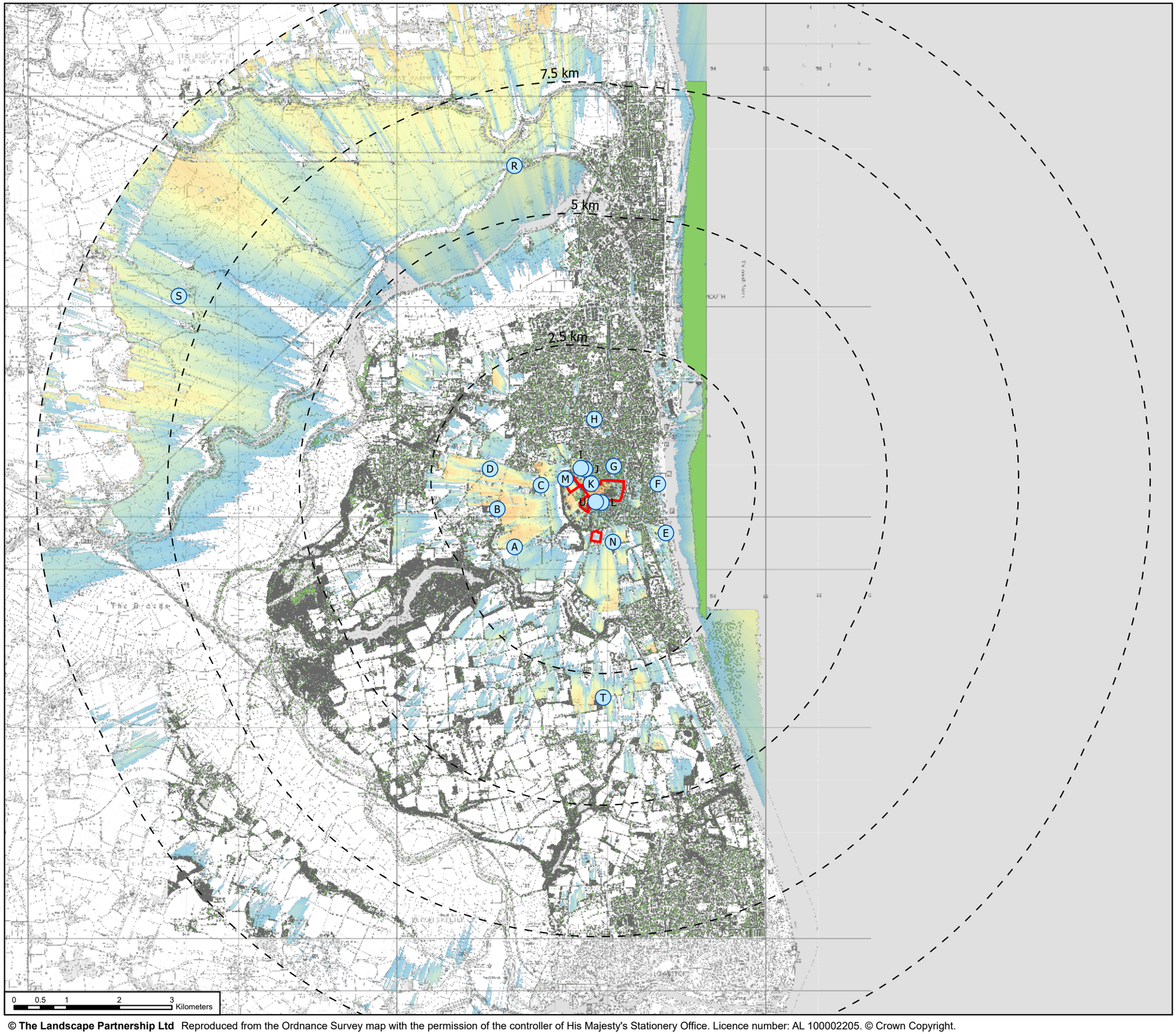

Key

- Site Boundary
- 1km radii steps from the Site Boundary

Screening obstacles

- <3m height
- >3m height

Zone of Theoretical Visibility

- Greatest visibility of proposals (100% of proposals visible)
- Approx. 50% of proposals visible
- Lowest visibility of proposals (~1% of proposals visible)

Visibility calculated using 1m resolution LiDAR data (Contains public sector information licensed under the Open Government Licence v3.0.).

ZTV calculated using ArcGIS Pro 3.2.2 Viewshed tool with observer eye height 1.6m and varying building heights obtained from Perkins&Will; Drawing: JPUH Parameter Plan - Maximum Development Heights; Sheet number: JPU-PWA-ZZ-ZZ-DR-A-0013. Hospital building at 50m high and Surrounding area at 30m high. Corrections for earth curvature and atmospheric refraction applied.

The areas shown identify the extent of theoretical visibility taking into account topography and screening obstacles, such as buildings and vegetation. Other above ground features not captured within the LiDAR DSM may further limit theoretical visibility. Actual visibility on the ground may therefore differ from that suggested by this map.

E23816 - James Paget Hospital, Gorleston

Zone of Theoretical Visibility - Screening
Hospital at 50m + Surrounding Area at 30m

Figure 03

Scale: 1:70,000
December 2024
Drawn: BV Checked: SN

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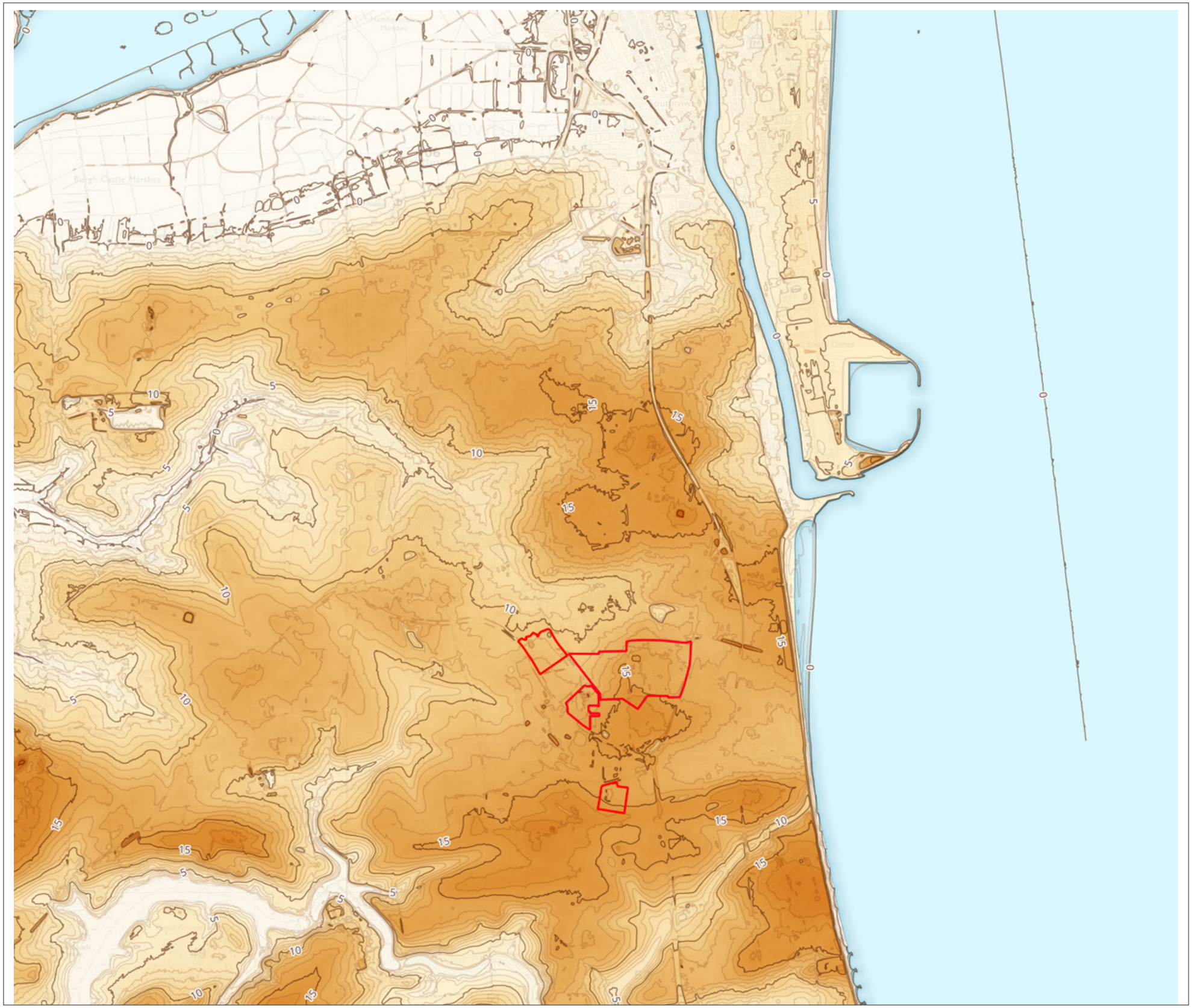

E23816 James Paget Hospital

Topography

Figure 04

Scale: 1:25,000 at A3

December 2024

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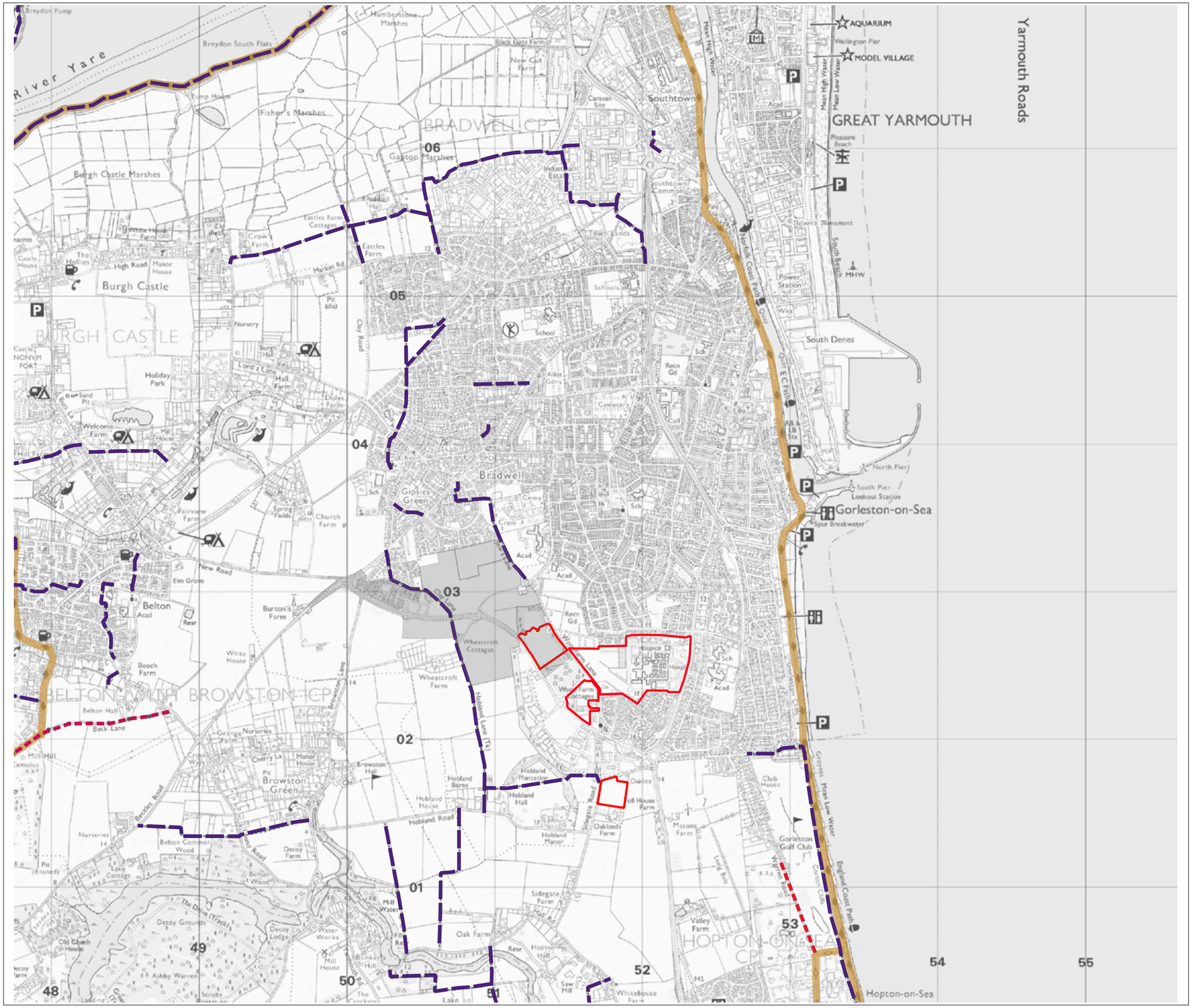

Key

- Site boundary
- Development site
- Public Right of Way
- Long distance path
- Traffic-free cycle route

E23816 James Paget Hospital
Public Rights of Ways and Long distance paths

Figure 05

Scale: 1:25,000 at A3

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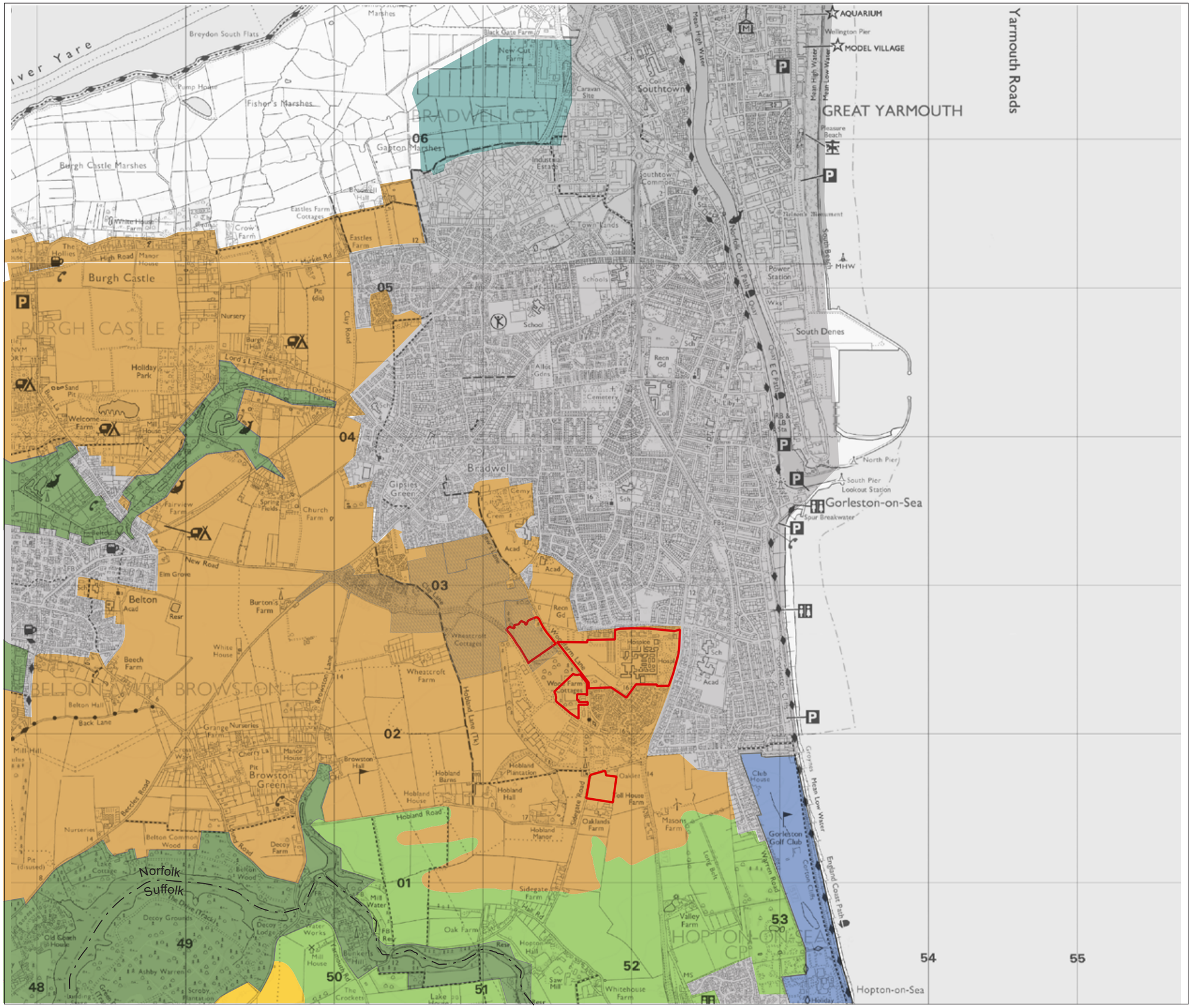

Key

- Site boundary
- Development site

Great Yarmouth and Waveney Landscape Character Assessment (2008)
Landscape Character Types & Areas

A: Rural Wooded Valleys
- A1 Waveney Rural Wooded Valley

C: Broads River Valley
- C1 Yare Valley - Great Yarmouth Edge

E: Dunes, Coastal Levels & Resorts
- E2 Great Yarmouth Coastal Strip

G: Settled Farmland
- G4 Hobland Settled Farmland
- G5 Somerleyton Settled Farmland

H: Tributary Valley Farmland
- H1 Blundeston Tributary Valley Farmland

Urban (unassessed)

E23816 James Paget Hospital

Landscape character

Figure 06

Scale: 1:25,000 at A3

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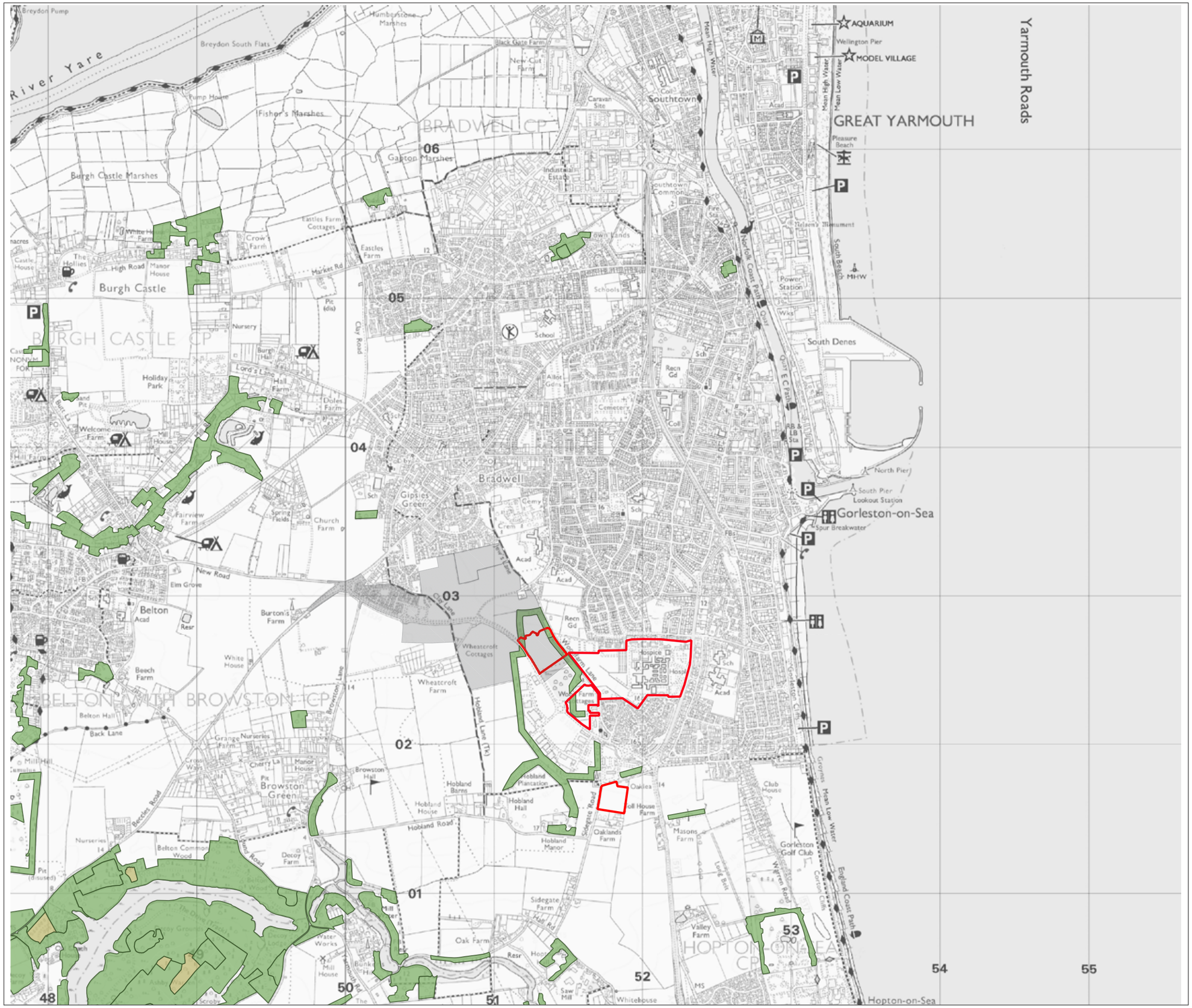

Key

- Site boundary
- Development site
- Woodland
- Non Woodland

E23816 James Paget Hospital

Landscape feature

Figure 07

Scale: 1:25,000 at A3

December 2024

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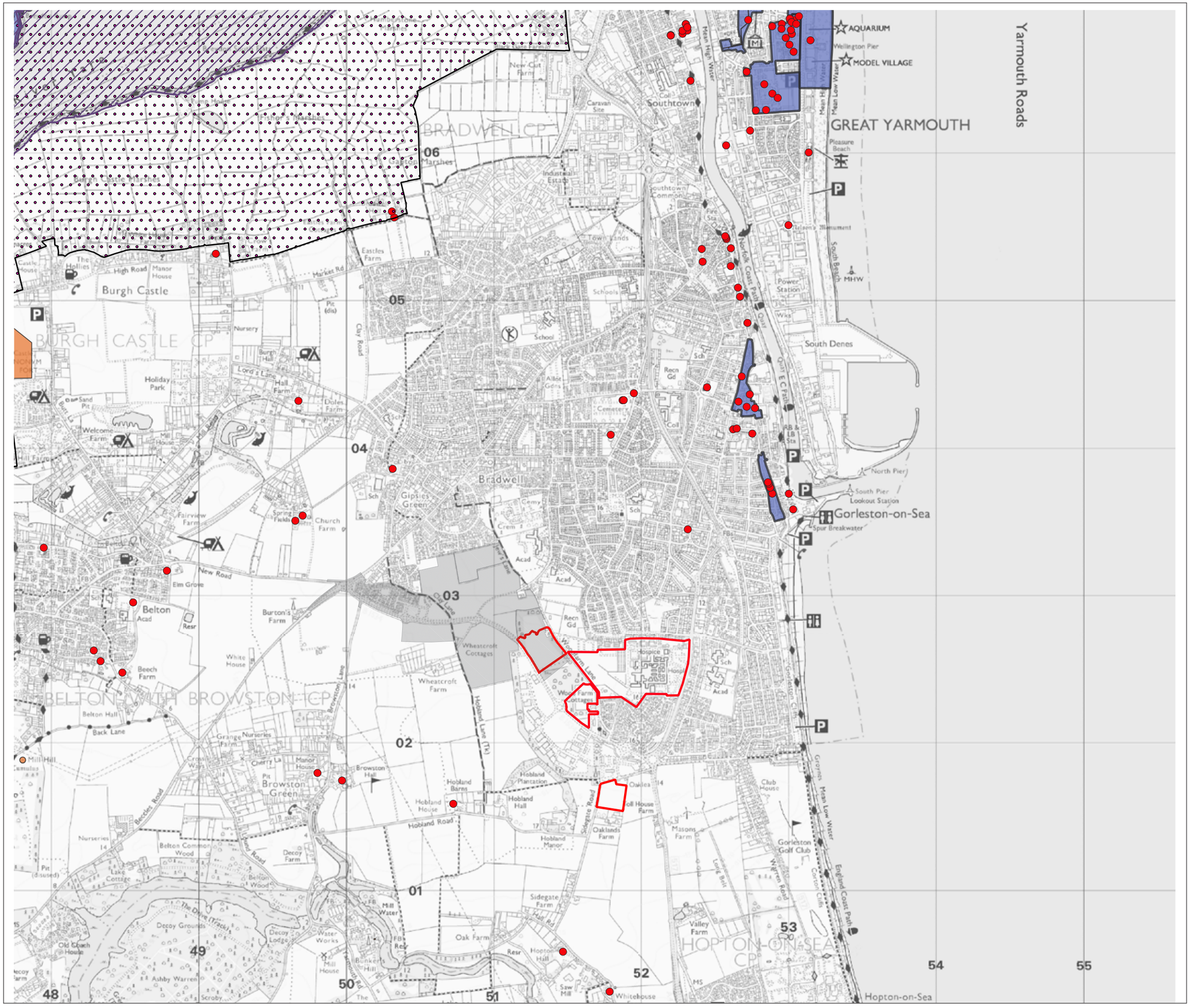

Key

- Site boundary
- Development site
- Sites of Special Scientific Interest (SSSI)
- The Norfolk and Suffolk Broads
- Conservation Area
- Scheduled Monuments
- Listed Buildings

Data sources

Natural England
Contains public sector information licensed under the Open Government Licence v3.0

Historic England
© Historic England 2023. Contains Ordnance Survey data © Crown copyright and database right 2023.
The Historic England GIS Data contained in this material was obtained on 11.01.23. The most publicly available up to date Historic England GIS Data can be obtained from HistoricEngland.org.uk.

E23816 James Paget Hospital

Landscape-related designations

Figure 08

Scale: 1:25,000 at A3

December 2024

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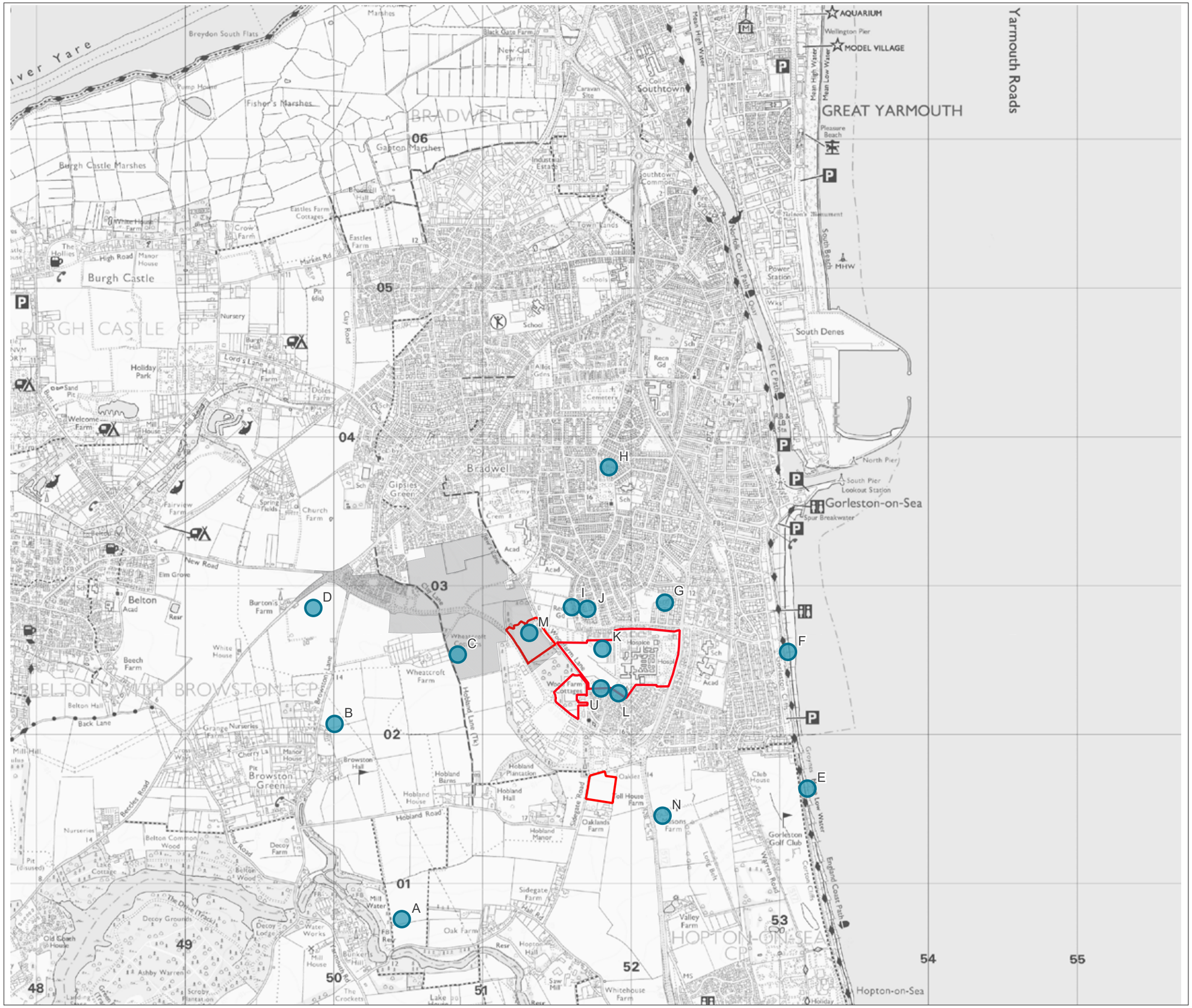

Key

Site boundary

Development site

A Viewpoint location

Note: Viewpoints O, P and Q not used.

E23816 James Paget Hospital

Viewpoint Location Plan

Figure 09

Scale: 1:25000 at A3

December 2024

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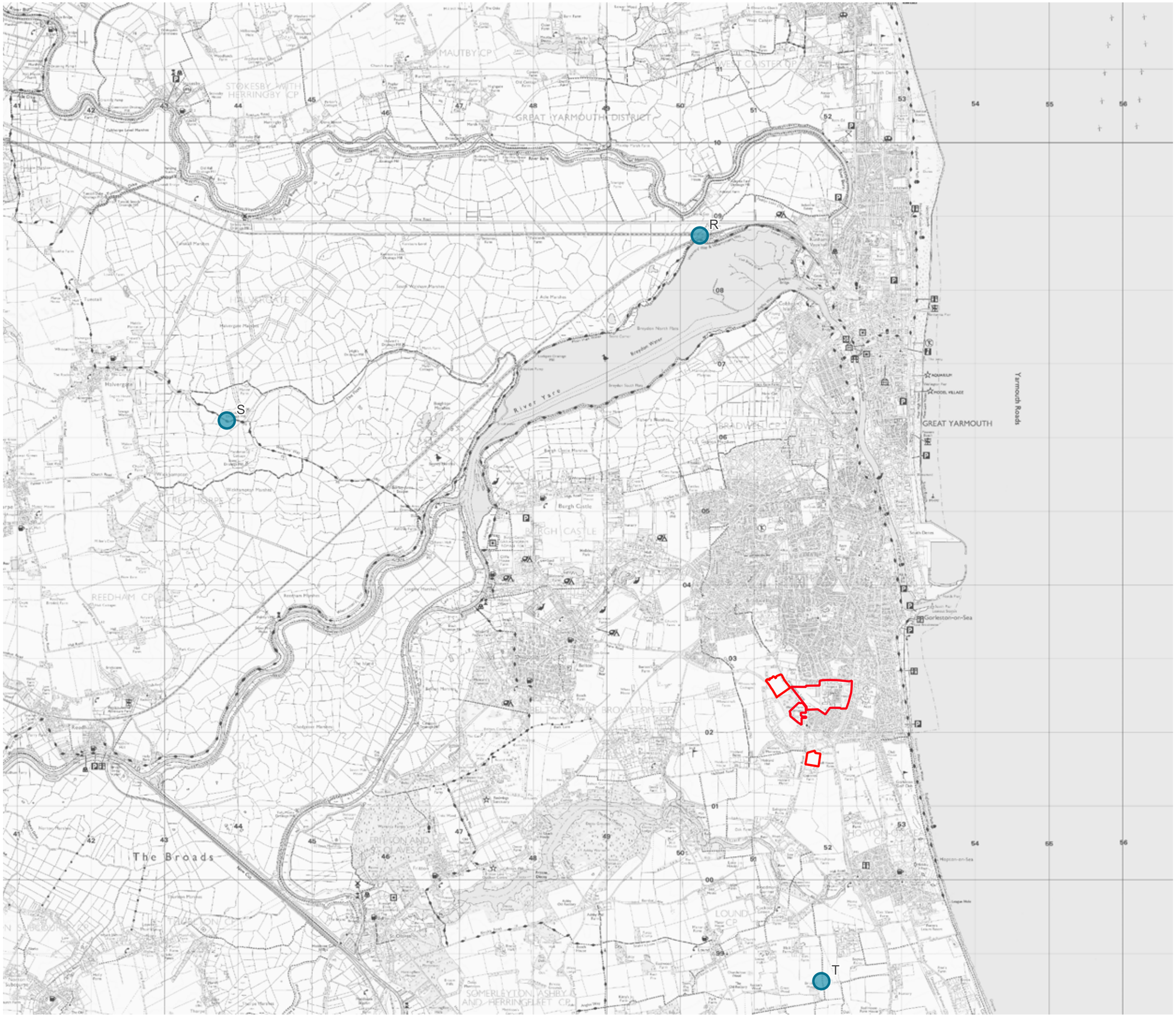

Key

Site boundary

A Viewpoint location

Note: Viewpoints O, P and Q not used.

E23816- James Paget Hospital

Viewpoint Location Plan

Figure 10

Scale: 1:50.000 at A3

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APPENDIX 8
LANDSCAPE AND VISUAL METHODOLOGY

James Paget University Hospitals,
Gorleston-on-Sea, Norfolk

LVIA Scoping Report

for

James Paget University Hospitals
NHS Foundation Trust

Appendix 01: Methodology

Scoping | Rev 01 | July 2024

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1 Scope and process

1.1 Introduction

1.1.1 Landscape and Visual Impact Assessment (LVIA)) involves a combination of quantitative and qualitative considerations within a framework that allows for structured, informed and reasoned professional judgment. The Guidelines for Landscape and Visual Impact Assessment, Third Edition[1], (GLVIA3) forms the current nationally recognized professional guidance tool for LVIAs. It describes LVIA as:

> *… a tool used to identity and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity.*

1.1.2 GLVIA3 reflects current legislation and professional experience secured over many years of undertaking landscape and visual assessments. This methodology follows the principles and guidance set out within GLVIA3 as part of the assessment process.

1.1.3 In defining *landscape*, GLVIA3 makes reference is made to the adopted definition agreed by the European Landscape Convention (Florence: Council of Europe 2000), which states that the landscape is *"an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"*. This definition includes the landscapes of towns and cities, i.e. townscapes, as well as seascapes.

1.1.4 Whilst the process of assessment is often referred to as a Landscape and Visual *Impact* Assessment, it is important to understand the difference between *impact* and *effect*. *Impact* is defined as the action being taken and *effect* as the change resulting from the action [GLVIA3, para 1.15]. The changes resulting from the implementation of the development form the principal consideration of this assessment and thus the word effect is mainly used. The two main components are:

- landscape effects – effects on the character and attributes of landscape as a resource in it is own right; and
- visual effects – effects on visual receptors and the general amenity of the view.

1.1.5 An assessment of the existing situation and the effects of the proposals is carried out in relation to the following geographical extents:

- national and regional scale landscape character;
- county and district scale landscape character and the local visual setting; and
- the site and more immediate landscape and visual setting.

1.1.6 The spatial scope of the LVIA covers a study area of approximately 2km radius from the site. This is based on the initial results of a desktop study reviewing location, topography and the nature of the

[1] Guidelines for Landscape and Visual Impact Assessment, the Landscape Institute and the Institute of Environmental Management and Assessment, 3rd Edition, April 2013

development, and defined the basis for the extent of the ZTV. This desk-based work was then verified as part of the field survey.

1.1.7 The likely effects of the proposed scheme are assessed in terms of the degree of change experienced during the construction process, on completion of the works in winter of the first year (year 1) and after a period of 15 years (year 15) in summer. Where the field survey and assessment were carried out in summer months, a correlation is made as to what the predicted effects would be in winter, and vice versa. An assessment in year 15 enables the effectiveness of any planting and other soft works mitigation measures proposed to be determined, since they would have had sufficient time to become established and deliver their intended objectives in a meaningful way. Between years 1 and 15, the proposed planting would be in the process of meeting these objectives and a correlation over this span of time can be made as to the extent to which this has been partially achieved. Beyond 15 years, trees can be expected to continue to grow to reach their mature height, and thus potentially provide increased mitigation in later years.

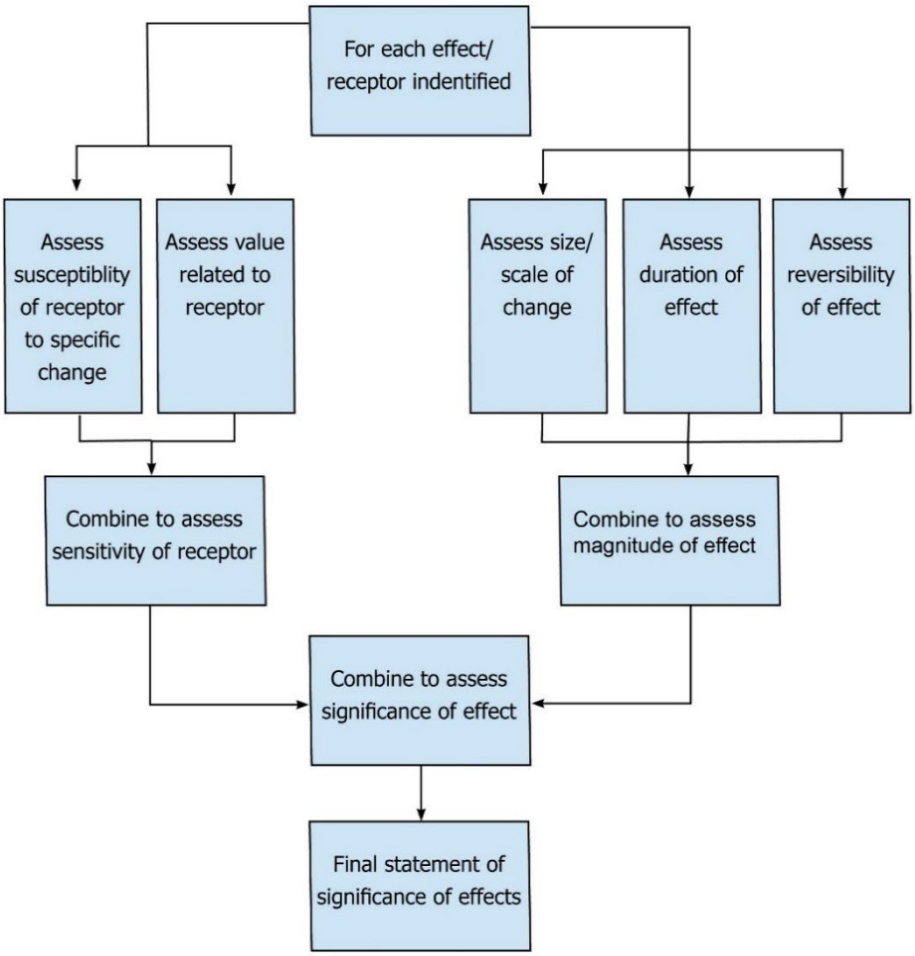

Figure 1 - Assessing the significance of effect[2]

1.1.8 Matrices are utilised to enable consistent and transparent judgements to be arrived at and for these to be easily understood by the reader. By this means, different levels of sensitivity and magnitude of change can be applied and be combined in order to define a significance of effect. The category levels and matrix combination outcomes set out in this methodology reflect the typical situation. However, there are occasions when it is not appropriate to apply these judgements in a rigid and formulaic manner, and the assessor may judge that it would be appropriate to apply a different category or combination outcome. This would primarily apply in the combining of sensitivity and magnitude used in Tables 7 and 14. Any deviation from the categories used in the matrices are explained in the main body of the report.

1.2 Viewpoint analysis and assessment

1.2.1 The extent of visual influence of the development is described in two stages.

1.2.2 Firstly, a desk-based analysis is undertaken using an OS Explorer plan to determine where landform is likely to prevent views and to identify the main areas of woodland that would act as a visual

[2] Guidelines for Landscape and Visual Impact Assessment, the Landscape Institute and the Institute of Environmental Management and Assessment, 3rd Edition, April 2013, Figure 3.5: Assessing the significance of effects

barrier. Google Streetview is also used as a further guide to determine the main areas where there may be views of the proposed development.

1.2.3 Secondly, field work is undertaken. This includes walking the site and observing locations beyond the site boundaries where the site and/or the proposed development may be visible from, and then checking these locations using publicly accessible means to further fine tune the likely visibility of the proposed development. To assist in the process, screening features are noted and features of known height within or adjacent to the site are used as visual reference points to determine the location of the site in views in and act as a scale reference. Other locations identified with the desk-based analysis as potential affording visibility are checked as part of the visual assessment. This leads to the defining of an approximate Zone of Visual Influence (ZVI) i.e. an area(s) from where it would be possible to view the proposed development.

1.2.4 To assist the reader, viewpoints are provided to demonstrate the range of available views experienced by a variety of visual receptors (people) at different geographical locations. GLVIA3 [para 6.19] refers to three types of viewpoint, which may be utilised within an LVIA or LVA.

- **Representative viewpoint** – *"selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ – for example, certain points may be chosen to represent the views of users of particular footpaths and bridleways"*. Where the viewpoint is not representative of a neighbouring visual receptor, and there would be different significant effects, this is stated within the text.
- **Specific viewpoint** – *"chosen because they are key and sometimes promoted viewpoints within the landscape, including for example specific local visitor attractions, viewpoints in areas of particularly noteworthy visual and/or recreational amenity such as landscapes with statutory landscape designations, or viewpoints with particular cultural landscape associations".*
- **Illustrative viewpoint** – *"chosen specifically to demonstrate a particular effect or specific issues, which might, for example, be the restrictive visibility at certain locations."* These are also used to illustrate particular site features, the extent of visibility from within the site from non-publicly accessible locations, or features that prevent views from certain locations.

1.2.5 A range of representative viewpoints are selected to assess the visual effects upon a range of visual receptor groups across a variety of different geographical locations, distances. Viewpoint locations are usually at publicly accessible locations and can include public rights of way, roads and public open space. Viewpoints are provided to help appreciate and then describe the views available to visual receptors at and around these locations, identify features within the view, define the location and extent of the site within the view, and to provide a visual record.

1.2.6 The assessment of effects upon the views available to visual receptors includes consideration of:

- the proximity of the visual receptor to the proposed development;
- the extent of visibility or proportion of the proposed development visible within the wider context of the view;
- the nature and complexity of the existing view and any changes that would affect the skyline;

- elements within the view that may detract from or add to its quality;
- the extent to which the proposed development would occupy the view, and whether it would be a framed view, glimpsed or panoramic view; and
- whether the view would be experienced from a specific fixed location or whether it would form part of a sequence of views when the viewer would be moving, and if from a fixed location, such as a window, whether the proposed development would form the central focus of the view or be part of a more oblique outlook.

1.2.7 A variety of visual receptors are assessed with a focus on those who are most likely to be concerned about changes to views.

1.2.8 In undertaking the assessment, other than the site, private property has not been accessed, as it is generally considered impracticable to seek approval to gain access to residential properties or other buildings to assess the effect on views from each window in a property or adjoining land. This would, in any case, form part of a Residential Visual Amenity Assessment which is a separate task and does not form part of an LVIA (Landscape Institute TGN 02/2019). Where it is necessary to assess the view from private property, assessment is based on the nearest publicly accessible location, which will usually be a road or public right of way, or on views within the site looking outwards. Professional judgement is used to extrapolate what the likely effect on views would be from windows, making allowances for changes in height, e.g. from a first-floor window.

1.3 Photography and site work

1.3.1 Details of the camera used, approach to undertaking the photography, and the preparation of visualisations, are set out in Section 5.

1.3.2 The date and weather conditions at the time the photographs were taken is detailed within the main report and within the details included for any visualisations. Wherever possible, photographs are taken with the sun behind or to one side of the view to prevent over-exposure and a high contrast of photographs, or features appearing in shadow.

2 Criteria and categories: landscape receptors

2.1 Overview

2.1.1 The assessment includes a description of the existing landscape elements including topography, vegetation, landform, land uses, and landscape infrastructure, and provides an assessment of the effects of the development upon the character and attributes of the landscape. The national landscape character areas provide an initial high-level basis for setting the scene and to understand the broad scale of the landscape at the national context. However, the primary source for assessing landscape character is based on district-scale character assessments or similar. The key characteristics that form the landscape are identified, including the individual elements, aesthetic aspects and perceptual aspects, and their condition is identified. An assessment of effects on the site itself is made, predominantly in relation to change/loss of the individual landscape features.

2.1.2 In determining the significance of effects on the landscape, sensitivity is determined for each landscape feature within the site, landscape character area, or landscape type that would be affected, and this is combined with the magnitude of change arising from the proposed development. The criteria and categories used to determine the effects on landscape, are set out below.

2.2 Landscape sensitivity (the nature of the receptor)

2.2.1 This in part is based on the ***value*** of the landscape receptor. This includes considerations such as landscape quality/condition; landscape fabric and rarity; scenic quality; wildlife, heritage and cultural interest; recreation value; and perceptual aspects. The presence of a landscape designation can help to identify value and reasons for a designation are usually established in a supporting study. Landscapes or features without any formal designation may also express characteristics that are valued locally. Where there is no supporting evidence base, details regarding sensitivity should typically be derived from landscape character assessments.

Table 1: Value of Landscape Receptor (landscape sensitivity factor No.1)

Value of landscape receptor	Criteria
Very High	**Character:** areas with international or national landscape designations, i.e. National Parks and Areas of Outstanding Natural Beauty or international heritage designations, e.g. World Heritage Sites, and their landscape setting, and displaying good condition and/or a strong strength of character. Very high value may occasionally exist in landscapes with no such designation, where the Landscape Character Assessment or Historic Environment Assessment indicates an area as being of particularly high sensitivity or of international or national rarity. **Features:** where they form a very important contributory element of the landscape, which have particular historical or cultural reference, or are distinctive or rare and typically of good condition.
High	**Character:** Landscape Character Assessments that identify an area as being of high sensitivity, e.g. good condition and/or strong strength of character or of particular local value. Areas with local landscape designations may indicate a High value, but weight should also be given to the Landscape Character Assessment to determine the specific value. **Features:** where they form an important element of the landscape and a major contribution to the character of the landscape. Features that play an important role in the local visual and amenity of the area, are typically of good condition, and likely to be of historical or cultural relevance to the locality.
Medium	**Character**: landscape type or area identified as medium sensitivity (e.g. having a moderate condition and/or strength of character) including judgements within relevant Landscape Character Assessments as of medium sensitivity. The landscape is likely to exhibit some damage or deterioration but may have some individual features of local rarity or value.

Value of landscape receptor	Criteria
	Features: where they form a notable feature in the landscape but do not form an important or key characteristic. Alternatively, where the feature is an intrinsic element of the landscape but is in poor condition. Features that contribute some value to the visual and amenity aspect of the locality and provide some relevance to the historical or cultural context of the landscape.
Low	**Character:** landscape type or area that is identified as having low sensitivity (e.g. poor condition and/or weak strength of character). Landscapes that typically illustrate clear indication of damage, deterioration, and limited visual cohesion. **Features:** where they form an intrusive element that is unlikely to be valued or that provide a limited contribution to the character and local visual and amenity value. The feature may be of such poor condition that it has lost its ability to contribute effectively to the character of the landscape. It is likely that the feature has little historical or cultural relevance.

2.2.2 ***Susceptibility to change*** assesses the relative ability of the landscape to accommodate the changes that would result from different types of development. This is an integral element of the landscape assessment but one that can only be judged in the context of the generic type of development being proposed. However, it is not necessary to understand the specifics of the development to make this judgement and thus susceptibility to change can be considered as part of the baseline assessment. Susceptibility to change will, in part, relate to the features and characteristics displayed within the landscape type or area: the relative extent of enclosure and openness, the presence of similar development within or adjacent to the landscape type or area, condition/quality, and the ability to meet landscape planning policies and strategies. Where available, reference is made to judgements made in landscape character assessments as well as site-based judgements. It is particularly important to make this judgement in the context of the site, i.e. determining the relative presence of those aspects that are evident within the proximity of the site.

Table 2: Landscape susceptibility to change (landscape sensitivity factor No.2)

Susceptibility of landscape receptor to change	Criteria
Very High	A very limited ability of the landscape to accommodate development of the type proposed. Features particularly susceptible to change from development.
High	A fairly limited ability of the landscape to accommodate development of the type proposed. Features often susceptible to change from development.
Medium	A moderate ability of the landscape to accommodate development of the type proposed. Features likely to have some susceptibility to change from development.

Susceptibility of landscape receptor to change	Criteria
Low	A well-defined ability of the landscape to accommodate development of the type proposed. Features have little susceptibility to change from development.

2.2.3 The two aspects of susceptibility to change and value are combined to create an overall judgement of sensitivity as follows.

Table 3: Landscape sensitivity matrix (combination of landscape sensitivity factors Nos.1 and 2)

Criteria		Susceptibility			
		Very High	High	Medium	Low
Value	Very High	Very High	Very High	High	Medium
	High	Very High	High	High	Medium
	Medium	High	High	Medium	Low
	Low	Medium	Medium	Low	Very Low

2.3 Magnitude of landscape effect

2.3.1 The magnitude of effect of the development on each of the landscape features, or landscape character types or areas, is assessed on the basis of three factors: size or scale of change, geographical influence, i.e. extent, and duration and reversibility, which are combined to provide an overall judgement of magnitude.

2.3.2 The ***size or scale of change*** is based on the following professional judgement and site-based assessment.

Table 4: Landscape: size or scale of change (landscape magnitude of change factor No.1)

Size/scale of change	Criteria
Very High	The proposals would constitute a very major change to the feature or key characteristics and attributes of the landscape type or area, resulting in total loss or permanent alteration to existing landscape features and forming a dominant new feature in the landscape, such that post development the baseline situation would be fundamentally changed.
High	The proposals would constitute a major change to the feature or key characteristics and attributes of the landscape type or area, resulting in major loss or permanent alteration to existing landscape features and forming a prominent new feature in the landscape, such that post development the baseline situation would be substantially changed.

Size/scale of change	Criteria
Medium	The proposals would constitute a noticeable change to the feature or key characteristics and attributes of the landscape type or area, resulting in a conspicuous loss or alteration to existing landscape features and forming a new feature in the landscape, such that post development the baseline situation would be noticeably changed.
Low	The proposals would constitute a minor change to the feature or key characteristics and attributes of the landscape type or area, resulting in limited loss or alteration to existing landscape features and forming a minor new feature in the landscape, such that post development the baseline situation would be largely unchanged despite discernible differences.
Very Low	The proposals would constitute little discernible change to the feature or key characteristics and attributes of the landscape type or area, resulting in no loss or permanent alteration to existing landscape features and forming a barely discernible new feature in the landscape, such that post development the baseline situation would be fundamentally unchanged with barely perceptible differences.

2.3.3 ***Geographical influence*** determines the extent of the local landscape type affected by the proposed development.

Table 5: Landscape: geographical influence (landscape magnitude of change factor No.2)

Geological influence	Criteria
Very High	Effects that would be experienced over an extensive portion of the feature or at district level for a landscape character area, where this would likely have an evident effect at the national level of landscape character.
High	Effects that would be experienced over large parts of a feature or landscape character area.
Medium	Effects that would be experienced over a moderate extent of a feature or landscape character area.
Low	Effects that would be limited to a localised area and small proportion of the overall feature or landscape character area.
Very Low	Effects that would be limited to a very restricted extent, sufficient that there would be little discernible influence on the feature or character of the landscape character area.

2.3.4 Magnitude is also affected by ***duration and reversibility***, as set out below:

Table 6: Landscape: duration and reversibility (landscape magnitude of change factor No.3)

Duration and reversibility	Criteria
High	Long-term development over 30 years and/or difficult to reverse.

Duration and reversibility	Criteria
Medium	Medium-term development (5 to 30 years) and/or moderately difficult to reverse.
Low	Short-term development 1 to 5 years and/or fully reversible.

2.3.5 The three aspects of magnitude are combined based on professional judgement, with greater weight being given to scale/size of change, into one of the following categories: **Very High**, **High**, **High**, **Medium**, **Low** or **Very Low**. **No Change** is used to define where there would be no effect to the receptor.

2.4 Significance of effect and nature of change

2.4.1 On the basis of the above, the following categories of significance of effect for landscape change are identified. **No Change** is used to define where there would be no effect to the receptor.

Table 7: Significance of effect on landscape receptors

Criteria		Sensitivity				
		Very High	High	Medium	Low	Very Low
Magnitude	Very High	Major	Major	Major-Moderate	Moderate	Minor
	High	Major	Major-Moderate	Major-Moderate	Moderate	Minor
	Medium	Major-Moderate	Major-Moderate	Moderate	Moderate-Minor	Negligible
	Low	Moderate	Moderate	Moderate-Minor	Minor	Negligible
	Very Low	Minor	Minor	Negligible	Negligible	Negligible

2.4.2 The nature of change of the effect is also identified, providing a judgement on whether the predicted effects would be beneficial, adverse or neutral on the basis of the following:

- **Adverse effects** - those effects that would, on balance, be damaging to the quality, integrity or key characteristics of the landscape receptor.
- **Beneficial effects** - those effects that would, on balance, result in an improvement in the quality, integrity or key characteristics of the landscape receptor.
- **Neutral effects** - those effects that would maintain, on balance, the existing levels of the quality, integrity or key characteristics of the landscape receptor. (A neutral effect may therefore arise where beneficial effects offset adverse effects or where the value judgement would consider the change to be different, but neither a deterioration nor an enhancement).

2.4.3 Where the LVIA forms part of an Environmental Impact Assessment (EIA), effects that are considered to be *Significant* in EIA terms, are those that create an effect of Major or Major-Moderate significance.

3 Criteria and categories: visual receptors

3.1 Overview

3.1.1 In determining the significance of effects on visual receptors, sensitivity to the type of development is determined for each visual receptor that would be affected and this is combined with the magnitude of change arising from the proposed development. The criteria and categories used to determine the effects on views, are set out below.

3.2 Visual sensitivity (the nature of the receptor)

3.2.1 The sensitivity of views is considered in relation to the person experiencing the view: the receptor. This in part will be based on the ***value*** that the receptor places on the view. This is considered on a collective basis, so will be influenced by the extent to which it is publicised, relative noteworthiness, e.g. clearly defined view or vista that is distinguished from other views, and the extent to which the view is utilised or enjoyed.

Table 8: Value of view (visual sensitivity factor No. 1)

Value of view	Criteria
High	Views from publicised vantage points and of regional and sub-regional value. Tourist attractions/historic estates/statutory heritage asset with a specific vista or focused views. Particularly noteworthy public views from national trails, National Parks or AONBs or statutory heritage assets, i.e. those with more than local value and which could be expected to be regularly experienced. Windows from residential properties specifically designed to take advantage of a particular view.
Medium	Locally known or valued viewpoints. Views from promoted public rights of way and areas of informal open space with clear evidence of regular use. Views from regularly used rooms or living space. Panoramic views, vista or other noteworthy views from active recreation areas or transport routes.
Low	Views that are not publicised and/or where there is relatively limited evidence of them being regularly experienced. Visually degraded locations. Views from small windows or likely non-main living spaces. Views of little noteworthiness from areas of active recreation or transport routes.

3.2.2 The ***susceptibility to change*** of the visual receptor will vary depending on the activity or use of the particular location and the extent to which the view is an important aspect of the activity or use. The following criteria are used to determine susceptibility to change.

Table 9: Susceptibility of visual receptor to change (visual sensitivity factor No.2)

Susceptibility of visual receptor to change	Criteria
High	Receptors experiencing views from: residential properties; areas of open space where informal recreation is the main activity (e.g. country parks and public open space); public rights of way; areas of recreational activity where the primary enjoyment comes from the view; and general views from heritage assets or attractions.
Medium	Receptors experiencing views from: areas of outdoor sport or active recreation where appreciation of views forms part of the experience (e.g. golf courses); footways along roads (pedestrians); roads (vehicular users and cyclists) and trains (rail passengers).
Low	Receptors experiencing views from: areas of active sport or play where the view does not form part of the experience (e.g. football, rugby, play equipment); and commercial premises and areas of employment (where the view has limited value in relation to the activity being undertaken. There may be specific locations where buildings and the type of employment has been designed to enhance the quality of working life, in which case a higher-level sensitivity would be applicable.

3.2.3 These two aspects are combined to create an overall judgement of sensitivity as follows:

Table 10: Visual sensitivity matrix (combination of visual sensitivity factors Nos. 1 and 2)

Criteria		Susceptibility			
		High	Medium	Low	
Value	High	Very High	High	Medium	
	Medium	High	Medium	Low	
	Low	Medium	Low	Very Low	

3.3 Magnitude of visual effect

3.3.1 The magnitude of effect of the Development on each view was assessed on the basis of three factors, size or scale of change, geographical influence (i.e. extent) and duration and reversibility, which are combined to provide an overall judgement of magnitude.

3.3.2 The ***size or scale of change*** is based on the following professional judgement and site-based assessment.

Table 11: Visual: size or scale of change (visual magnitude of change factor No.1)

Size/scale of change	Criteria
Very High	The proposed development would become the most dominant feature in the view and one that completely contrasts with the other existing features in the

Size/scale of change	Criteria
	view. The contrasting features of the development would be fully visible, such that post development, the baseline situation would be fundamentally changed.
High	The proposed development would constitute a major change to the view, forming a prominent new feature in the view that would noticeably contrast with other existing features in the view. The development would be predominantly visible such that post development the baseline situation would be substantially changed.
Medium	The proposed development would form a noticeable change to the view, forming a conspicuous new feature in the view that would partially contrast or harmonise with other features in the view. The contrasting features of the development would be partially visible such that post development the baseline situation would be noticeably changed.
Low	The proposed development would constitute a small change to the view, forming a minor new feature in the view that would largely integrate with its surroundings with little discernible change. The development could be experienced as a glimpsed or filtered view through vegetation and/or one at some distance relative to its scale, such that post development the baseline situation would be largely unchanged despite discernible differences.
Very Low	The proposed development would be a barely discernible change to the view. The development could be experienced as a very filtered view through vegetation or at considerable distance relative to scale, such that the baseline situation would be fundamentally unchanged with barely perceptible differences.

3.3.3 ***Geographical influence*** determines how far the effect would be experienced. The wider the geographical effect, the greater the magnitude of change.

Table 12: Visual: geographical influence (visual magnitude of change factor No.2)

Geological influence	Criteria
Very High	The development would affect all or nearly all of the view available to visual receptors and would form the primary focus of the view to the extent that it would be overwhelming. It is likely that the view would be experienced from a point within the site or very close to the site.
High	The development would affect a large extent of the view available to visual receptors and would likely lie at the centre of the view. It is also likely that the view would be experienced from a point close to the site or possibly in the site.
Medium	The development would affect a moderate extent of the view and would lie near the centre of the view or at a slightly oblique angle. It is likely that this would be a localised view.

Geological influence	Criteria
Low	The development would affect a small extent of the view and/or would be at a moderately oblique angle. It is likely that the development would be in the mid-distance of the view.
Very Low	The development would affect a very small extent of the view and and/or lie at a very oblique angle. It is likely that the development would be in the far distance of the view.

3.3.4 Magnitude is also affected by ***duration and reversibility***, as set out below.

Table 13: Visual: duration and reversibility (visual magnitude of change factor No.3)

Duration and reversibility	Criteria
High	Long-term development over 30 years and/or difficult to reverse.
Medium	Medium-term development (5 to 30 years) and/or moderately difficult to reverse.
Low	Short-term development 1 to 5 years and/or fully reversible.

3.3.5 The three aspects of magnitude are combined based on professional judgement, with greater weight being given to scale/size of change, into one of the following categories: **Very High**, **High**, **High**, **Medium**, **Low** or **Very Low. No Change** is used to define where there would be no effect on the receptor.

3.4 Significance of effect

3.4.1 On the basis of the above, the following categories of significance of effect for visual change are identified. **No Change** is also used to identify where there would be no effect on the receptor.

3.4.2 Table 14: Significance of effect on visual receptors

Criteria		Sensitivity				
		Very High	High	Medium	Low	Very Low
Magnitude	Very High	Major	Major	Major-Moderate	Moderate	Minor
	High	Major	Major-Moderate	Major-Moderate	Moderate	Minor
	Medium	Major-Moderate	Major-Moderate	Moderate	Moderate-Minor	Negligible
	Low	Moderate	Moderate	Moderate-Minor	Minor	Negligible
	Very Low	Minor	Minor	Negligible	Negligible	Negligible

3.4.3 The nature of change of the effect is also identified, providing a judgement on whether the predicted effects would be beneficial, adverse or neutral on the basis of the following:

- **Adverse effects** - those effects that are, on balance, damaging to the quality, integrity or key characteristics of the view experienced by the visual receptor.
- **Beneficial effects** - those effects that would, on balance, result in an improvement in the quality, integrity or key characteristics of the view experienced by the visual receptor.
- **Neutral effects** - those effects that would maintain, on balance, the existing levels of the quality, integrity or key characteristics of the view as experienced by the visual receptor. (A neutral effect may therefore arise where beneficial effects offset adverse effects or where the value judgement would consider the change to be different, but neither a deterioration nor an enhancement).

3.4.4 Where the LVIA forms part of an Environmental Impact Assessment (EIA), effects that are considered to be *Significant* in EIA terms, are those that create an effect of Major or Major-Moderate significance.

4 Criteria of other factors assessed

4.1.1 The assessment also considered the following aspects, as set out below.

- **Direct and indirect**: Direct effects that relate to changes on the site including re-contouring of landform, loss and addition of vegetation, removal or inclusion of built structures and surface treatments, etc. Direct effects would also be experienced where there are changes to the character of the landscape, where the proposed development would be physically located within a character area or type. Effects on views are always considered to be direct. Indirect

effects would occur where the character would be influenced by changes in a neighbouring landscape character area.

- **Seasonal variation and duration**: Due to the role that vegetation can play in preventing or limiting views or influencing the character of the landscape, the difference between winter and summer needs to be considered. This is considered by assessing impacts in winter (in the first year following completion) and in summer (after 15 years).

5 Visualisations

5.1 Photography

Camera equipment

5.1.1 Sony a7 Mark II digital, full frame, single lens reflex camera using a 50mm prime lens. The horizontal field of view in landscape format from a single frame shot is approximately 40 degrees. A tripod with bubble level is used, set to approximately 1.6m height, with a Manfrotto 338 QTVR Levelling Base used to ensure a level horizontal plane is established. A Manfrotto MH057A5 Virtual Reality and Pan Pro Head is also fitted to the tripod to prevent the effects of parallax. The camera is rotated in increments of 20^{o} to allow a reasonable proportion of overlap of photographs (i.e. approximately 50%) to create a join that is as accurate as possible. Exposure, shutter speed, film speed and white balance are kept the same for each panorama to ensure the same appearance for each photograph.

5.2 Site work

5.2.1 A handheld GPS device with a 1m to 5m accuracy is used to record the GB National Grid location of the viewpoint. To further assist with accurately identifying the location of the viewpoint, where possible, viewpoints are based on readily identifiable locations. Google Earth is then used to identify and check the location.

5.2.2 A photograph is taken of the tripod and camera to aid with identifying the location of the viewpoint and for future reference should there be a need to return to retake the photography.

5.3 Visualisation presentation

Introduction

5.3.1 The Type 1 and 3 visualisations are prepared in accordance with the Landscape Institute's Technical Guidance Note 06/19 Visual Representation of Development Proposals. InDesign is used to lay out the visualisations to the required sizes.

5.3.2 Each viewpoint includes the following images, and the relevant horizontal field of view (HFoV):

- A3 single frame image with a 39.6^{o} HFoV; and a
- A3 panorama for context with a 80^{o} HFoV.

5.3.3 Type 1 Annotated Photograph Visualisations are labelled to identify specific features and the location and extent of the site/development in the view.

Photo-stitching

5.3.4 The panoramic photographs are stitched together using an Adobe Photoshop plugin *Photomerge*.

Contextual information/metadata

5.3.5 Each viewpoint includes tabulated details regarding the location of the viewpoint, photography and presentation of the viewpoint. This includes the following: camera; lens; HFoV; VFoV; camera height; location; visualisation type, projection, enlargement; date and time of photography; distance to nearest site boundary or feature; eye level AOD; direction of view; coordinates expressed as easting and northings; and weather and light condition.

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