2 PROJECT DESCRIPTION

2.1 Introduction

2.1.1 This chapter provides a description of the proposed re-development of the Application Site and forms the basis for the environmental assessment provided in this Environmental Statement (ES). Further information can be found in the appendices to this chapter provided in Volume 3 of this ES.

2.1.2 The effects of the proposed development have been assessed throughout the ES based on the 'likely case'. A number of measures which would reduce or avoid adverse environmental effects arising have been included as part of the project design. Details of these measures are provided in this chapter and set out in each topic chapter. This chapter, together with the subsequent topic chapters, provide the data required to identify and assess the main and likely significant effects of the proposed development in accordance with Regulation 18 and Schedule 4 of the EIA Regulations.

2.1.3 This chapter provides a description of the Application Site and the key components of the proposed development, including an overview of the approach to construction.

2.2 The Site and Surrounding Area

Site Location

2.2.1 The Application Site is located at the National Data Centre site, Old Burderop Hospital on Brimble Hill, Wroughton. It is approximately 980 m from Wroughton, 1.2 km south of the outskirts of Swindon and 670 m from the M4 motorway. The location is shown on Figure 1.1. The Application site extends to 11.3 hectares (ha) however, the development area is approximately 5.53 ha.

2.2.2 The Application Site is located within the North Wessex Downs Area of Outstanding Natural Beauty (AONB). The AONB covers an area of approximately 1,730 km^2 and extends across the counties of Berkshire. Hampshire. Oxfordshire and Wiltshire. It is characterised by rolling chalk hills, downs, steep scarp slopes and river valleys. The underlying chalk geology and well-drained soils have created conditions for a wide variety of flowers and insects. The AONB also includes areas of archaeological significance with barrows and other prehistoric features present alongside Roman Roads and ancient tracks such as the Ridge way. The Application Site is immediately adjacent to the Burderop Woods Site of Special Scientific Interest (SSSI) which is a 47.96 ha area of wet ash-maple and pedunculate oak-hazel woodland, with a rich associated ground flora.

2.2.3 The Application Site is located within a rural setting, surrounded predominantly by countryside/recreational land, with some residential and industrial businesses located to the south and west. Trees and hedgerows are located on all boundaries of the site and interspersed within the central and northern areas of the site.

2.2.4 Burderop Park is located directly south of the Application Site. It is a private agricultural and sporting estate with a house and garden which are open to the public; limited commercial space and a converted barn used as an exhibition centre.

Geology and Topography

2.2.5 Published geology information from the British Geological Survey (BGS) shows that the ground conditions underlying the Application Site comprise Made Ground directly overlaying the bedrock of the West Melbury Marly Chalk Formation. The Chalk Formation is a grey/off-white, soft, marly

chalk and hard grey limestone. Beneath the Chalk at depth lies the Upper Greensand Formation comprising sand and sandstone, fine-grained silt, glauconitic and shelly. Soils at the site comprise freely draining lime rich soils over chalk or limestone.

2.2.6 Both the Chalk and Greensand are important groundwater resources: they are classified as Principal Aquifers and have a high groundwater vulnerability, however beyond the northern boundary of the Application Site the vulnerability reduces to medium-low. The closest potable abstraction to the Application Site is from the Wroughton Catchpits and is located over 1 km to the west. There are no Source Protection Zones within 2 km of the Application Site. The closest non-potable groundwater abstraction is approximately 730m south east and is used for general farming and domestic processes.

2.2.7 An intrusive investigation was undertaken at the Application Site in October 2020 which confirmed that the ground conditions align with the published geology. The thickness of Made Ground ranged from 0.15m to 3.20m, but in most locations was up to 1.25m. Groundwater was not encountered during the investigation.

2.2.8 The Application Site is generally flat: existing gradients vary across the site between 170 m and 178 m AOD, however in the north western area gradients are generally between ±4% slope and locally up to ±10% slope. No streams or watercourses pass through or are adjacent to the site.

Site History

2.2.9 The Application Site was used as the National Data Centre until July 2020 and comprises three buildings: two buildings in the north east (known as Gamma and Beta) and one is the south (known as Alpha). The western area of the Application site is largely undeveloped although a security building and a number of smaller structures are dotted around the site.

2.2.10 Prior to the construction of these buildings, the Application Site was formerly occupied by a military hospital, telephone exchange and office building. These buildings were demolished in the 1980s and early 1990s and replaced by the existing data centre buildings. The site history is presented in Table 2.1 below.

Table 2.1: History of the Application Site

Date	Description of Application Site	Description of Surrounding Land
1885 - 1886	The site is undeveloped land with trees in the central portion and a pond to the north east boundary.	Surrounding area is predominantly green land with adjacent land to north marked as Burderop Wood and area to the south east marked as Burderop Park.
1898 -1899	The site remains predominantly unchanged with minor earthworks (two locations) in the southern portion.	The surrounding area appears predominantly unchanged with a tank marked approximately 250m south east of the site.
1900	The site remains predominantly unchanged.	A chalk pit is shown approximately 70m east of the site.
1924	The site remains predominantly unchanged.	The tank to the south east of the site is now marked as Sewage tank.
1943	The site remains predominantly unchanged.	The chalk pit appears to have been infilled with non-water material.
1956	The site is now fully developed with buildings across much of the site; all of	Further commercial/industrial development has occurred to the south west of the site including an

	which appear to form part of Burderop Hospital.	electricity sub station and tank approximately 100m from the site. Also, a school is marked adjacent to the south east.
1969	Three tanks, two electricity substations and a water tower are now marked within the site boundary. It is not clear whether any underground tanks were previously present. The pond appears to be infilled and the earthworks are no longer shown.	The school appears to be demolished.
1985-1987	The site remains predominantly unchanged with minor demolition of small buildings across the site.	The buildings to the adjacent south west appear to be demolished.
1993	Burderop Hospital is no longer marked and the major buildings to the central portion of the site have been demolished. Two data centres are shown to the north east and south west.	The surrounding area appears predominantly unchanged.
2001	The site remains predominantly unchanged.	The surrounding area appears predominantly unchanged
2003	The site appears predominantly unchanged with a small pond marked to the central portion of the site.	The surrounding area appears predominantly unchanged.
2010-2020	The site remains predominantly unchanged.	The surrounding area appears predominantly unchanged.

Policy Context

2.2.11 The Application Site is located within the administrative area of Swindon Borough Council. The Swindon Local Plan was adopted in March 2015 and provides the development strategy to deliver sustainable growth up to the year 2026.

2.2.12 Policy SD2: Sustainable Development Strategy (criterion d) outlines that sustainable economic and housing growth will be delivered in the Borough through the duration of the plan. This provision takes the form of 119.5 ha of employment land (class B) split into 77.5 ha of additional employment land and 42 ha of existing allocations carried forward.

2.2.13 Policy EN1: Green Infrastructure Network highlights that in line with the Swindon Borough Green Infrastructure Strategy, developments are required to not only protect but also enhance green infrastructure assets. This includes aspects such as ecologically valuable trees hedges and woodland. This need is amplified by the site being in the North Wessex Downs AONB. Policy EN5: Landscape Character and Historic Landscape discusses that developments should not significantly affect the landscape in which it is situated.

2.2.14 Policy EN4: Biodiversity and Geodiversity focuses on the need for developments to avoid both direct and indirect negative impacts on biodiversity and geodiversity sites which includes allocated sites such as the Burderop Woods SSSI. Where feasible, developments should seek to not only protect biodiversity but also enhance it and provide local biodiversity net gain.

2.2.15 The Swindon Green Infrastructure Strategy is used to provide an approach to the creation and sustained management across Swindon and surrounding authorities. Section 3.3 discusses the

conservation of landscape heritage and local distinctiveness with particular emphasis placed on the conservation of these within the North Wessex Downs AONB. In addition, Burderop Woods SSSI is identified as being part of the River Ray Corridor and Sustrans Route 45, part of the wider Green Infrastructure Strategic Network. While largely inaccessible, conservation of the wood is deemed important owing to it being "*the largest and most significant ancient semi-natural woodland in Swindon Borough*".

2.2.16 The North Wessex Down AONB Management Plan sets out the objectives that can be applied to help conserve and enhance the nationally important landscape of the North Wessex Down AONB. It splits these objectives up into 8 Themes:

- Theme 1 Landscape;
- Theme 2 Rural Land Management;
- Theme 3 Biodiversity;
- Theme 4 Historic Environment;
- Theme 5 Natural Resources;
- Theme 6 Development;
- Theme 7 Communities; and
- Theme 8 Tourism, Leisure and Access.

2.2.17 In the context of the proposed development Themes 1, 3, 4 and 6 of the North Wessex Down AONB Management Plan are of particular importance. Within Theme 1: Landscape, it is summarised that one of the main issues facing the landscape character of the AONB is the "*intense pressure for development*". It is thought that this poses a threat to the character and quality of the area and needs careful consideration to protect the landscape character, while Theme 4 Historic Environment emphasises that there is a lack of knowledge regarding the importance of the broader historic environment of the AONB. Theme 3: Biodiversity highlights the risk of habitat fragmentation and uncertainties over future land use and the impact this could have on wildlife populations and opportunities for biodiversity net gain. Theme 6: Development discusses the potential for new development to result in a loss of rural character through the addition of features such as lighting, fencing and parking.

2.3 Project Description

Key Elements of the Proposal

2.3.1 The proposed development will comprise the following:

- A one storey replacement Data Centre building to include:
  - data hall, associated electrical and mechanical plant room, loading bay, maintenance and storage space, office administration area and screened plant and solar panel array at roof level;
- emergency backup generators and emissions stacks, diesel tanks and filling area;
- associated infrastructure including:
  - electrical switchroom;
  - a water sprinkler pump room and storage tanks;
  - a gatehouse/security building;
  - site access and internal access roads;

- hard and soft landscaping;
- a rainwater infiltration pond;
- cycle shelter;
- waste bin store;
- process water tank;
- MV room; and
- intermediate power supply.

2.3.2 The storage capacity of the infiltration pond based on a 1 in 100-year event with 40% climate change allowance is approximately 2,750 m^3 assuming no infiltration. This is based on infiltration rates from soakaway testing undertaken in the location of the proposed infiltration pond. The testing was in accordance with the Building Research Establishment (BRE) methodology set out in Digest 365: Soakaway Design (BRE, 2016). The infiltration rates are presented in the Ground Conditions Report Volume 3 Appendix 8.5 of this ES and have informed the drainage design philosophy (document reference 20305S-RPS-00_XX-RP-D-9605).

2.3.3 Buildings Beta, Gamma and Alpha will be demolished together with the existing ancillary buildings in order to accommodate the proposed replacement data centre. The existing data centre (comprising Alpha, Beta and Gamma and ancillary buildings) equates to a building area schedule of 9,665 m^2, the proposed replacement data centre would equate to a building area schedule of 9,632 m^2, a reduction of 33 m^2 or 0.3%.

Data Centre Building

2.3.4 The proposed replacement Data Centre building will be single storey and the parameters are set out in Table 2.1.

2.3.5 Internally the Data Hall layout is primarily driven by the process of cooling internal equipment during operation. Free Cooling is used as the primary means of cooling for the Data Hall. External air is drawn *via* the sides of the replacement Data Centre building before being distributed in the Data Hall. A high-level return plenum transfers the warmed air either to roof mounted plant to discard or recirculates the air to the cooling equipment depending on the seasonal cooling requirements of the building. During peak summer temperatures, the outside air cooling is supplemented by an evaporative cooling system.

Power Generation

2.3.6 The building will be served by a direct connection to the National Grid and will be distributed *via* the Medium Voltage (MV) intake building and transformers.

2.3.7 The buildings will be served by a direct Medium Voltage (MV) National Grid (NG) connection routed from the north and distributed via the onsite MV Compound. The proposed MV Compound is located to the north of the Application Site. This location and orientation has been driven by the site's incoming power supply from the north. Utility Supplier and Occupier Switchrooms are provided, together with dedicated maintenance access and secure fencing. The Utility Supplier building is the primary intake switchroom owned and maintained by Utility Supplier. The Occupier building is the distribution switchroom for the site owned and maintained by the Applicant. Access to this building is obtained from within Application Site, via locked gate to ensure that this is not utilised as a main access point

Resilience and Redundancy

2.3.8 Power for the replacement data centre will be supplied from/by the National Grid which operates its transmission system in accordance with the Security and Quality of Supply Standard which is a requirement of its Transmission Licence. In accordance with this standard, a level of redundancy is also built into the transmission system.

2.3.9 The overall reliability of supply for the National Grid Electricity Transmission (NGET) System during 2018 - 2019 was 99.999984%. During 2018-19, there were 347 NGET system events in the United Kingdom where transmission circuits were disconnected either automatically or by urgent manual switching. Most of these events had no impact on electricity users with only three of those disconnections resulting in a temporary loss of power supplies to customers.

2.3.10 The power distribution system, on-site, starting from the Medium Voltage intake substation down to the Low Voltage distribution, is designed to be safe, reliable, robust, and efficient and have in-built redundancy. The Operator designs and builds systems with in-built redundancy, based on Medium Voltage power supply connections from an electricity grid, being the primary power source to the site. The dual redundant circuit provides security of supply in the event of a fault or loss of supply from one source, the other circuit is capable of supplying full load to the site. To achieve this redundancy, the operator is proposing for the full supply to be split 50%/50% (dual-feeds) from alternative supply sources, each capable of supplying the 100%, if required. Essentially, the data centre will be supplied from the Grid by a substation with 2 separate cables from 2 separate feeders; therefore, in the event of a loss of supply from a single source, 50% of the development is still on the alternative source, while the remaining 50% is on back-up emergency generators temporarily until the site's own distribution system can be rearranged to resume supply from the available source. This arrangement stays in place until the failed source has restored supply, at which point power returns to the two supply sources. This arrangement is subject to connection agreement and compliance with transmission and distribution regulations (and providers).

2.3.11 The on-site infrastructure is designed on N+1 reliability and concurrently maintainable design. This means that there is redundancy built into the system, so that any one component, or any one distribution path can be out of service without affecting operations. Similarly, for the grid connection to the data centre to fail, it would require a number of failures to the upstream distribution network to occur simultaneously. The requirement to run back-up generators is therefore minimised.

2.3.12 The Operator also undertakes a regular and robust infrastructure inspection, preventive maintenance and testing programme and has an integrated Building Management System (BMS) and an Electrical Power Monitoring System (EPMS): these are additional control tools which are used to monitor physical assets and equipment status and performance.

2.3.13 The measures will minimise the potential for emergency operation of the diesel generators, reducing the overall environmental impact from the installation, in the rare event that they are triggered.

Emergency Generators

2.3.14 In the unlikely event of a loss of power supply (i.e. temporary grid blackout) the diesel-powered emergency (back-up) generators (3MVA) will be utilised to maintain power supply. These generators are designed to automatically activate and provide power to the plant pending restoration of mains power. The building will be served by 10 generators, each with an individual acoustic enclosure and an individual flue stack at a height of 15 m. There will also be a smaller generator (less than 1MVA) to provide back-up supply to the administration section of the Data Centre.

2.3.15 To ensure the emergency generators are maintained and ready in the event of grid power failure the generators will be tested periodically at the following frequency:

- each generator tested separately at 25% load for a maximum of 0.5 hour (it will typically be less than half this) every two weeks per year (i.e. a total of 13 hours per generator per year);
- subject to maintenance needs, there will also be approximately one hour of testing each generator (at approximately 25% load) per quarter following preventative maintenance and replacement of some critical components (i.e. four hours per generator per year); and
- each generator tested separately at 100% load for 1.5 hours twice a year (i.e. three hours per generator per year).

2.3.16 All testing will be undertaken during normal daytime working hours (i.e. Monday to Friday between 07:00 and 19:00 hours) excluding weekend and Bank Holidays.

2.3.17 The emergency generators will be individually containerised within enhanced acoustic enclosures (specifically engineered for greater sound attenuation) and located within a secure compound adjacent to the replacement Data Centre.

2.3.18 Diesel will be stored on site and the compound will be served by a main top-up tank holding approximately 40,000 litres. Each of the 3MVA emergency generators will also have an associated belly tank with a capacity of approximately 16,000 litres. The smaller 1MVA emergency generator will have an associated belly tank with a capacity of approximately 6,000 litres. The 16,000 litres and 6,000 litres represent the approximate volume of diesel required for 24 hours emergency operation of each engine running at full load. All tanks will be above ground and double skinned. The pipelines from the top-up tank to the belly tanks will also be above ground. The top-up tank will be contained within a concrete bund with a capacity of 110% of the storage capacity of the tank. Each belly tank is containerised and self-bunded to contain 110% of the storage capacity of the tank. The fuel fill point is located in close proximity to the emergency generators associated with each data centre and includes provision for fuel interceptors in the unlikely event of a fuel spill Leak detection will be provided at key points as well as a fuel monitoring system.

2.3.19 The operation of these back-up features will be regulated by an Environmental Permit under the separate consenting regime within the context of the Industrial Emissions Directive (IED) and Environmental Permitting Regulations.

Intermediate Power Supply

2.3.20 Ahead of the construction of the Utility Supplier switchroom an MV power supply will be used for the initial phase of operation. This is referred to as the Intermediate power supply and is required until the NG power supply is available. The associated substation building, within the Temporary MV Compound, is located adjacent to the permanent MV compound, as shown on the Master Site Plan (ref 20305S-RPS-00-XX-DR-A-9501) and is 15.6m(l) x 12.1m(w) x 5.6m(h).

2.3.21 Once the Utility Supplier switchroom is delivered and the power supply available, the Intermediate supply will be decommissioned, and above ground structures associated with it demolished.

2.3.22 Although this building is only required for a temporary basis it is shown on the Master Site Plan, as could potentially be in situ for two to three years. Following removal of this temporary building, the area will be laid to grass, equivalent to its immediate surroundings

Ancillary Facilities

2.3.23 The proposed replacement data centre will be supported by a number of ancillary facilities:

Security Gatehouse

2.3.24 A single Security Gatehouse with a GEA of 65m² serves the entire site at the principle site entrance. This is a single storey building with a single slope pitch roof. The gatehouse will be manned 24 hours a day and controls the electronically operated gated entrance to the Application Site.

Sprinkler Tank and Pump House

2.3.25 A single sprinkler tank and pump house are located remotely from the replacement Data Centre and will be used for fire protection purposes.

2.3.26 The pump house will be 4.8m in height, with a flat roof. The tank room is accessed via a steel composite door on the western elevation.

2.3.27 The associated tank is located to the south of the pump room and is at a height of 5.8m.

Cycle Shelter

2.3.28 A cycle shelter, to house 4 bicycles will be located adjacent to the car park. The shelter is 5m in length and 2.75m wide. The shelter is 2.86m in height to allow adequate space for a person to walk under.

Waste Bin Store

2.3.29 A dedicate waste bin store is provided adjacent to the office element of the building. This is constructed from treated softwood timber fencing, 2.4m in height, to provide a compound area 8.4m^2.

Process Water Tanks

2.3.30 A process water tank will be located adjacent to the office area of the replacement Data Centre building and will measure 6.1m in diameter and 10.9m in height.

2.3.31 The process water tank contains the water required to supplement the cooling system for cooling the data hall spaces. During peak summer temperature, the outside air cooling is supplemented by an evaporative cooling system. Water from the storage tank is sprayed across a media to lower the supply air temperature to maintain satisfactory internal conditions.

MV Room

2.3.32 An MV Room, separate from the replacement Data Centre building, will be provided. It will be single storey with a flat roof at a height of 6.9m and a GEA of 216m^2.

2.4 Main Project Wide Elements

Hours of Operation and Site Staff

2.4.1 The proposed development is expected to create a number of direct and indirect employment opportunities in addition to contributing induced employment to the local economy. The replacement data centre is provisionally estimated to have between 40 and 50 staff across a 24-hour period.

2.4.2 Whilst the proposed development will operate 24 hours a day the majority of staff will be present during normal office hours. A team of key engineering staff and security team will be required 24 hours a day; this involves approximately 10 personnel on a shift basis.

Site Access and Parking

2.4.3 The Application Site is currently served by one access point *via* a private road leading from Brimble Hill Road (B4005) which is adjacent to the part of the site's western boundary. The private road has entry barriers restricting access to the site.

2.4.4 Once on the site the access road takes vehicles through a controlled access enclosure involving a series of secure barriers, electronic bi-fold gates and intercom system linked to the Security Gatehouse. The gated access is close to its junction with Brimble Hill Road.

2.4.5 Vehicles accepted onto the site will pass *via* the gates and pass the Security Gatehouse. Although likely to be a rare occurrence, those vehicles rejected from the site will exit back onto Brimble Hill Road.

2.4.6 An area of surface car parking will be provided comprising 35 car parking spaces within the main car park with a further two parking spaces adjacent to the MV compound. There would be zero HGV parking spaces on site, other than the service yard areas, which also reflects the very low level of HGV activity that would be generated during operation.

2.4.7 The proposed parking quantum would include three disabled (blue badge holder) spaces. Disabled parking is located next to the internal pedestrian network, to facilitate safe access to the nearby datacentre.

2.4.8 Of the total parking provision, four spaces will also be provided with active electric vehicle charging infrastructure. 100% of spaces would be provided with passive electric vehicle charging infrastructure (i.e. the cabling) for future implementation.

2.4.9 Of the total parking provision, five spaces will also be assigned for car share users with appropriate signage in place to encourage the use of car sharing.

2.4.10 A Swept Path Analysis demonstrating that the car parking area is practical and usable is shown at Volume 3 Appendix 8.3 of the ES. Access to refuse areas is also demonstrated at the same Appendix.

2.4.11 In terms of materials, the external yard areas which experience heavy vehicular loads are to be constructed in concrete, the parking areas and access roads will be laid to macadam.

Landscaping

2.4.12 The proposed development will include an area of landscape planting, including a grassed area, trees and shrubs, together with drainage infrastructure. A landscape strategy accompanies the application (see Volume 2 Figure 5.45) and illustrates the areas of proposed planting. The strategy includes the following features:

- native tree and shrub planting;
- wildflower turf cut frequently to allow amenity and maintenance access;
- meadow grassland topped ay 300mm or mown annually in autumn to maintain floristic diversity;
- flood tolerant grassland to edge of infiltration pond; and
- native species marginal planting within pond.

2.4.13 To accord with on-site security requirements with regards to grassland management in and around the security fencing, a grassland management regime was developed and is presented as the Grassland Management Plan that differentiates the various grassland maintenance regimes across the site.

2.4.14 In summary there are three levels of grassland maintenance:

- Level 1 – close mown 'Eco Lawn' that includes low creeping herb species maintained up to 75 mm and mown at least once a fortnight.
- Level 2 – wildflower grassland topped as required to maintain 300 mm growth.
- Level 3 – appropriate wildflower meadow for soil conditions would be cut annually in September.

Security and Lighting

2.4.15 Security fencing is provided to the perimeter of the building and around the site. Four different types of fencing are proposed, varying in height from 2.4m to a maximum of 3.5m. The details of the fencing types and locations are set out on the Masterplan Fence Types plan (ref 20305S-RPS-00-XX-DR-A-9504) and are summarised in Table 2.3.

2.4.16 Around the Application Site perimeter, along the line of the Type 1 and 2 fencing, 7m high CCTV equipment on mounting poles are proposed at circa 50m intervals or where there is a change in fence direction.

2.4.17 Combined with the CCTV, lighting is also proposed (6m and 8m in height) around the Application Site, providing lighting to access areas, pedestrian routes and for surveillance. The lighting design has been optimised for the site to ensure no obtrusive glare, light spillage or other light nuisance on neighbouring uses. The external perimeter lighting is required during hours of darkness (dusk til dawn). Lighting within the generator compound incorporates integral motion sensors and will only be activated as necessary.

2.4.18 To prevent vehicle access onto landscaped areas and vehicular control bollards are proposed at specific areas of the site, such as adjacent to the main site entrance to aid the filtering of traffic (lane management). These are 1m in height.

2.4.19 Location and elevational details of the above measures can be found on the Fence Types plan (ref 20305S-RPS-00-XX-DR-A-9504) and further details within the submitted Site External Lighting Report (ref 20305S-CON-XX-XX-RP-E-9735)

Waste

2.4.20 The proposed replacement data centre will generate some operational waste in the form of normal office and visitor waste. This would include packaging, printer toners and cartridges, paper, plastic and food waste. Other wastes would include:

- waste electrical and electronic equipment (WEEE) such as end of life server equipment;
- damaged or redundant racks;
- waste from the maintenance and testing of the cooling system and emergency backup generators; and
- waste from the maintenance of landscaping and the infiltration pond.

2.4.21 The buildings will be provided with a dedicated area within the building allowing for the dedicated collection of both refuse and re-cycling, tailored to operational requirements. Bin stores are

provided external of the building which will be emptied periodically by an appropriately licenced waste management contractor.

2.4.22 Small quantities of hazardous wastes (such as light bulbs, waste oils, batteries, IT equipment) will be generated but will be temporarily stored in specialist storage containers prior to periodic collection by an appropriately licenced waste management contractor for recovery, recycling or disposal.

2.4.23 Waste electrical and electronic media (from data storage servers etc) will be collected by a licenced waste management contractor for recovery, recycling or final disposal. Electronic media will be sanitized within the facility for data security and confidentiality reasons, prior to collection by a licenced waste contractor. This takes place in the Decommissioning Room. No additional waste disposal is required to facilitate operation of the facility.

2.4.24 Waste will be reused or recycled where possible. Where recycling is not possible, waste would be disposed of at a permitted facility via an appropriately licensed waste carrier.

2.4.25 All waste arising from the operation of the facility would be handled and managed in according with relevant legislation and duty of care requirements.

2.4.26 General principles of how construction waste will be managed are set out in the submitted CoCP. A Site Waste Management Plan has been prepared and is appended to the CoCP at Appendix D setting out the likely types of waste to be generated and how they will be managed.

Use of Natural Resources

2.4.27 The EIA Directive refers to the use of land, soil and biodiversity resources. The project comprises a Data Centre and associated infrastructure and would not, therefore, require the use of these resources during its operational phase.

2.4.28 The Application Site is entirely located within an area of ‘Non-agricultural land: land predominantly in urban use’, as defined by the Provisional Agricultural Land Classification by Natural England (2020). The construction of the proposed development would therefore not result in the loss of any agricultural land.

2.4.29 The Screening opinion received from Swindon Borough Council highlighted that high quality or scarce resources could be affected as well as physical changes to the topography of the area. A Code of Construction Practice (CoCP) will be prepared and agreed with Swindon Borough Council which will set out measures to control construction impacts upon natural resources. Further, the LVIA (Chapter 5 of this ES) concluded that the likely effects from the proposed replacement data centre would not have any significant effects on landscape or visual resources and receptors. In addition, it was highlighted that the proposed development in this part of the North Wessex AONB would not affect the special qualities of the AONB or the key characteristics of the AONB landscape character areas that it lies within, or, those it can be seen from.

Residues and Emissions

2.4.30 There will be times of the year when water is needed for cooling and this would generate small quantities of process wastewater. Process wastewaters will also include the rainwater from the stacks which will be weakly acidic. This will connect into the process water drains and ultimately discharge to sewer with other process waters from the data centre. Domestic effluent arising from the occupation of the data storage building and process water will discharge to the Thames Water Sewer situated approximately 420 m west of the Application Site in Brimble Hill. Levels between the Application Site and the foul sewer preclude a new gravity connection and therefore, a

package pumping station and rising main is proposed to convey domestic and process water flows to the Thames Water sewer (ref MH9201).

2.4.31 Discharges of surface water will be restricted to run-off from the roof hardstanding and paved areas etc. and water would flow through the below ground surface water drainage system passing through a silt catch pit and outfall into the proposed infiltration pond before discharge to the ground. A cellular storage / soakaway located beneath the infiltration basin will allow flows to infiltrate into the granular chalk strata at a depth of at least 3m below the basin. The cellular soakaway and surrounding porous backfill will provide the required attenuation.

2.4.32 An Environmental Permit will be in place for the operation of the diesel-fired emergency generators.

Vulnerability to Accidents and Disasters

2.4.33 The EIA Regulations require consideration of the effects on the environment deriving from the vulnerability of the project to risks from major accidents and/or disasters, where these are relevant to the project concerned.

2.4.34 This section considers the potential accidents and disasters that could affect the project or the environment. However, it is stressed that such events are not considered likely. A summary of the potential risks associated with major accidents and disasters relevant to specific environmental topic areas are covered in Chapters 5-7 of this ES.

Fire

2.4.35 A ‘fire engineered solution’ has been adopted as part of the design for the proposed development, with reference to relevant Fire Standards and Building Regulations. The proposed development will be equipped with a number of active fire protection measures as well as fire detection and alarm systems.

Security

2.4.36 Security measures have been incorporated into the design of the proposed development. The proposed development is located on a campus with a private access and established security measures in place. A security gatehouse with associated barrier entry system will be located at the entrance of the site. The site will be manned by security personnel 24 hours a day. The site will be surrounded by fencing and CCTV equipment will also be provided as part of the proposed development.

Site Operations

2.4.37 All operations will be accompanied by emergency evacuation plans, based on best practice guidance.

Demolition-related Accidents

2.4.38 Demolition activities will be controlled by standard demolition/construction practices and safety procedures. As such, the risk of major accidents and/or disasters associated with future demolition would not be significant. It is therefore not considered that future demolition activity would present a significant risk of accident or disaster.

Summary of Key Parameters

2.4.39 The table below provides a summary of the key parameters which have formed the basis for the assessment of effects.

Table 2.2: Data Centre Parameters

Data Centre Parameters	
Whole Site Area	11.3 hectares
Development Area	5.53 hectares
Building Area (GEA)	Data Centre accommodation consists of: Technical Spaces – 7,267 m^2 Office and Personnel Space – 1,425 m^2 **Total – 8,692 m^2**
Building Dimensions including rooftop plant	Height – 12 m Height – 13.8m (including roof and mounted equipment) Length – 139.2 m Width – 67.3 m

Table 2.3: Power Generation Parameters

Power Generation Parameters	
MV Substation (Utility)	Height – 5.6 m Length – 18.1 m Width – 8.6 m
MV Substation (Occupier)	Height – 5.6 m Length – 17.1 m Width – 13.4 m
MV Room	Height – 6.9 m Length – 20.6 m Width – 12.5 m
Temporary MV Compound	Height – 5.6 m Length – 15.6 m Width – 12.1 m
Emergency Generators	11
Capacity of Emergency Generators	10 x 2,400 kW_e output and 1 x 600 kW_e
Flue Height	15 m

Table 2.4: Ancillary Facilities Parameters

Ancillary Facilities Parameters	
Surface Water Infiltration Area	2,100 m^2 (approximate)
Sprinkler Pumphouse	Height – 4.8 m Length – 9.7 m Width – 8.7 m
Sprinkler Tanks	Height – 5.8 m Diameter – 11 m
Security Gatehouse	Height – 5.4 m Length – 10.4 m Width – 6.2 m
Surface Water Infiltration Area	2,750 m^3

Ancillary Facilities Parameters	
Car Parking	35 spaces main car park 2 spaces at MV compound
Cycle Parking	4 spaces
Fencing and Security	Type 1: 2.65 m (h) weld mesh panel fence (green)
	Type 2: 3.5 m (h) weld mesh panel fence (green)
	Type 3: 2.65 m (h) weld mesh panel fence (black)
	Type 4: 2.4 m(h) weld mesh profiled fence (green)
Lighting	Serving vehicular/pedestrian access and CCTV monitoring
	6 m(h) adjacent to site perimeter 8 m(h) adjacent to access roads and inner fence perimeter around the building.

Infrastructure Upgrades

2.4.40 The existing electrical infrastructure to the Application Site has adequate capacity to meet the business demand and energy requirements for the operation of the first phase of the data centre. For the operation of the subsequent phases of the data centre, an upgrade to the electrical infrastructure is likely to be required. The utility provider will be responsible for the design, permitting and construction of the upgrades which will involve works to the substations at Toothill and Wroughton and the installation of two 33kV circuits. The routing of the new circuit is currently not known but will be installed by the utility provider using standard trenching techniques and industry-standard construction practices. The timeframe for the upgrades will be subject to the business demand of the data centre. In addition to power infrastructure, fibre connectivity and water-utility connections will be required to the site. Offsite connections with respect to water-utility services are limited to connections at the immediate boundary of the site. The fibre works to the site will predominantly consist of leveraging the existing telecommunications duct infrastructure to deliver new fibre cables to the site. Due to the age and installation method, the existing fibre cables cannot be reused however, where possible, existing ductwork will be reutilised.

2.4.41 Any new infrastructure works is expected to be in an industry-standard underground utility trench in public roads or carriageways. Such works would be expected to be undertaken in accordance with standard-utility construction work guidelines and methods of construction. Further information on all of these works is provided in Volume 3 Appendix 4.3 of this ES. To ensure that the assessment in the ES and technical reports is robust, these future upgrades have been included in the list of cumulative developments and assessed (based on available information) in the ES chapters and technical reports.

2.5 Construction

2.5.1 The details of construction methods, timing and phasing are necessarily broad at this stage. The limits of the assessment, however, have been set sufficiently wide to allow a robust assessment to be undertaken of a reasonable worst-case scenario.

2.5.2 The proposed development is anticipated to utilise standard construction methodologies (including piling) for infrastructure.

Indicative Phasing of Construction Works

2.5.3 Soft-stripping of the existing buildings in the north east (Beta and Gamma) and south west (Alpha) of the Application Site will be undertaken prior to demolition and will be carried out at the start of construction programme. Initial construction works will also begin at a similar time.

2.5.4 The existing topography is around 175 to 177 m AOD in the proposed area of the data centre building, and some cut and fill will be required to develop a suitable development platform.

2.5.5 The construction phase is estimated to take 10 – 12 months to complete and will comprise external construction and civils activities. This is forecast to commence in Q3 2021 (subject to the progress of the planning process). At the end of that period all external construction activities and civils work will be completed, including:

- hard and soft landscaping;
- security and access areas;
- perimeter fencing;
- internal access roads and car parking areas;
- drainage and attenuation; and
- the shell and core construction of the main data centre building and administration block.

2.5.6 The construction phase will be followed by the installation and testing of the IT equipment (data storage and data processing technology) and then the creation of the data networks and various cloud computing services that will operate from the facility. These are then tested prior to becoming available for Customer data. All the Electrical, Mechanical & IT across the entire facility will not be deployed all at one time. Instead, internal fitout will occur in phases, the initial phase commencing within the site construction works in Q3 2021, with follow on phased fit out determined by Customer demand. The reason for this is that having unused data servers and associated mechanical and electrical support systems would unnecessarily consume energy and also require ongoing maintenance and servicing. Thus, they are deployed close to the anticipated Customer needs.

2.5.7 Fitout works associated with these subsequent phases will primarily be carried out inside the completed building and be of approximately six months duration. There will be limited external works involving the installation of generator sets and roof mounted mechanical equipment, associated with that phase. The principal foundations for each generator set will be built during the main construction period, as described above.

2.5.8 All materials and plant associated with the construction phase will be stored within the footprint of the Application Site. A loading and unloading area for plant and materials will be provided within the site boundary. It is anticipated that the majority of deliveries will be made via articulated low loader vehicles and rigid HGVs.

2.5.9 The fitout phases will not generate significant levels of noise and traffic over predicted operational levels and will have no ‘construction’ type impacts. All activities will be carried out inside the building and will be indistinguishable from the normal operating conditions of the application site. The exception to this will be the installation of generator sets for the additional data rooms, which will be installed outside this construction period. However, the principal foundations for each generator set will be built during the main construction period as described above.

Construction Working Hours

2.5.10 Working hours would be 07:00 to 19:00 hours Monday to Friday, 07:00 to 13:00 hours on Saturday and at no time on Sundays or on public or bank holidays. These hours would be subject to agreement with the local planning authority. In the event that works are required outside of these hours in exceptional circumstances, this would be agreed with the local planning authority prior to commencement of the activity.

2.6 Decommissioning

2.6.1 The lifespan of the proposed development is not defined but it is anticipated that it will be at least 10-20 years. It is likely that regular maintenance a periodic upgrading of the facility over time will enable it to continue to meet future demands.

2.6.2 Upon closure the buildings, plant, equipment, drainage networks etc at the application site will be decommissioned in accordance with prevailing best practice. Once rendered environmentally safe, the buildings will more than likely be retained and sold on for future use following closure.

2.7 Environmental Management during Construction

2.7.1 Construction would be undertaken in accordance with the Code of Construction Practice (CoCP) (see Volume 3, Appendix 2.1). The CoCP sets out the key management measures that contractors would be required to adopt and implement. Measures required to be included in the CoCP, based on the findings of the EIA process, are set out in the topic chapters of this ES. These measures include strategies and control measures for manging the potential environmental effects of construction and limiting disturbance from construction activities as far as reasonably practicable.

Construction Working Areas

2.7.2 The majority of construction activities including construction compounds will take place within the site boundary identified on Figure 2.1.

2.7.3 A number of temporary facilities will be required during construction including:

- Temporary offices and welfare facilities;
- Storage area for materials, fuels, plant and equipment;
- Waste management areas; and
- Car parking facilities.

2.7.4 These facilities will be located on the Application Site. As far as possible, storage areas would be located away from existing properties. Such storage areas would be bunded to mitigate any spillages of potential contaminants and will avoid being located in areas of vegetation or habitat to be retained.

Construction Access

2.7.5 The Application Site is currently served by one access point via a private road leading from Brimble Hill Road (B4005) which is adjacent to the part of the site's western boundary. The private road has entry barriers restricting access to the site.

2.7.6 All construction traffic routes to the site entrance are set out in the Construction Traffic Management Plan (document reference 20305S-RPS-XX-XX-RP-P-9731) and would be agreed

with Swindon Borough Council. Every effort would be taken to minimise the effects of traffic associated with the construction phase of the project. Materials and resources would be sourced locally where possible and deliveries and construction traffic would endeavour to avoid travel during commuter peaks.

Construction Vehicles

2.7.7 The type of construction vehicles would be selected by the contractor prior to and during the construction phase. However, the following vehicles would typically be used during construction:

- Excavators;
- Cranes: Required for assembly and erection;
- Low loaders: Required for transport of construction equipment and plant;
- Concrete lorries;
- Tipper lorries; and
- Construction staff vehicles.

2.7.8 The peak construction period would require up to a maximum of 400 construction staff on site per day, plus 150 heavy goods vehicle (HGV) movements per day. Although it is not expected that the project would generate any abnormal loads, if this was required, the routing and nature of such loads would be agreed with the highway authority prior to work commencing.

2.7.9 It is anticipated that the peak periods for traffic movements associated with the construction phase would be 07.00-08.00 and 15.00-16.00. Further details of construction traffic associated with the project can be found in the Construction Traffic Management Plan (document reference 20305S-RPS-XX-XX-RP-P-9731).

Drainage

2.7.10 The construction phase would incorporate pollution prevention and flood response measures to ensure that the potential for any temporary effects on water quality or flood risk are reduced as far as practicable.

2.7.11 Such measures would be implemented through the CoCP, which will include the following:

- Installation of wheel washing facilities at the entrance to the construction compounds;
- Covers for lorries transporting materials to/from site to prevent releases of dust/sediment to watercourses/drains;
- Bulk storage areas to be secured and provided with secondary containment (in accordance with the Oil Storage Regulations and best practice);
- Storage of oils and chemicals away from existing watercourses, including drainage ditches or ponds;
- Concrete to be stored and handled appropriately to prevent release to drains;
- Preparation of a flood response plan in the event of flooding during construction works. This would include a procedure for securing or relocating materials stored in bulk;
- Treatment of any runoff water that gathers in the trenches would be pumped via settling tanks or ponds to remove any sediment;
- Obtain consent for any works (e.g. discharge of surface water) that may affect an existing watercourse. The conditions of the consent will be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial risk;

- Use of a documented spill procedure and use of spill kits kept in the vicinity of chemical/oil storage;
- Storage of stockpiled materials on an impermeable surface to prevent leaching of contaminants and use of covers when not in use to prevent materials being dispersed and to protect from rain; and
- Stockpiles to be kept to minimum possible size with gaps to allow surface water runoff to pass through.

Construction Waste

2.7.12 Construction waste is likely to include timber, concrete, inert waste, ceramic waste, insulation plastic, packaging, metal, plaster and cement. Waste would also be generated during the demolition of the Beta and Gamma buildings in the form of plasterboard. A pre-demolition audit would be undertaken to identify and remove any recyclable or recoverable materials. Similarly, hazardous materials would be removed where possible prior to demolition. All waste, except the inert waste, some packaging and any miscellaneous waste could be recycled. A range of management measures would be proposed for the project.

2.7.13 All waste, except the inert waste, some packaging and any miscellaneous waste could be recycled. A range of waste management measures would be proposed for the project.

2.7.14 A Site Waste Management Plan has been prepared (see Volume 3, Appendix 2.1) that includes measures to reduce waste.

Use of Natural Resources

2.7.15 The CoCP requires the contractor to identify the main types and quantities of materials required for the project in order to assess potential for sourcing materials in an environmentally responsible way. The construction specification would place preference, when options are available, on the use of materials with a high recycled content.

2.7.16 The Considerate Contractors Scheme includes measures relating to the use of resources, including categories in relation to minimising the use of water. All timbers used as primary structural elements would be required to be Forest Stewardship Council (FSC) certified.

2.7.17 The construction process would take into account the principles of good practice in soil handling and restoration set out in the following documents, wherever possible, to reduce the possibility of damage to soil materials during the construction process:

- Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soil Handling Guide; and
- Department for Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (including the Toolbox Talks).

2.7.18 The EIA Directive also refers to the use of land and biodiversity resources. Further details are provided in Chapter 6 Ecology and Biodiversity of this ES.

Residues and Emissions

2.7.19 Construction of the proposed development has the potential to lead to contamination of water and soil resourced, as well as impacts on sensitive receptors from noise and dust. However, a CoCP has been prepared and accompanies the application (see Volume 3, Appendix 2.1) that sets out measures to control construction impacts and provide a procedure for recording and resolving complaints. In addition, technical reports for air quality, noise and vibration, and ground conditions have been prepared and are summarised in Chapter 8.

Vulnerability to Accidents and Disasters

Flood Risk

2.7.20 Temporary drainage infrastructure would be installed at an early stage of construction to ensure there would be no increase in flood risk during the construction works.

2.7.21 The Application Ste would be developed in phases which minimises the part of the site being worked so topsoil and grass would only be removed as required, ensuring runoff rates are managed. Surface water drainage would be installed at the earliest opportunity to further minimise the effects from construction.

Pollution

2.7.22 The CoCP (Volume 3, Appendix 2.1) sets out best practice measures to be implemented during the construction phase. Should any previously unidentified contamination be detected at the site during the construction phase, a formal remediation strategy would be submitted to and agreed with the local planning authority prior to any remediation works being undertaken.

2.7.23 With respect to potential spillages or runoff affecting water quality, the CoCP includes pollution prevention/construction best practice measures to ensure that good practice guidance is adhered to throughout the construction phase. These measures would also limit the potential for spills or releases of materials to surface water or groundwater.

Traffic

2.7.24 The assessment of personal injury accident data and effects associated with traffic accidents and safety for the project are set out in the Construction Traffic Management Plan (CTMP) and would be implemented and managed to minimise risk of accidents. Routing of construction traffic would be agreed with the local authority.

2.7.25 The routing and nature of any large loads that may be required would be agreed with the local highway authority prior to work commencing and an escort would be provided in order to avoid conflict and potential hazards with other road users.

Construction Safety

2.7.26 Normal construction good practice would be followed to ensure on site safety of the workforce in accordance with the Construction (Design and Management) Regulations 2015.

2.7.27 During the construction programme, independent health and safety advisors would be employed by the contractor/s to report on the site's safety. It will be required that these reports take place monthly with the reports being provided to the developer.

2.8 Measures Adopted as Part of the Project

2.8.1 In order to avoid or reduce the environmental effects, a number of measures have been designed into the project. Details of these can be found within each topic chapter of the ES and are summarised in Tables 2.4 and 2.5 below.

Table 2.4: Schedule of Measures to be Adopted as Part of the Project during Construction

Topic	Proposed Measures during Construction
Design	All construction activities would take place within the site boundary identified on Figure 2.1. No additional land would be required for construction compounds or storage. A number of temporary facilities would be required during construction including: • Temporary offices and welfare facilities; • Storage area for materials, fuels, plant and equipment; • Waste management areas; and • Car parking facilities. As far as possible, storage areas would be located away from existing properties. Such storage areas would be bunded to mitigate any spillages of potential contaminants and would avoid being located in areas of vegetation or habitat to be retained. **Site Operations** All operations will be accompanied by emergency evacuation plans, based on best practice guidance. **Demolition-related Accidents** Demolition activities on the Application Site will be controlled by standard construction practice and safety procedures. As such, the risk of major accidents and/or disasters associated with future demolition would not be significant. It is therefore not considered that future demolition activity would present a significant risk of accident or disaster.
Landscape and Visual Resources	Hoarding will be erected around the construction works in the north of the Application Site. Trees to be maintained within the Application Site will be protected in line with the measures set out in the Tree Survey and Arboricutural Impact Assessment (see Volume 3 Appendix 5.3).
Ecology and Nature Conservation	**Habitat Protection** Construction fencing would be installed around the perimeter of the construction area to protect adjacent retained habitats. Fencing would prevent access to contractors, machinery and vehicles and the storage of vehicles, machinery, equipment and materials in areas outside of the fence line. Measures would be adopted with reference to industry and regulatory pollution prevention guidelines and would protect the environment from potential construction related discharges to ensure negative effects on water and air quality are minimised during construction. Environmental protection measures are specified in the Code of Construction Practice (CoCP (Volume 3 Appendix 2.1) and includes measures for dust control, surface water control, spill prevention management and designating secure areas for refuelling and storing chemicals in line with appropriate regulations and guidelines. Tree protection measures will also be implemented during construction to protect retained trees and trees within Burderop Wood SSSI as specified in the Arboricultural Impact Assessment (Appendix 5.5 document ref 20305S-RPS-XX-XX-RP-P-9712) and are in accordance with BS5837(2012) Trees in Relation to Design, Demolition and Construction Prior to the start of ecologically sensitive works, an Ecological Clerk of Works (ECoW) would deliver a toolbox talk to the site construction team, briefing them on all ecology and nature conservation requirements on site. The ECoW would oversee all works potentially affecting sensitive ecological features. **Species Protection** **Bats** If the loss of one or more bat roosts is unavoidable, this will be addressed through species protection, mitigation and the provision of alternative roost features. The

Topic	Proposed Measures during Construction
	detailed measures would be agreed with Natural England and would be covered by an EPS mitigation licence. The licence would be obtained prior to any works affecting any of the potential bat roosts in trees or buildings identified in the baseline surveys. Based on the likely type of roosts three new bat roost boxes would be provided for each low status roost where loss is unavoidable. Installation of new boxes on new buildings impractical due to the minimum level of security lighting required and therefore, all the bat boxes would be installed on retained mature trees located on the northern and south-eastern boundaries. Each box would be installed at least 3m above ground with a south-east or south west facing aspect in locations not exposed to any light spill from artificial lighting; and Details of the mitigation will be presented in the Method Statement which will accompany the licence application the following measures would be undertaken: • installation of replacement roosts would be installed in advance of roost closure to provide receptacles where relocated bats could be moved; • bats would be excluded from roosts using devices fitted during suitable weather and in the active season and left in place for a suitable period to allow bats to leave. • Confirmed and potential roost features in buildings would be subject to hand search, soft stripping of structures under direct ecological supervision and destructive closure in advance of full demolition; • all works to be supervised by the Named Ecologist on the EPS mitigation licence or their agent. In the absence of any bat roosts within the development, a minimum of six long lasting woodcrete bat boxes would be installed in the boundary plantation woodland on the northern and western boundaries of the development to provide additional opportunities for roosting bats. Boxes would be installed two to a tree with two different box designs on each tree to provide a range of roosting micro-conditions. **Breeding Birds** Where possible suitable nesting habitat would be removed outside of the bird nesting season (generally considered to be March to August inclusive). Where this is not possible, nesting bird checks of vegetation to be removed would be carried out by an Ecological Clerk of Works (ECoW) no more than 48 hours prior to removal. Any active nests would be protected with an exclusion zone (minimum 5m radius) established around the nest within which no work would be permitted. The exclusion zone would be demarcated with posts and barrier tape or similar materials. The nest would be monitored regular and no works would be undertaken within the exclusion zone until the ECoW has confirmed the young birds have fledged and the nest is no longer in use. Ten long lasting woodcrete bird boxes will be installed in the boundary plantation woodland on the eastern and south-eastern boundaries of the development to provide additional opportunities for breeding birds. **Reptiles** A precautionary working method will be followed for the removal of suitable reptile habitat to ensure that any animals within the working area are displaced into the retained grassland around the edges of the Application Site. The detailed working method is provided in Appendix 6.6. Following the working method suitable reptile habitats will be cleared only during the time of year and during suitable weather conditions when reptiles will be active. Habitat will be systematically degraded with cutting in stages progressing to removal to ground level to allow animals to move out of the construction area. Habitats will be cleared moving from the centre of the Application Site working towards the Application Site boundaries where grassland habit will be retained. Retained grassland into which

Topic	Proposed Measures during Construction
	animals will be displaced will be protected with suitable fencing or other barrier fixed to the ground. Potential hibernation or shelter features will be dismantled and removed by hand and any reptiles placed in the retained grassland minimising animal handling time. A final destructive clearance will render the working area unsuitable for reptiles. Systematic vegetation removal, dismantling of shelter features and destructive clearance will be carried under the guidance and supervision of an experienced ECoW. **Badger** To minimise the risk of mammals being harmed, a means of escape from any larger excavations (i.e. excavations over 0.5 m depth) left open overnight would be provided as necessary, such as the provision of a scaffold plank as a ramp (at no more than 45° angle), or the profiling of at least one wall of an excavation to provide a gentle slope (no more than 45°) that an individual could use to exit the excavation. Alternatively, where practicable the excavation would be covered. Best practice measures implemented during construction would include hazardous material being safely stored in a locked container away from potential disturbance by animals. **Translocation of Grassland** . In addition to habitat retention and protection, the landscaping scheme would include the translocation of approximately 1ha of approximately 0.60ha of wildflower rich species-rich semi-improved neutral grassland (the most ecologically valuable grassland within the Application Site) . The grassland will be translocated as turves from the centre of the site and placed in prepared receptor areas located on the eastern boundary and in the demolished footprint of the Alpha building in the south-western within the centre part of the site. The translocation will be undertaken following the Outline Grassland Translocation and Soil Management Method Statement in Volume 3 Appendix 6.6.
Historic Environment	If considered necessary, a targeted programme of archaeological monitoring during construction would be agreed with the archaeological advisers to the planning authority. This would enable a better understanding of the presence, nature and date of any archaeological remains within the Application Site and allow for the development of an appropriate strategy to avoid, reduce or offset any impacts that could occur as a result of construction. This programme of archaeological investigation would be an archaeological watching brief during removal of made ground in areas where this activity will result in the exposure of the underlying deposits with the potential to contain archaeological remains.
Other topics not included in ES	
Noise and Vibration	Construction works would follow Best Practicable Means (BPM) outlined in Section 72 of the Control of Pollution Act 1974 (as amended) to minimise noise effects. A Code of Construction Practice CoCP has been prepared, which provides strategies and control measures designed to mitigate the potential environmental impacts and limit the disturbance from the construction activities as far as reasonably practicable (Volume 3, Appendix 2.4). The following mitigation measures for noise and vibration are included in the CoCP, based upon the guidance contained in BS 5228:2009+A1:2014: • **Communication**: Occupiers of residential and business properties that are likely to be affected by the works will be notified in advance of the works. Information regarding the nature and duration of the works and named contact details for key members of staff will be displayed on a noticeboard near to the Site. • **Standard Construction Hours**: Normal construction working hours would be. 07:00 to 19:00 hours Monday to Friday, 07:00 to 14:30 hours on Saturday and at no time on Sundays or on public or bank holidays. In the event that external works are required outside of these hours in exceptional circumstances, this would be agreed with SBC prior to commencement of the activity. In such

Topic	Proposed Measures during Construction
	instances, the contractor would apply to SBC for written consent prior to work commencing by submitting either a Section 61 consent application or an agreed method statement in line with the Control of Pollutions Act. • **Access Routes**: A Construction Traffic Management Plan is included in the application (document reference 20305S-RPS-XX-XX-RP-P-9731) which sets out the access routes for construction traffic. • **Equipment**: Quieter alternative methods, plant and equipment would be used, where reasonably practicable. • **Worksite**: Plant, equipment, site offices, storage areas and worksites would be positioned away from existing NSRs, where reasonably practicable. • **Barriers**: Site hoardings and portable acoustic enclosures/screens will also be used, as required. • **Maintenance**: All vehicles, plant and equipment would be maintained and operated in an appropriate manner, to ensure that extraneous noise from mechanical vibration, creaking and squeaking is kept to a minimum. Noise complaints will be investigated, and actions will be implemented to ensure repetition of the issues are avoided. In the event of complaints about noise, a noise monitoring programme will be undertaken by suitably qualified specialists. Logs of all noise monitoring will be kept within the Application Site files and will be made readily available for inspection. The following will be noted at each identified sensitive receptor when noise monitoring is being undertaken: • time; • weather conditions and wind direction; • location of monitoring; • background noise level; and • dB LAeq reading over the relevant time period.
Air Quality	The IAQM dust guidance lists mitigation measures for low, medium and high dust risks. Without mitigation, the risk is considered to be medium. The measures below are based on the IAQM general site measures described as 'highly recommended' for medium risks. Measures based on the 'highly recommended' measures for high risk demolition and medium risk construction and trackout are also listed. **Communications** Develop and implement a stakeholder communications plan that includes community engagement before work commences on site (refer to the Code of Construction Practice (CoCP) Appendix 2.1 of the Environmental Statement) Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. Display the head or regional office contact information **Dust Management Plan** The mitigation measures listed below to control the emissions from dust are included the CoCP (Volume 3, Appendix 2.1 of the Environmental Statement). **Site Management** Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Make the complaints log available to SBC when asked. Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the logbook. **Monitoring** Carry out dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the Application Site boundary.

Topic	Proposed Measures during Construction
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. **Preparing and Maintaining the Site** Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Use screening intelligently where possible – e.g. locating site offices between potentially dusty activities and the receptors. Erect solid screens or barriers around the construction site boundary. Avoid site runoff of water or mud. Keep site fencing, barriers and scaffolding clean. Provide enhanced screening for specific operations where there is a high potential for dust production and the site is active for an extended period Remove materials that have a potential to produce dust from the Application Site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. Depending on the duration that stockpiles will be present and their size - cover, seed, fence or water to prevent wind whipping. **Operating Vehicle/Machinery and Sustainable Travel** Ensure all vehicles switch off engines when stationary – no idling vehicles. Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. A Construction Traffic Management Plan has been prepared as part of the application (20305S-RPS-XX-XX-RP-P-9731) to manage the sustainable delivery of goods and materials. **Operations** Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible. Use enclosed chutes, conveyors and covered skips, where practicable. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. **Waste Management** Bonfires and burning of waste materials will not be permitted. **Measure Specific to Trackout** Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the Application Site. This may require the sweeper being continuously in use. Avoid dry sweeping of large areas. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as practicable. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site).

Topic	Proposed Measures during Construction
	Record all inspections of haul routes and any subsequent action in a site log book. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. Proposed access gates are located at least 10 m from receptors. **Measures Specific to Demolition** Ensure effective water suppression is used during demolition operations. Hand-held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground. Appropriate manual or mechanical demolition methods will be used as an alternative to explosive blasting. Bag and remove any biological debris or damp down such material before demolition **Measures Specific to Construction** Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. **Summary** The IAQM dust guidance states that with the appropriate dust mitigation measures in place the residual effect will normally be “not significant”, and recommends the mitigation is secured by for example planning conditions, a legal obligation, or by legislation.
Traffic and Transport	There is potential for construction workers to car share or travel by bicycle to the site. It is therefore deemed appropriate to promote the following measures to promote sustainable travel by construction staff: • Include local public transport timetables and route maps within the on-site compound for construction staff to review: • Providing changing and storage facilities for construction staff; • Assist in matching car sharers; and • Minimise, where possible, the number of contractors on site at any one time to reduce trips generated and promote car sharing.
Flood Risk	Preparation of a flood response plan in the event of flooding during construction works. This would include a procedure for securing or relocating materials stored in bulk Obtain consent for any works (e.g. discharge of surface water) that may affect an existing watercourse. The conditions of the consent will be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial risk
Ground Conditions	Potential risks to construction workers can easily be controlled in most site areas by the use of appropriate personal protective equipment (disposable coveralls, gloves, and particulate/vapour masks) and by adopting high levels of personal hygiene (as set out in the Code of Construction Practice (see Volume 3 Appendix 2.1). As a result, they are not considered to be at significant risk from potential contaminants of concern and have not been considered further as part of this assessment. The following will also be incorporated during construction: • Installation of wheel washing facilities at the entrance to the construction compounds • Covers for lorries transporting materials to/from site to prevent releases of dust/sediment to watercourses/drains;

Topic	Proposed Measures during Construction
	• Bulk storage areas to be secured and provided with secondary containment (in accordance with the Oil Storage Regulations and best practice); • Storage of oils and chemicals away from existing watercourses, including drainage ditches or ponds; • Concrete to be stored and handled appropriately to prevent release to drains • Treatment of any runoff water that gathers in the trenches would be pumped via settling tanks or ponds to remove any sediment • Use of a documented spill procedure and use of spill kits kept in the vicinity of chemical/oil storage; • Storage of stockpiled materials on an impermeable surface to prevent leaching of contaminants and use of covers when not in use to prevent materials being dispersed and to protect from rain; and • Stockpiles to be kept to minimum possible size with gaps to allow surface water runoff to pass through. In areas of the site proposed to be covered by buildings and hardstanding the risks to on-site users from asbestos in soils via the pathway inhalation will be mitigated. It is understood that some undeveloped areas of the site will be retained as part of the ecological mitigation and in other areas existing surface vegetation will be translocated to maintain sensitive grassland habitats. In order to minimise the risk associated with asbestos in Made Ground these areas will be subject to supplementary shallow soil sampling to enable more detailed assessment of the risk in these areas. If the targeted assessment identifies a potential risk in these areas then it may be necessary to implement a surface cover system in some areas or design enhanced management systems for these areas such as preventing unauthorised access and controlling the potential for soil disturbance using management plans and a permit to work procedures. The proposed infiltration pond will be constructed in the natural strata (ie below Made Ground) which mitigates the risk of the contaminants of concern leaching into the groundwater.

Table 2.5: Schedule of Measures to be Adopted as Part of the Project during Operation

Topic	Proposed Measures during Operation
Design	**Drainage** The storage capacity of the infiltration pond based on a 1 in 100-year event with 40% climate change allowance is approximately 2,750 m^3 assuming no infiltration. This is based on infiltration rates from soakaway testing undertaken in the location of the proposed infiltration pond. The testing was in accordance with the Building Research Establishment (BRE) methodology set out in Digest 365: Soakaway Design (BRE, 2016). The infiltration rates are presented in the Ground Conditions Report Volume 3 Appendix 8.5 of this ES and have informed the drainage design philosophy (document reference 20305S-RPS-00_XX-RP-D-9605). **Resilience and Redundancy** The data centre will be supplied from the Grid by a substation with 2 separate cables from 2 separate feeders; therefore, in the event of a loss of supply from a single source, 50% of the development is still on the alternative source, while the remaining 50% is on back-up emergency generators temporarily until the site's own distribution system can be rearranged to resume supply from the available source. This limits the number of backup generators required at one time. The on-site infrastructure is designed on N+1 reliability and concurrently maintainable design. This means that there is redundancy built into the system, so that any one component, or any one distribution path can be out of service without affecting operations. Similarly, for the grid connection to the data centre to fail, it would require a number of failures to the upstream distribution network to occur simultaneously. The requirement to run back-up generators is therefore minimised. The Operator also undertakes a regular and robust infrastructure inspection, preventive maintenance and testing programme and has an integrated Building

Topic	Proposed Measures during Operation

Management System (BMS) and an Electrical Power Monitoring System (EPMS): these are additional control tools which are used to monitor physical assets and equipment status and performance.

The measures will minimise the potential for emergency operation of the diesel generators, reducing the overall environmental impact from the installation, in the rare event that they are triggered.

Landscaping

The proposed development will include an area of landscape planting, including a grassed area, trees and shrubs, together with drainage infrastructure. A landscape strategy accompanies the application (see Volume 2 Figure 5.45) and illustrates the areas of proposed planting. The strategy includes the following features:

- native tree and shrub planting;
- wildflower turf cut frequently to allow amenity and maintenance access;
- meadow grassland topped ay 300mm or mown annually in autumn to maintain floristic diversity;
- flood tolerant grassland to edge of infiltration pond; and
- native species marginal planting within pond.

In summary there are three levels of grassland maintenance:

- Level 1 – close mown ‘Eco Lawn’ that includes low creeping herb species maintained up to 75 mm and mown at least once a fortnight.
- Level 2 – wildflower grassland topped as required to maintain 300 mm growth.
- Level 3 – appropriate wildflower meadow for soil conditions would be cut annually in September.

Lighting Design

The lighting design has been optimised for the site to ensure no obtrusive glare, light spillage or other light nuisance on neighbouring uses. The external perimeter lighting is required during hours of darkness (dusk til dawn). Lighting within the generator compound incorporates integral motion sensors and will only be activated as necessary.

Waste

The proposed development would generate some operational waste in the form of normal office and visitor waste. This would include packaging, printer toners and cartridges, paper, plastic and food waste. Other wastes would include waste electrical and electronic equipment (WEEE), damaged or redundant racks, waste from the maintenance and testing of the cooling system and emergency backup generators and waste from the maintenance of landscaping and the infiltration pond.

Waste would be reused or recycled where possible. Where recycling is not possible, waste would be disposed of at a permitted facility via an appropriately licensed waste carrier.

All waste arising from the operation of the facility would be handled and managed in according with relevant legislation and duty of care requirements.

Use of Natural Resources

The Application Site is entirely located within an area of ‘Non-agricultural land: land predominantly in urban use’, as defined by the Provisional Agricultural Land Classification by Natural England (2020). The construction of the proposed development would therefore not result in the loss of any agricultural land.

The Screening opinion received from Swindon Borough Council highlighted that high quality or scarce resources could be affected as well as physical changes to the topography of the area. A Code of Construction Practice (CoCP) will be prepared and agreed with Swindon Borough Council which will set out measures to control construction impacts upon natural resources.

Topic	Proposed Measures during Operation
	Residues and Emissions There will be times of the year when water is needed for cooling and this would generate small quantities of process wastewater. Domestic effluent arising from the occupation of the data storage building and process water will discharge to the Thames Water Sewer in Brimble Hill. A package pumping station and rising main is proposed to convey domestic and process water flows to the Thames Water sewer (ref MH9201). Discharges of surface water will be restricted to run-off from the roof hardstanding and paved areas etc. A Surface water drainage system and a cellular storage / soakaway will be utilised. An Environmental Permit will be in place for the operation of the diesel-fired emergency generators. **Vulnerability to Accidents and Disasters** **Fire** A 'fire engineered solution' has been adopted as part of the design for the proposed development, with reference to relevant Fire Standards and Building Regulations. The proposed development will be equipped with a number of active fire protection measures as well as fire detection and alarm systems. **Security** Security measures have been incorporated into the design of the proposed development. The proposed development is located on a campus with a private access and established security measures in place. A security gatehouse with associated barrier entry system will be located at the entrance of the site. The site will be manned by security personnel 24 hours a day. The site will be surrounded by fencing and CCTV equipment will also be provided as part of the proposed development.
Landscape and Visual Resources	**Lighting** Illustrative proposed lighting layout plans have been produced for the proposed development (document reference 20305S-CON—XX-XX-RP-E-9735). The detailed lighting proposals for the Application Site would be developed during the detailed design process. The proposed development would replace the bollard lighting with street-lamp type lighting, along a reconfigured internal road and increase the security lighting along the security fences around the Application Site. The proposed site-wide security lighting strategy would seek to minimise light levels when practical, without compromise to safety and security. It is anticipated that energy use and light pollution would be minimised as far as possible by: • Minimising potential for sky glow by reducing upward reflected light; • Employing high quality luminaire optics and shields to precisely focus light; and • Employing a lighting control system to intelligently switch lighting. The scale of the lighting, i.e. the mounting heights of the luminaires, shall respond to the use of the route or space. Light fittings within the Application Site, including those used for security, to light roads, spaces and surface carparks, would be a maximum height of 8 m for road lighting at approximately 28-30 metres apart. to ensure that light trespass is avoided as far as possible and that the view of the Application Site is not compromised after dark. The use LEDs is intended throughout to help minimise energy use, manage the lit image of the Application Site and limit light spill. Lighting control systems would allow lighting to be switched off according to the time of day. It is expected that the Application Site would be lit from dusk to dawn. This would ensure that an appropriate quantity of security light is delivered at all times, however light spill would be mostly retained within the Application Site boundary.

Topic	Proposed Measures during Operation

The Landscape Scheme

The landscape proposals have been designed as an integral part of the proposed development to provide treatment and landscape integration for the perimeter and internal part of the site, and mitigation and visual amenity from the properties and roads adjacent to the Application Site boundary. The proposed landscape design comprises predominantly locally native tree (119 no. individual trees) shrub (as part of a woodland planting mix) and wildflower meadow planting, using translocated turf from the area being developed where possible.

The tree and shrub mixes have been based on natural species associations for the soil type and species found in the adjacent, surrounding land, as the soils on the Application Site have been disturbed through previous and existing development. The existing species within the majority of the Application Site are not locally native species, or not locally native species in the correct ratio as those areas of naturally occurring woodland tree and shrub mixes in the surrounding area.

The landscape strategy of the proposed development is illustrated on Figure 5.45 and detailed in Appendix 5.2, accompanying this Application. The landscape strategy is focused on the following key objectives:

- To provide a high-quality landscape setting for the buildings that enhance the site and compliment the Application Site's wider context.
- To strengthen the Application Site's containment by extending the areas of existing woodland surrounding the site, with areas of individual trees and meadow grass areas in order to increase the potential biodiversity value.
- To accommodate the drainage measures necessary within an attractive and naturalistic area of enhanced biodiversity, including native species trees and shrubs, wildflower meadow and wet grassland, with different habitat features associated with the attenuation pond including native species wetland and marginal planting.
- To retain the existing seed bank and increase the floristic diversity of the grassland.

Landscape proposals include the following features:

- retained and proposed woodland (to be underplanted / infilled where practicable);
- retained existing grassland to be enhanced (reseeded where required) and mown annually to maintain floristic diversity;
- close-mown grassland cut frequently to maintain a height of 75 mm for security purposes;
- local meadow grassland mix (Barbury Castle mix) maintained to 300 mm;
- local meadow grassland mix (Barbury Castle mix) mown annually in autumn to maintain floristic diversity;
- translocated turf from existing grassland mown annually in autumn to maintain floristic diversity;
- flood tolerant grassland within sides of attenuation pond, mown annually in autumn to maintain floristic diversity;
- pond edge wildflower mix, mown annually in autumn to maintain floristic diversity; and
- native species marginal planting within pond.

The positioning of the buildings and associated infrastructure will enable the retention of surrounding woodland and some areas of woodland and individual trees within the Application Site, which would be protected as necessary during construction and augmented using native species to extend the area of woodland within the Application Site.

The landscape proposals seek to improve the character of the Application Site and the surrounding landscape by establishing vegetation using native species predominantly appropriate to the local area, which will provide screening and

Topic	Proposed Measures during Operation
	connectivity to the surrounding area and as an enhancement to the existing site conditions. All trees, shrubs and grass/wildflower mixes are to be sourced responsibly, in the first instance, from UK Nurseries / suppliers, where they have been propagated and/or grown on for a minimum of five years in the UK.
Ecology and Nature Conservation	**Habitat Retention and Enhancement** The site layout has been designed to retain as much of the existing habitat as possible within the limitations of the security requirements of the operational data centre. Those requirements are for a minimum level of security lighting and the avoidance of planting close to the buildings or security fence. Details of the retained habitats are shown in the Landscape Strategy (Figure 5.45) and the Tree Retention and Loss Plan in the Arboricultural Impact Assessment (Appendix 5.5). The following habitats will be retained: • mature plantation broad-leaved woodland on the site boundaries (approximately 1.5ha); • semi-improved neutral grassland in the north-western quarter of the site, along the boundary of the SSSI woodland, in the south-eastern area adjoining plantation woodland; ; and • a large number of mature and semi mature trees. The areas of retained grassland are not currently managed and are becoming rank. The grassland would be cut, and where it is currently species-poor would be scarified and over sown with a wildflower seed mix appropriate to the soil type. A cutting regime will be implemented to promote floristic diversity and prevent domination by grasses (see Grassland Management Plan Figure 6.5). **Biodiversity Net Gain** A Biodiversity Net Gain (BNG) Assessment has been undertaken to identify the biodiversity gain or loss based on the existing habitats which are mapped on the Habitat Plan (Volume 2, Figure 6.2). The Landscape Strategy has been designed to maximise biodiversity value within the Application Site through the retention of neutral grassland and semi-improved neutral grassland. The retention and enhancement of the boundary woodland will also contribute to the biodiversity value of the operational site. Although on-site credits have been maximised there is small overall loss of biodiversity habitat units. A contribution to an off-site grassland creation scheme will provide the compensation needed for the development to deliver a 10% gain. The loss of a tree line and ornamental hedgerow is been mitigated through the creation of a new native hedgerow with trees and associated ditch which will result in a biodiversity gain in terms of linear habitats. **Biodiversity Management and Monitoring Plan** New bat roosts provided under a Natural England EPS mitigation licence will be monitored in accordance with the details specified in the licence. Monitoring typically will comprise a physical roost inspection and emergency / re-entry survey in the year following installation of replacement with further inspections biennially up to five years after installation depending on the conservation status of the roosts being replaced. New habitat creation for biodiversity gain would normally be monitored in the first year after creation to assess initial establishment of new habitats. For the translocated, new and enhanced grassland areas, botanical surveys at the appropriate time of years (usually early and late summer) would record vegetation cover and species composition against the grassland specification. Further monitoring would typically be carried out in years two or three and year five. The findings of monitoring would be used to inform management with management practices modified where necessary to ensure biodiversity objectives are being met.

Topic	Proposed Measures during Operation
	Where there is a significant short fall in the objectives being achieved, remedial measures would be recommended such as resowing. Formal biodiversity objectives are defined in the Biodiversity Management and Monitoring Plan (BMMP) (Volume 3, 6.7) which includes a timetable for implementation and monitoring, defined roles and responsibilities for monitoring and management and formal management review after each monitoring round.
Historic Environment	N/A
Other topics not included in ES	
Noise and Vibration	**Generator Design, Operation and Planning Considerations** The main source of noise at the data centre would be the emergency generators. As discussed in Volume 3, Noise Impact Assessment: 20305S-RPS-XX-XX-RP-P-9720, the generators will be within acoustic enclosures. The enclosures have been designed to reduce the noise to the lowest practicable levels. Measures include an enhanced cladding specification above what is normally provided to the roof or the enclosures, and a silencer fitted to the stack of each generator. Without an enclosure, the typical sound level from a generator is 113 dB LAeq at 1 m. RPS ran an initial model with a generator in an enclosure, which reduced this level to 85 dB LAeq at 1 m. However, as the predicted noise levels from the generators were high, the specification of the enclosures was upgraded, using an enhanced and bespoke design, to reduce sound pressure levels to between 73 and 75 dB LAeq at 1 m (giving an overall sound power level of 100 dB LWA based on dimensions of a typical unit in an enclosure). In addition, the exhaust stacks have been fitted with silencers reducing the emission to 75 dB LAeq at 1 m. Therefore, considerable acoustic mitigation measures have been incorporated into the design of the generators and reducing the acoustic emissions by over 33%. Note this has required the generator enclosures to be larger to accommodate the additional attenuation material but this has avoided the need to change the scale and massing of the main building. **Grid Reliability and In-built Redundancy** Every effort will be made to ensure that the emergency generators would not be required in practice, as described below. Power for the data centre will be supplied from/by the National Grid which operates its transmission system in accordance with the Security and Quality of Supply Standard which is a requirement of its Transmission Licence. In accordance with this standard, a level of redundancy is also built into the transmission system. The overall reliability of supply for the National Grid Electricity Transmission (NGET) System during 2018 - 2019 was 99.999984%. During 2018-19, there were 347 NGET system events where transmission circuits were disconnected either automatically or by urgent manual switching. Most of these events had no impact on electricity users with only three resulting in loss of supplies to customers. See ‘Resilience and Redundancy’ in the Deign Section of Table 2.5 for aspects relating to the design of the grid connection, on-site infrastructure, and maintenance. As a result of these measures the anticipated use of generators and potential noise impact is reduced. **Phasing** The data centre is a phased facility which means that commissioning of the phases will likely to be carried out over time. The operator will not fully deploy all the IT and data storage equipment (or support infrastructure such as the emergency generators) across the entire facility; instead the data servers will be deployed on a phased-basis, determined by customer demand. The time-gaps between the phased deployment can be months. As subsequent data rooms are bought online, the approved backup generator sets in relation to that phase are delivered and installed. As such, when the data centre first becomes operational, the emergency backup generators associated with the latter phases (of which there are 3 after the construction phase of the project) will not be in use in initial operations.

Topic	Proposed Measures during Operation
Air Quality	The key mitigation of the operational impacts is determining the optimum height for the generator stacks. The results of the stack height determination are provided in Annex B of the Air Quality Assessment (2035S-RPS-XX-XX-RP-R-9721)
Traffic and Transport	From the analysis of the traffic volumes and impact it is considered that the vehicle movements generated by the proposed development would not result in an unacceptable impact on highway safety or result in a residual cumulative impact on the road network that is severe
Flood Risk	**Surface Water and Drainage Strategy** The sustainable management of surface water is an essential element of reducing future flood risk to the site and its surroundings. The Application Site was previously used for three data centres, one of which is proposed to be retained. The topographical survey indicates that there are existing soakaways, suggesting that the site is located on good infiltration media. Site Investigation and Soakaway Testing was completed by RPS in October 2020. Groundwater was not encountered in any intrusive works at the site. Surface water arising from a developed site should as far as is practicable be managed in a sustainable manner. It should also provide betterment to the existing surface water flows arising from the site prior to the proposed development while reducing the risk of flooding at the site and elsewhere, taking climate change into account. A drainage strategy has been prepared (20305S-RPS-00-XX-DR-D-9630) for the proposed development to support this FRA and forms part of the planning application. It sets out the proposed approach for managing surface water from the proposed development. **Proposed Surface Water Drainage** Surface water runoff at the site is proposed to be discharged via infiltration through soakaway into a geocellular attenuation tank. Details for of the supporting calculations are presented in RPS Drainage Design Philosophy, reference 20305S-RPS-00-XX-RP-D-9605.Testing. The proposed new surface water drainage system has been designed using current Micro Drainage analysis software, cognisant of planning policies, LLFA and EA guidance to prevent uncontrolled flooding off the site to surrounding areas. The Overall Proposed Surface Water Drainage Strategy is presented on drawing reference 20305S-RPS-00-XX-DR-D-9630 within the RPS Drainage Design Philosophy (20305S-RPS-00-XX-RP-D-9605). In summary surface water runoff from the proposed development will be collected as follows: 1. Surface water runoff generated by the new data centre will be conveyed in an easterly direction to an infiltration basin located east of the data buildings; and 2. Impermeable building roof areas will be drained using traditional gravity gutters and downpipes, connected to a network of slot drains and conveyed into soakaways. The existing surface water drainage network associated with the southern building is proposed to be retained. This strategy is presented in the Drainage Design Philosophy (20305S-RPS-00-XX-RP-D-9605) of the planning application together with indicative invert levels of the proposed infiltration basin. The location and levels of the proposed surface water conveyance network and infiltration basin will be confirmed during the detailed design stage. The infiltration basin will assist with the removal of sedimentation from runoff, with benefits in improving water quality and reducing the total maintenance required. The proposed system also provides benefits in encouraging biodiversity through habitat creation.

Topic	Proposed Measures during Operation
	Surface water runoff from the site will be discharged principally via infiltration.

3 NEED AND ALTERNATIVES CONSIDERED

3.1 Introduction

3.1.1 This chapter of the Environmental Statement (ES) provides a summary of the need for the proposed development and the main alternatives considered by the Applicant during the EIA process. It includes a summary of the reasons for the selection of the site, together with a description of the alternative design and layout options that have been considered. Further information is provided in the Planning Statement (document reference 20305S-RPS-XX-XX-RP-T-9701) and Design and Access Statement (20305S-RPS-XX-XX-RP-A-9750) that accompany the planning application.

3.2 Data Centres

Purpose of a Data Centre

3.2.1 Over recent years, a wide variety of service providers, including the Operator, have begun offering IT infrastructure services – now commonly known as ‘cloud computing’. At the core of cloud computing are Data Centres which comprise networks of remote servers hosted to store, manage, and process data in place of local servers and personal computers.

3.2.2 The proposed Data Centre will support the provision of cloud computing services. Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing. Instead of buying, owning, and maintaining physical data centres and servers, organisations can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud providers such as the Operator of the proposed facilities.

3.2.3 Organizations of every type, size, and industry are using the cloud for a wide variety of use cases, such as data backup, disaster recovery, email, virtual desktops, software development and testing, big data analytics, and customer-facing web applications. Cloud computing offers significant advantages to organisations over traditional in-house (on premises) data storage systems. The primary advantages are:

- higher reliability and redundancy of systems;
- 24/7 monitoring and maintenance of storage by staff;
- higher security and data protection;
- flexibility & Lower Cost – ability to increase or decrease storage requirements at short notice in line with specific business needs; and
- increased energy efficiency over on-premises data centres; attributable to the combination of a more energy efficient server population and much higher server utilisation. The Operator has commissioned studies to estimate the efficiency of its infrastructure in comparison to traditional computing and found it to be more than three times as efficient, due to efficient servers and higher utilitisation rates. The Operator’s efforts on energy efficiency are never complete and it continuously seeks out additional opportunities to reduce energy usage from every aspect of its business. The operator custom builds its own hardware, which is designed to run workloads with high level of resource utilization to increase efficiency.

3.2.4 The growth of the digital economy depends heavily on the capacity to store, process and access data. The proposed development is intended to help meet this demand.

Requirements of a data centre

3.2.5 Whilst physically resembling a conventional warehouse-type building, a Data Centre has a series of specific infrastructural and technological requirements.

3.2.6 These include the need for secure and resilient electrical power, which will ensure the operation of the servers on a continual and 'critical' basis (24 hours a day). A key consideration in the site selection process is therefore locating a Data Centre close to existing electricity infrastructure. The critical-facility nature of a Data Centre means that power supply to the facility must be guaranteed even in the event of a utility power failure. Thus, a Data Centre must also be equipped with 'back-up' power infrastructure, specifically comprising on-site emergency (back-up) generators with sufficient capacity to temporarily power the servers (at their critical IT load) and other infrastructure in an emergency (i.e. a power failure) scenario.

3.2.7 Data Centres rely on the ability to import data via the internet, and accordingly robust incoming fibre connectivity is also required. Distances to the fibre network are critical to ensuring that a Data Centre can function and operate with fast data-transfer speeds.

3.2.8 A Data Centre must be carefully controlled for optimal internal temperatures. Computer servers produce heat while operating, meaning that to ensure their optimum performance the internal environment must be controlled. As such, Data Centres must be equipped with specialised cooling and humidity control infrastructure, in the form of air handling units. Accommodating this equipment, with air handling units either side of the data halls and exhaust fans at roof level, influences the size and layout of Data Centre design.

3.2.9 Lastly, effective safety and security measures must be incorporated given that a Data Centre houses sensitive customer data and computer processes for organisations and individuals. These can include 'physical security' incorporated into the building's structural design, as well as measures such as, secure perimeter fencing, access controls and CCTV.

3.3 Need for the Development

3.3.1 The proposed development will cater for the growing demand for cloud computing and online services across the globe.

3.3.2 With the growing digital economy comes the requirement for data storage capacity. There is currently a high demand for data storage, processing and access and according to recent research, the demand for public cloud services is expected to accelerate in growth in the U.K.

3.3.3 While the use of traditional managed services appears to be in decline, demand for public cloud services is growing. This is not restricted to large scale businesses, with medium and small businesses increasingly using cloud-based systems.

3.3.4 This has been further supported by the increasing shift to home-based working, particularly due to the pandemic. The proposed development is intended to help meet this increase in demand.

3.3.5 The development will meet a recognised national demand for data centre provision, thus contributing to the national technology infrastructure and economy. At a local level, the proposals will make a significant inward investment and contribution towards the local economy, not only in the longer-term operation of the facility but also in the shorter-term construction phases, with the creation of a significant number of construction related jobs. Moreover, refusal of permission would have a major detrimental impact, not only on the local and national economy but also on the critical and ever-increasing demand for data storage and processing at a national level.

National Policy Context

3.3.6 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government 2019a) sets out the Governments planning policies for England and how these should be applied.

3.3.7 Section 6 of the NPPF 'Building and strong, competitive economy' states that:

"Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development."

3.3.8 Paragraph 82 states:

"Planning policies and decisions should recognise and address the specific locational requirements of different sectors. This includes making provision for clusters or networks of knowledge and data-driven, creative or high technology industries; and for storage and distribution operations at a variety of scales and in suitably accessible locations."

3.3.9 Paragraph 83 states that:

"Planning policies and decisions should enable:

a) the sustainable growth and expansion of all types of business in rural areas, both through conversion of existing buildings and well-designed new buildings;…"

3.3.10 For the support of high quality communications, Section 10 of the NPPF states:

"Advanced, high quality and reliable communications infrastructure is essential for economic growth and social well-being."

3.3.11 Paragraph 114 states that:

"Local planning authorities should not impose a ban on new electronic communications development in certain areas, impose blanket Article 4 directions over a wide area or a wide range of electronic communications development, or insist on minimum distances between new electronic communications development and existing development. They should ensure that:

a) they have evidence to demonstrate that electronic communications infrastructure is not expected to cause significant and irremediable interference with other electrical equipment, air traffic services or instrumentation operated in the national interest; and

b) they have considered the possibility of the construction of new buildings or other structures interfering with broadcast and electronic communications services."

3.3.12 For the effective use of land Section 11 of the NPPF states:

"Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions."

3.3.13 Paragraph 118 states:

"Planning policies and decisions should:

a) encourage multiple benefits from both urban and rural land, including through mixed use schemes and taking opportunities to achieve net environmental gains - such as developments that would enable new habitat creation or improve public access to the countryside…"

3.3.14 With regard the design of the project, Section 12 of the NPPF states:

"Planning policies and decisions should ensure that developments:

a) will function well and add to the overall quality of the area, not just for the short term but for the lifetime of the development;

b) are visually attractive as a result of good architecture, design and appropriate and effective landscaping;

c) are sympathetic to the local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging the appropriate innovation or change (such as increased densities);

d) establish or maintain a strong sense of place, using the arrangements of streets, spaces, building types and materials to create an attractive, welcoming and distinctive place to live, work and visit;

e) optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space) and support local facilities and transport networks; and

f) create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience."

3.3.15 The Ministry of Housing, Communities and Local Government has also published its National Planning Practice Guidance (NPPG) (Ministry of Housing, Communities and Local Government, 2019b).

3.3.16 The National Data Strategy produced by the Department for Digital, Culture, Media and Sport was last updated in December 2020. It should be noted that this is not yet a framework but provides insight as to the governments perspective on data moving forward.

3.3.17 It outlines how the more efficient use of data can assist many organisations in achieving success This can include the delivery of existing services or the creation of new products as well as being a driver of scientific innovation and aid in the delivery of key public services and goal for society. It is highlighted that the UK is already one of the leading digital nations globally, however, the last 5 years have seen a marked shift in technological changes and as such the strategy states that:

"We need a data strategy that reflects the opportunities and challenges of our new hyper-digital world"

3.3.18 Within Section1: About the National Data Strategy the broad range of what data is used for and relied upon in everyday life is highlighted and the importance of not only manging data but also storing it, stating:

"To ensure that data dependency risks are well managed, we are also interested in the infrastructure underpinning the storage of data, such as physical and virtualised data centres/the Cloud."

Local Policy Context

Swindon's Development need

3.3.19 The Swindon Local Plan is the principal planning policy document for the Borough and provides the development strategy to deliver sustainable growth until 2026. Within Policy SD2: The Sustainable Development Strategy sets out the provision of 199.5 ha of land for employment in order to deliver sustainable economic and housing growth. It is hoped that through this sustainable development strategy and the allocation of employment land, Swindon's development needs can be met while also protecting its most important assets. While the strategy places more of a focus on the urban centre of Swindon, it also facilitates the Borough council to adopt a rational and responsible approach to town expansion. As such, development opportunities outside of the urban centre of Swindon should be "*realistic and not compromise the existing or emerging longer-term vision and strategy.*"

3.3.20 The Economic Strategy for Swindon (2012-2026) highlights that the creation of new jobs and developing the skills of the residents of Swindon and ensuring that many of the young people are working within Swindon is one of the Boroughs main priorities. This is need is further exacerbated by an ever-expanding population over the past decade with a simultaneous drop in employment meaning Swindon needs to create more jobs.

Spatial Objectives

3.3.21 Part 2 of the Swindon Local Plan looks at the context, vision and spatial objectives for the borough. The key development priorities which guide the Local Plan's Strategic Objectives are set out below:

- Deliver growth that is balanced and sustainable, and provides the necessary infrastructure, while addressing the impacts of climate change;
- Deliver regeneration in a way that meets the needs of Swindon's future, but conserves and enhances the best of the past; and
- Recognise the important role of green infrastructure to enhance the quality of life for existing and future residents.

3.3.22 Underpinning the Spatial Vision for Swindon and the Borough Council's priorities is a themed set of Strategic Objectives based on the strategies of the Borough and its partners, and developed through consultation. Those relevant to this proposal include:

- Strategic Objective 1: High Quality Sustainable Development - to improve the image of Swindon, enable inclusive communities and address climate change by the provision of high quality, well designed and sustainable development;
- Strategic Objective 2: Infrastructure - to meet the infrastructure needs for and arising from the growth of Swindon (including health and community needs) in a timely and co-ordinated manner and being adequately funded.
- Strategic Objective 3: Economy - to meet the needs of local businesses and the forecast growth in the local economy, and to enhance Swindon's position as the UK's best business location;

The need for Infrastructure in Swindon

3.3.23 The Swindon Local Plan highlights within Strategic Objective 2 the desire to meet Swindon's infrastructure needs in-line with the increasing demands from its growth. In order to assist in Swindon's sustainable development vision, it is key that new development is able to facilitate the economic development within the Borough.

3.3.24 The plan discusses that strategic development, which the proposed development falls under, is most likely to be delivered off-site. The Swindon Borough Infrastructure delivery plan expands on this with the Application Site falling under Information Communication Technology and classified as Physical Infrastructure. The local plan highlights that owing to the varied opportunities of ICT and the high potential for them to assist in town centre regeneration as well as good opportunities for rural employment, the Local Planning Authority will support and facilitate the growth of ICT and telecommunications while simultaneously protecting the character of the area.

3.3.25 The proposed development will contribute to the ambitions of Swindon Borough Council to attract business and enterprise in the fields of science and technology, including through spill-over effects arising from the clustering of high-tech operators, high value activity to the supply chain of products and services.

3.4 Alternatives Considered

3.4.1 The EIA Regulations require that an ES should include:

'A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.' (Schedule 4(2)).

3.4.2 This section therefore sets out the key reasons for the selection of the Application Site and current layout, taking into account environmental effects.

Site Location

3.4.3 When considering the location for the proposed development, the applicant conducted a site search with an objective of shortlisting potential sites for initial consideration. The shortlist was selected based on location, plot size and dimensions, proximity to optic fibre, availability of and proximity to power infrastructure, availability of labour and schedule for delivery of an operational Data Centre. Five sites were short-listed sites and were taken through a qualification and initial evaluation process. These sites were:

1. National Data Centre, Old Burderop Hospital site, Wroughton, Swindon, Wiltshire
2. Southpoint Business Park, Showell, Chippenham, Wiltshire
3. Chippenham Gateway, Chippenham, Wiltshire
4. Panattoni Park, A420, Swindon, Wiltshire
5. Ignition, Faraday Road, Swindon, Wiltshire

3.4.4 This process included Technical Due Diligence where the sites were subject to desktop site investigations including geotechnical, air quality, topographical, legal, planning, and other environmental studies. The sites were test fitted with concept-level design which included the required security setbacks, site plans and elevations. Desktop planning and environmental evaluation were undertaken to establish the planning requirements for each location and whether

the design and use would meet the requirements of the site's planning policy, other planning and development guidance and development plans covering the sites.

3.4.5 Following this initial review process three sites were taken through to pre-delivery appraisal. These were: Southpoint, Showell; Chippenham Gateway, Chippenham; and National Data Centre, Burderop Park. All of these sites were reviewed from a fibre connectivity perspective to assess the feasibility of connecting the sites appropriately, with the three shortlisted being the preferred sites. The Panattoni site was leased to another party before terms were agreed. The Ignition site did not meet the design requirements for security setbacks and building height.

3.4.6 The remaining three sites were progressed for further evaluation and pre-delivery appraisal. Power applications on the remaining three sites were also submitted. Power offers were subsequently received for Southpoint and Chippenham Gateway. These showed a power delivery date between 18 and 24 months later than needed. The National Data Centre site already had an existing power connection (with the historic use as a Data Centre campus) and was also close to other power infrastructure in the area that met initial requirements (thus avoiding the need for major power infrastructure works). The Southpoint site was subsequently rejected after reviewing the findings of the power-delivery schedule, planning and environmental evaluation.

3.4.7 The National Data Centre site and Chippenham Gateway sites were progressed for more detailed analysis prior to final site selection. The Chippenham Gateway site was leasehold whereas the National Data Centre site was available to purchase Freehold. Leasehold is a less preferred occupation method for the applicant as it offers less control over access and future operation changes than a freehold site. Power delivery for Chippenham Gateway was 24 months later than required, significantly delaying launch. The National Data Centre site had power connections in place to the required level for initial launch requirements (i.e. no launch delays due to power availability). National Data Centre also had existing fibre connectivity which reduces the quantum of new fibre network construction works, as it had three individual data centres across the campus/site. In summary, the National Data Centre site was selected on the basis that it was an existing Data Centre location until 2020; had the required infrastructure available (including power and fibre) proximal to the site and thus, not delay launch (some minor upgrade works by the utility providers are likely to be needed); and available for freehold purchase to the timeline required.

3.4.8 The planning and environmental appraisals of the National Data Centre site did identify the various planning and environmental sensitivities (as reported in the Baseline section of the Environmental Statement) and noted the potential challenges of developing this preferred site. However, the relatively large site area (approximately 28 acres) provided for the masterplanning of the site such that development would be concentrated away from the ecologically sensitive boundaries. The sites established status as Previously Developed Land (PDL), its established land use for a Data Centre (with close proximity to critical infrastructure needed) and the opportunity for re-use of a redundant site, were also viewed as significant environmental and economic benefits. Further information on the design alternatives considered and the evolution of the design in response to baseline studies and site sensitivities can be found in the Design & Access Statement accompanying this application (document reference 20305S-RPS-XX-XX-RP-A-9570).

Masterplaning space considerations

3.4.9 Masterplanning space considerations for the data centre design includes an inner and outer securely fenced compound of approximately 210m by 140m, with 10m minimum of maintained grass outside of the fences for visibility and monitoring. The inner compound required two vehicle access points in order to maintain operational security during phased fit-out works, as well as for emergency services access.

3.4.10 Adjacent to the data centre, and between the data centre and the existing utility supplies will be utility compounds for the incoming power connections required for the operation of the building. This compound will be approximately 50m x 50m, but the final size will depend on the orientation and position due to the technical requirements set by the utility companies.

3.4.11 Between the highway access point and the data centre will be the security reception area, where pedestrians, cyclists and vehicles will pass through security check. The sallyport area will be approximately 70m x 30m which includes standing space for vehicles either side of the sallyport gates

Site Layout and Design

3.4.12 An evaluation of site constraints and opportunities was undertaken to inform the site layout and design. Constraining factors that affected the layout of the proposed development included:

- the location of the Application Site within the North Wessex Dows Area of Outstanding Natural Beauty (AONB);
- the location of the Burderop Woods Site of Special Scientific Interest (SSSI) to the north of the Application Site;
- existing trees and grassland present at the Application Site;
- predominantly rural setting;
- listed buildings at Burderop Park to the south;
- existing and future residential dwellings in the local area.

3.4.13 The proposed development presents an opportunity to provide the following:

- redevelopment of the current data centre campus through the replacement of the existing Data Centre buildings (and ancillary infrastructure) with a single and more energy-efficient facility;
- providing a source of employment during construction and operation including high-skilled and high-tech jobs contributing to the high-skilled labour pool within the area;
- enhance the biodiversity on the Application Site including native species of trees and shrubs, wildflower meadow and wet grassland.

3.4.14 The findings of the EIA process have influenced the iterative design process of the proposed development, through the identification of the above constraints, responses during the consultation process, and identification of environmental effects.

3.4.15 A number of revisions and iterations to the masterplan and design have been implemented through the EIA process including:

- location of the data centre building on the Application Site;
- position of the infiltration pond;
- reconfiguration of the external fence position and secondary access; and
- orientation of the data centre building.

3.4.16 Natural England has been consulted during the application process and feedback was sought on the location and the layout of the proposed development. They raised concerns regarding the area of grassland that would be lost as a result of the layout of the proposed development. In response to this feedback, the Applicant undertook an exercise to identify if the proposed development could be accommodated on the area of adjacent land to the south east. Notwithstanding that this parcel of land falls outside the application boundary and outside the control of the Applicant, the exercise

demonstrated that the security requirements around the building and associated infrastructure requirements could not be accommodated on this parcel of land and was not considered further (see Figure 3.1 below). This parcel was also not available for sale when the Applicant searched for alternative sites in 2020.

Figure 3.1: Discounted Alternative Site Location

3.4.17 Two options for the location of the data centre hall building within the Application Site were considered: a building in the north east or a building in the north west.

3.4.18 The proposed data centre building has been positioned as far east as possible adjacent to the Beta/Gamma buildings which will be demolished as part of the development proposals. This has allowed for the building has been positioned on a relatively flat plateau on the site in order to minimise the amount of site disturbance and cut and fill required. The position of the infiltration pond on the footprint of the existing building utilises the existing basement which subsequently, reduces the volume of material to be excavated (and transported off site) and follows the site topography.

3.4.19 The topography of the Application Site falls from the highest point in the north to the lowest point in the south. The proposed location of the building in the north east is at a lower elevation compared to the north west to minimise visual impacts on the AONB and designated heritage assets in the area.

3.4.20 Natural England requested clarification about the position of the proposed replacement data centre on the Application Site. They suggested that if the building was located in the north west of the site, the area of higher value grassland (shown in Volume 3, Appendix 6.6) that would be lost would be greatly reduced. The Applicant considered both options and identified that the area of higher value grassland that would be lost would be similar in both options. The north west option would also result in the loss of more trees and scrub habitat which are also of ecological value.

3.4.21 The trees within the Burderop Woods SSSI are designated as an Ancient Woodland and attract special protection measures. As a result, the data centre has been positioned such as to limit any potential impact on these trees. A minimum of 15 m offset from the treeline has been maintained in order to protect the root zones of these trees. In most cases a much greater buffer has been provided to the treeline as shown in drawing 20305S-RPS-00-XX-DR-A-9501.

3.4.22 Options for the orientation of the building and the location of the generators were also considered (i.e. generators to the north or the south of the building). The generators have been positioned to the south of the data centre building to maximise the distance from the ecological receptors at Burderop Wood SSSI and to mitigate potential noise and air quality impacts. Considerable acoustic mitigation measures have been incorporated into the design of the generators, reducing the acoustic emissions by over 33%. Silencers are also proposed to be fitted to the exhaust fans on the roof of the data centre building to reduce noise emissions to background levels.

3.4.23 The established access into the Application Site will be maintained to provide access to the highway network and the sally port has been kept away from the main junction in order to provide space for a secondary emergency and construction access to the Application Site outside of the sally port. This has avoided the need to construct a secondary access from Brimble Hill, which would have required the removal of a high number of trees in order to provide the necessary visibility splays. This also allows the sally port and associated guardhouse and utility building to be further from the site entrance to minimise visual impact from the highway. The position of lighting columns have been modified to reduce the potential for light spill onto adjacent woodland habitats

3.4.24 These measures are illustrated on Figure 3.2 below.

Figure 3.2: Site Layout Considerations

3.4.25 The masterplan has also been revised in response to pre-submission feedback from Natural England to address their concerns regarding the loss of the grassland habitat within the AONB and loss of connectivity with the adjoining SSSI. As a result of discussions, the Applicant made the following changes to the design:

- Removal of the paved secondary access road around the perimeter and replacement with a reinforced grass emergency access route to the data centre building and access to utility compounds;
- Removal of security lighting away from the tree line along the western boundary; and;
- Retention of trees in the north west corner.

3.4.26 These changes are illustrated on Figure 3.3.

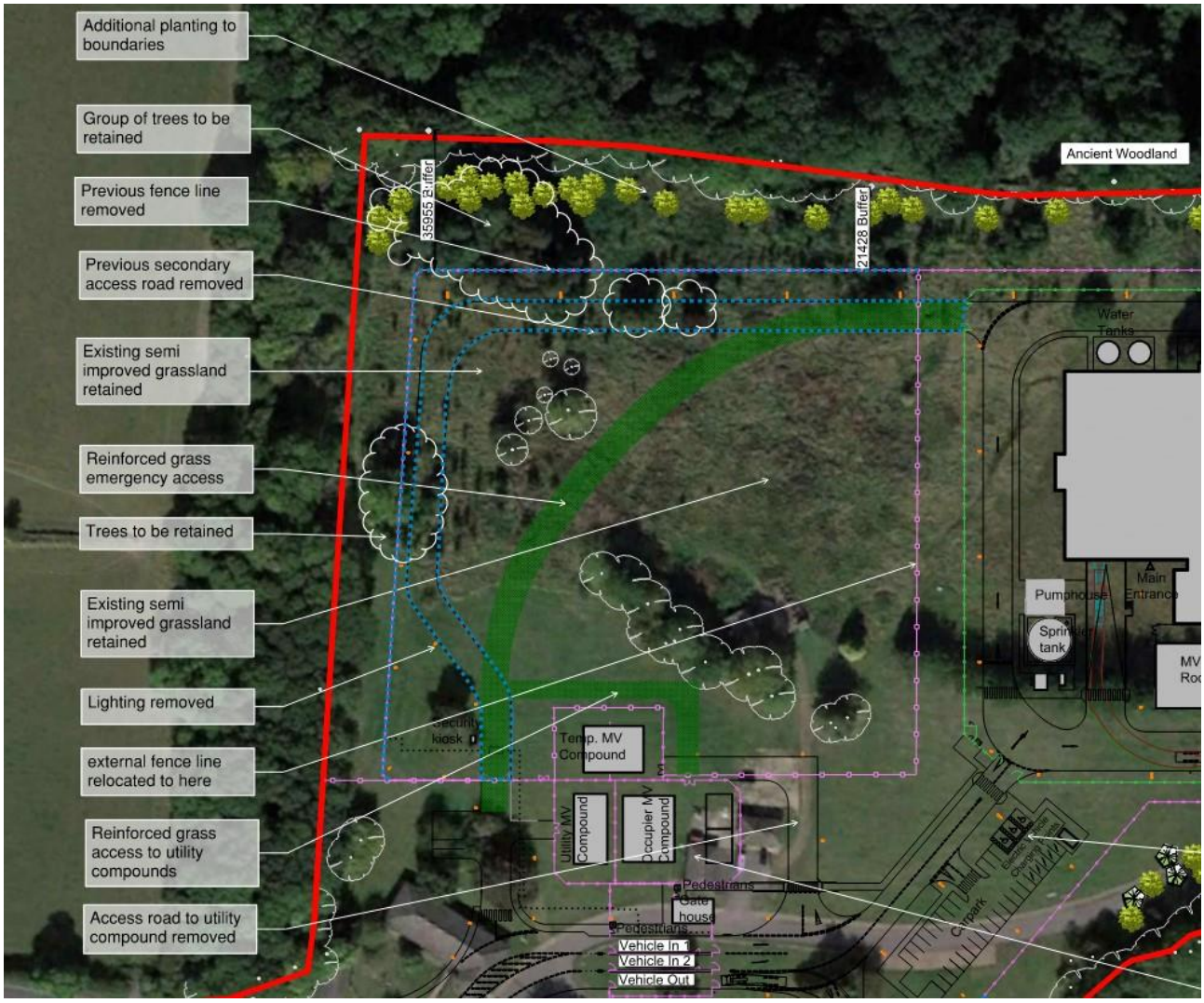

Figure 3.3: Evolving Design – North West Corner

3.4.27 The Applicant considered that additional design changes should be made to further reduce the area of habitats being lost. These changes are set out below and illustrated on Figure 3.4

- The demolition of the existing Alpha building and the creation of a new grassland habitat area;
- The removal of existing lighting and fencing;
- The relocation of fencing for the secure compound to be closer the access road;
- The enhancement of the perimeter grassland around the former building; and
- Additional tree planting.

Figure 3.4: Evolving Design – South West Corner

3.4.28 The new grassland habitat area will include higher value grassland translocated from the centre of the Application Site in accordance with the Outline Grassland Translocation and Soil Management Method Statement (Volume 3, Appendix 6.6) and it will be managed in accordance with the Biodiversity Management and Monitoring Plan (Volume 3, Appendix 6.7).

3.4.29 With the removal of the Alpha building, the building area schedule of the proposed development will be 9,632m^2 compared to the existing 9,665m$^{2.}$

Alternative Processes/Technologies

3.4.30 Alternative technologies are considered on an ongoing basis by the Applicant as a part of each of its designs based on many factors including technical feasibility, environmental impact, efficiency, security, reliability and cost.

3.4.31 The Applicant is committed to continually assessing and improving this technology particularly with respect to minimising power and water consumption. The Applicant's designs are constantly evolving, and hardware is chosen with energy efficiency central to the decision-making process.

3.4.32 The Energy Statement (document reference 20305S-CUN-XX-XX-RP-E-9736) which accompanies the planning application explains the reasoning for the selection of certain technologies to demonstrate that the proposed development represents a low energy solution whilst operating as a functional, critical data storage facility development.

Cooling Systems

3.4.33 As set out in the Energy Statement, the Proposed Development will use free air cooling (and adiabatic cooling, when required) whereby the data storage rooms are supplied with fresh air which is sufficient to cool the space for the majority of the annual running hours. For a small

number of hours during the peak cooling season, adiabatic cooling is required. The system utilises fans to supply air directly from outside to the data storage rooms. The air is warmed as it passes across the servers located in the data storage rooms, and subject to external ambient conditions, this air is either recirculated or exhausted to atmosphere. Adiabatic cooling uses mains water at ambient temperature conditions to provide cooling on peak cooling days. The system does not require chillers/compressors which minimises the use of electrical power to maintain the data storage room environmental conditions. The alternatives to free air cooling considered by the Applicant were as follows:

- Air cooling by chiller and computer room air conditioning (CRAC);
- Air cooling by indirect air-cooling air handling units (AHU); and
- Chilled-water cooling derived from free-cooling, hybrid cooling towers with chiller assist.

Air cooling by chiller and CRAC:

3.4.34 This chilled-water solution serves CRAC downflow units typically serving cold air to the data storage hall white space through a floor void. CRAC units normally include humidification elements to control the static electricity and all hot air is redirected back into the CRAC to remove the heat for redistribution into the white space. The source of the cooling water is via a traditional refrigeration chiller located externally, usually on the roof. This is the traditional tried and tested cooling method. However, it can create hot spots and inefficiencies and does not allow for free cooling.

Air cooling by indirect air-cooling (IAC) AHU

3.4.35 This ‘all air’-based cooling solution incorporates air handling plant mounted externally to the white space. Treated air is distributed to the white space via ductwork or through a plenum. Air is supplied at a relatively low velocity to the cold aisle, giving more control than traditional floor-void distribution. The hot air is returned to the IAC via ductwork and is cooled by the outdoor ambient air at a plate heat exchanger. To assist the cooling process during warm months, the ambient air is adiabatically cooled (water evaporation), which then cools the warm air at the plate heat exchanger in the IAC unit. The water used for adiabatic cooling is bulkstored in the event of a mains supply outage. The process water is distributed from a central pump plantroom to the IAC units. This is a proven, cost effective technology but it can result in acoustic challenges in comparison to the other alternatives.

Chilled-water cooling derived from free-cooling, hybrid cooling towers with chiller assist

3.4.36 This chilled-water solution serves CRAC downflow units typically supplying cold air to the white space through a floor void. The source of the cooling water is via ‘free cooling’ cooling towers located externally, usually on the roof. Ambient air is used to cool the warm return water from the CRAC units, with adiabatic cooling added during the warmer months. At peak times, when approaching the towers’ cooling-load limits, refrigeration chillers are used to run in parallel with the cooling towers. This requires large plant space, there is increased risk of water leaks and higher maintenance costs than the previous two alternatives.

3.4.37 Other than water and power consumption and acoustic performance, there were no perceptible differences identified between the three alternatives options for the other environmental aspects.

3.4.38 Free air cooling, which is the system proposed, requires a high capital investment but lower operating costs and results in lower water and power consumption than the alternatives considered.

3.4.39 High efficiency electrically commutated (EC) direct drive fans will be used in all air supply and extract systems serving the data storage rooms. These fans are lighter in weight and require less power than a traditional centrifugal fan with variable speed drive (VSD). Typically, savings of 10-20% in power consumption is achievable with an EC fan versus a centrifugal fan. Also, the office air conditioning shall be served by a variable refrigerant flow (VRF) refrigerant system. Typically, the energy efficiency of a VRF system will exceed that of traditional air-cooled chillers by 15-25%. Therefore, the use of EC direct drive fans and a VRF refrigerant system will result in less demand on the power supply network.

Water Management

3.4.40 The Operator prioritizes the use of outside air cooling, which means that water is rarely used to cool servers. Utilising this highly efficient cooling solution, the proposed data centre will use the equivalent annual water usage of just eight average UK households – less than 1000m3."

3.4.41 Other than potential impacts on materials assets and surface water drainage, there were no perceptible differences identified between the two options in terms of the other environmental aspects.

3.5 Conclusions

3.5.1 Based on the assessment of reasonable alternatives (in relation to site/location, layout, design, technology) relevant to the proposed development and its specific characteristics as set out in this chapter, the selected site is considered to be a suitable location for the proposed development from both an environmental perspective and a planning perspective.

4 ENVIRONMENTAL ASSESSMENT METHODOLOGY

4.1 Introduction

4.1.1 This chapter of the Environmental Statement (ES) sets out the approach taken in the Environmental Impact Assessment (EIA) of the project. The chapter also includes details of the consultation undertaken to date and the overall approach to the assessment of the likely effects of the project. Further details of topic specific methodologies, such as survey methods, are provided in each topic chapter of this ES.

4.2 Scoping

4.2.1 Scoping is the process of identifying the issues to be addressed during the EIA process. Scoping is an important preliminary procedure, which sets the context for the EIA process.

4.2.2 Regulation 15 of the EIA Regulations allows an applicant to request that the local planning authority sets out its opinion (known as a Scoping Opinion) as to the issues to be addressed in the ES. Whilst there is no formal requirement in the EIA Regulations to seek a Scoping Opinion prior to submission of an ES, it is recognised as best practice to do so.

4.2.3 A Scoping Request was submitted to Swindon Borough Council (SBC) on 4 December 2020. The Scoping Report that accompanied the request is provided at Volume 3 Appendix 4.1 of this ES. The Scoping Opinion was received from SBC on 9 February 2021 and is also included in Volume 3 Appendix 4.1 of this ES. The following consultees/organisations responded as part of the scoping process:

- Environment Agency;
- Natural England;
- Highways England;
- Thames Water;
- Local Highways Authority;
- Lead Local Flood Authority;
- Historic England; and
- SBC Ecology Officer

4.2.4 Volume 3 Appendix 4.2 of this ES provides a more detailed overview of the key points raised in the Scoping Opinion by consultees for each topic area, together with a response to these. The ES topic chapters also provide a summary of the key points raised during consultation with both statutory and non-statutory consultees.

4.2.5 The scoping exercise highlighted a number of areas that consultees wished to see addressed within the ES. Taking into account the nature, size and location of the proposed development, the information provided within the Scoping Opinion and other consultation responses provided throughout the EIA process, the following topics have been identified as requiring consideration within this ES:

- Chapter 5: Landscape and Visual Resources;
- Chapter 6: Ecology and Biodiversity; and
- Chapter 7: Historic Environment.

4.2.6 In addition to the above, Chapter 8: Other Environmental Effects is provided, which summarises the findings on the technical assessments submitted in support of the planning application. The structure of this ES is set out in Section 1.5 of Chapter 1: Introduction.

4.3 Climate Change

Climate Change Resilience

4.3.1 Resilience to future climate change has been considered during the design process. The design has taken into account, for example, future flood risk and resilience to extreme weather events. The storage capacity requirement of the infiltration pond based on a 1 in 100-year event with 40% climate change allowance is approximately 2,750m^3. This is based on infiltration rates from soakaway testing undertaken in the location of the proposed infiltration pond. The infiltration rates are presented in the Ground Conditions Report Volume 3 Appendix 8.5 of this ES (document reference 20305S-RPS-XX-XX-RP-P-9712) and have informed the drainage design philosophy (document reference 20305S-RPS-00_XX-RP-D-9605).

Changes to Future Environmental Conditions

4.3.2 Consideration of predicted changes in baseline environmental conditions, including changes resulting from climate change, has been set out within each ES topic chapter (Chapters 5 to 7), where robust information is available at the time of writing. Details are provided in the methodology section of this chapter.

4.3.3 The assessment of effects for each topic has taken into account trends or changes predicted to arise as a result of climate change.

Effects of the Project on Climate

4.3.4 Atmospheric emissions associated with use of the proposed development are considered within the Air Quality Report (Volume 3 Appendix 8.2 of this ES and summarised in the Project Description chapter (Chapter 2) of this ES. These include emissions from construction and operational traffic.

4.4 Topics Scoped Out of the EIA Process

4.4.1 Effects on other aspects of the environment are not likely to be significant. The topics scoped out of the assessment are set out in the Scoping Report (Volume 3 Appendix 4.1) and summarised below.

Land Use, Agriculture and Recreation

4.4.2 The Application Site is entirely located within an area of 'Non-agricultural land: land predominantly in urban use', as defined by the Provisional Agricultural Land Classification by Natural England (2020). The Application Site currently comprises buildings, areas of hard standing, grassland and some scattered trees. On this basis, it is considered that there would be no significant effects in relation to land use and soils.

4.4.3 There are no Public Rights of Way (PRoW) or public access within or adjacent to the Application Site. Ladder Lane (Bridleway WR36) is located to the west of the Application Site and would not be directly affected by the proposed development, however potential heritage impacts are considered in the Historic Environment chapter of the ES.

4.4.4 The construction of the proposed development would not result in the loss of any agricultural land. The proposed development would not result in the loss or diversion of any recreation facilities. On this basis, further consideration of land use or recreation is considered unnecessary. SBC agreed that this topic could be scoped out of the EIA.

Socioeconomics and Community

4.4.5 The main employment opportunities will be provided during the construction phase: the construction and fit out of the first phase will sustain on average approximately 400 full time equivalent (FTE) jobs. The FTE estimate considered both direct and indirect economic benefits and employment creation (such as supply-chain job creation). Subsequent (three) fit out phases (comprising predominately internal works within the completed DC building) will be timed to meet business demand, each taking approximately six months to complete. The completion of each of the remaining fit out phases will sustain on average approximately 120 FTE jobs.

4.4.6 The type of construction jobs available will vary according to the phase of construction but many are likely to be specialist in nature. There is likely to be temporary beneficial effects to the local economy both through direct employment and through local expenditure of the workforce.

4.4.7 The operation of the proposed development will sustain approximately 40 FTE job during the first three years. After the first three years, the ongoing operation expenditure is likely to sustain approximately 50 FTE jobs. The proposed development will operate 24 hours a day, however the majority of staff will be present during normal office hours. A team of key engineering staff and security team will be required 24 hours a day; this involves approximately 10 additional personnel working on a shift basis.

4.4.8 The proposed development will not result in any effects on recreational or community facilities in the local community.

4.4.9 Given the predicied levels of employment and absence of impacts on community facilities as a result of the development, significant adverse effects are unlikely to occur. SBC agreed that this topic could be scoped out of the EIA.

Human Health

4.4.10 Effects on human health can include those associated with dust emissions, traffic and noise. The proposed development is not likely to generate significant construction traffic flows: construction traffic that is generated will be managed through measures such as restricting access for Heavy Goods Vehicles (HGVs). Standard control measures from the Institute of Air Quality Management guidance will control the dust impacts from the proposed demolition of Beta and Gamma buildings in the north east. Best practice measures will be implemented during the construction phase to manage noise and air quality impacts in accordance with the Code of Construction Practice (CoCP) (Volume 3 Appendix 2.1 of the ES). The CoCP will also include measures to mitigate noise levels and a Construction Traffic Management Plan (document reference 20305SRPS-XX-XX-RP-P-9731) will include measures to mitigate the impacts of construction traffic.

4.4.11 During operation, traffic levels are predicted to be lower than those during the construction process and therefore, significant adverse impacts are considered unlikely. An Outline Travel Plan (20305S-RPS-XX-XX-RP-D-9730) and a Delivery and Servicing Management Plan (20305S-RPS-XX-XX-RP-P-9732) have been prepared as part of this application.

4.4.12 The main source of air emissions from the proposed development during operation is from the emergency generators. The design of the stacks has been informed by a stack height determination assessment to ensure effective mitigation for air quality (see Volume 3 Appendix 8.2 of the ES). An environmental permit will be in place to manage the operation of the generators and

the associated air emissions. The operation of the proposed data centre on nearby noise sensitive receptors has been assessed as not significant and includes mitigation measures (enhanced acoustic enclosures for the generator units and limiting generator testing to day-time hours only) – refer to the noise and vibration section below.

4.4.13 Significant effects on human health impacts are considered unlikely and, on that basis, a human health appraisal is not considered to be necessary. SBC agreed that this topic could be scoped out of the EIA.

Noise and Vibration

4.4.14 The Application Site is located in a predominantly rural location: there are a few individual and small clusters of houses in the vicinity and also planning permission for a residential development located directly to the south occupying part of Burderop Park. The closest Noise Sensitive Receptor (NSRs) is Lodge Farm approximately 240m east of the site.

4.4.15 There is an area of woodland adjacent to the north of the Application Site, the other neighbouring uses are agricultural.

4.4.16 A baseline acoustic survey was undertaken in accordance with BS 4142:2014+A1:2019 as agreed with SBC. Representative baseline sound levels were determined through a combination of long-term monitoring on the Application Site and short-term monitoring at locations close to the nearest residential properties.

4.4.17 A construction noise assessment has been undertaken which concludes that noise impacts will be minimal. Mitigation measures, including working hours, are set out in the CoCP (Volume 3 Appendix 2.1 of the ES).

4.4.18 An acoustic model was built of the proposed facility for a normal worst-case operation; testing of back-up generators and for the rare case of a major grid power failure with all generators running.

4.4.19 Noise from the generators has been mitigated and reduced to a minimum by locating the generators in enhanced acoustic enclosures (specifically engineered for greater sound attenuation). The generators have been modelled as industrial buildings with the sound power for each section of the enclosure included in the model. The stack has been modelled as a point source at the exhaust outlet.

4.4.20 During normal operation and generator testing, predicted operational noise levels at NSRs would be below the prevailing background sound levels; the World Health Organisation thresholds at which critical health effects would occur; and would only result in a small increase to existing baseline. Furthermore, noise from the proposed development would be similar in character to other operational facilities in the vicinity. On this basis, the noise impacts for general operation of the proposed development are anticipated to be negligible.

4.4.21 In the event of a major grid failure, if all emergency generators are required, the noise impact would be greater during the night-time. However, the noise impact is considered acceptable due to the rare likelihood of the emergency scenario occurring, National Grid reliability and the in-built redundancy and the mitigation proposed by the Applicant.

4.4.22 A technical report has been prepared that sets out the methodology and the results of the noise assessment and mitigation proposed by the Applicant (see Volume 3 Appendix 8.1 of the ES). The report concludes that significant adverse effects are unlikely to occur as a result of the proposed development with respect to noise and a separate chapter assessing the noise effects is considered unnecessary. SBC agrees with the approach that the effects of noise on human receptors can be scoped out of the EIA but that potential effects on species present in Burderop Wood Site of Special Scientific Interest, especially with regard to birds should be assessed. Therefore, a separate technical assessment of noise on ecological receptors has been undertaken and is included in Volume 3 Appendix 8.1 of the ES.

4.4.23 Further detail on noise effects from the proposed development are summarised in Chapter 8 Other Environmental Effects of the ES and Volume 3 Appendix 8.1.

Air Quality

4.4.24 Swindon Borough Council has designated an Air Quality Management Area (AQMA) for Kingshill Road, approximately 3.7 km to the north west of the site and is unlikely to be affected by the development. Potentially sensitive receptors in the vicinity of the proposed development include residential dwelling(s) (existing and proposed) at Burderop Park to the south and the adjacent Burderop Ancient Woodland and SSSI.

4.4.25 There is no local air quality monitoring within 2km of the Application Site, therefore, ambient annual-mean concentration estimates have been derived from the latest available Defra mapped background estimates for the 1 km grid square of the Application Site.

4.4.26 An air quality assessment has been undertaken that evaluates the temporary effects from fugitive construction dust and evaluates the key emission sources to air during testing and emergency use on the local area.

4.4.27 The type of activities that could cause fugitive dust emissions include demolition, earthworks, handling and disposal of spoil, wind-blown particulate material from stockpiles, handling of loose construction materials, and movement of vehicles, both on and off site. These are predicted to be short term and only during the construction phase. The results of the risk assessment undertaken using the Institute of Air Quality Management (IAQM) dust guidance, indicates that with the implementation of mitigation and controls, the risk of dust impacts will be “not significant”. These mitigation and controls are set out in the CoCP (Volume 3 Appendix 2.1 of the ES).

4.4.28 Exhaust emissions from construction-related vehicles are unlikely to have a significant impact on local air quality due to the relatively short construction programme.

4.4.29 Once operational, the key sources of emissions to air are the 11 diesel-powered emergency generators. Detailed modelling has been undertaken to predict NO_2, PM_{10}, SO_2, CO and benzene concentrations at selected sensitive receptors and the results compared with the relevant long and short-term Air Quality Strategy (AQS) objectives. The long-term operational impacts for all pollutants are predicted to be ‘negligible’. The short-term operational impacts for all pollutants have been screened-out as being insignificant at all receptors.

4.4.30 A technical report has been prepared that sets out the methodology and result of the air quality modelling and assessment (see Volume 3 Appendix 8.2 of the ES). The report concludes that the resulting air quality effect is considered ‘not significant’. On this basis, a separate chapter to assess the effects air quality as a result of the proposed development is considered unnecessary. SBC agrees with this approach that the effects of emissions on human receptors can be scoped out of the EIA but that potential effects on species present in Burderop Wood Site of Special Scientific Interest, should be assessed. Therefore, a separate technical assessment of air quality on ecological receptors has been undertaken and is included in Volume 3 Appendix 8.2 of the ES.

4.4.31 Further detail on noise effects from the proposed development are summarised in Chapter 8 Other Environmental Effects of the ES and Volume 3 Appendix 8.2.

Traffic and Transport

4.4.32 The road network immediately surrounding the Application Site comprises local roads, with the principal access to the site extending from the B4005. The Application Site can also be accessed by pedestrians and cyclists from the same entrance via the unnamed access road off B4005 Brimble Hill. A footway exists along the eastbound carriageway leading into the site. The full length

of B4005 Brimble Hill is listed in the 'Swindon List of Adopted Roads and Streets' as being a public road maintained by the Local Highway Authority.

4.4.33 Initial estimates of construction vehicle movements have been made using data derived from a similar data centre construction.

4.4.34 Car sharing promotion by the contractor is likely to reduce the number of cars. Based on previous construction sites, it is calculated that an average of 50% of staff will travel to the site as car drivers, with the remaining 50% car sharing and arriving by sustainable means of transport.

4.4.35 There is potential for the construction of the proposed development to overlap with the construction of the adjacent proposed residential development at Burderop Park.

4.4.36 Annual Average Daily Traffic (AADT) flow for the M4 between junctions 15 and 16 flow combined with anticipated construction vehicle movements, indicate that the impact of construction HGVs in the context of the existing HGV traffic within the vicinity of the Application Site can be considered negligible. Based upon the above, the combined construction vehicle movements generated by the proposed development and the proposed residential development at Burderop Park would not impact upon the Burderop Wood SSSI such that an Environmental Impact Assessment of the traffic flows should be necessary.

4.4.37 In accordance with good practice, a CTMP setting measures to manage the control, numbers and timings of construction vehicles has been prepared and submitted with the planning application (document reference 20305S-RPS-XX-XX-RP-P-9731).

4.4.38 During operation, the data centre is expected to create a number of direct and indirect employment opportunities in addition to contributing to induced employment in the local economy. 40-to 50 staff will works in shifts across a 24-hour period to provide 24/7 working on site. There will typically be six HGVs arriving and departing per day.

4.4.39 The vehicle movements generated during operation will be far lower than the construction vehicle movements, therefore, are not expected to result in any significant adverse environmental effects. On this basis, a separate chapter to assess the effects of traffic as a result of the proposed development is considered unnecessary. SBC agrees with this approach that this can be scoped out of the EIA. A Transport Statement is provided at Volume 3 Appendix 8.3 of the ES to demonstrate that no significant adverse effects will occur.

4.4.40 Further detail on traffic effects from the proposed development are summarised in Chapter 8 Other Environmental Effects of the ES.

Hydrology and Flood Risk

4.4.41 There are no surface watercourses on the Application Site, however there is a surface water drain to the south of the site that connects to a stream approximately 90m from the south east boundary and then into a series of ponds.

4.4.42 The entire Application Site is located in Flood Zone 1, land designated by the Environment Agency as having a less than 1 in 1,000 (0.1%) annual probability of flooding from rivers or the sea (i.e. very low risk). The majority of the Application Site has a very low risk of surface water flooding, equivalent to an annual chance less than 1 in 1,000 (0.1%). Small, isolated areas of the site are shown to experience minor flooding in a low likelihood surface water flood event, with an annual chance of 1 in 1,000 (0.1%). Flooding is restricted to a few small isolated areas and is generally shown to be shallow (<0.3m).

4.4.43 The British Geological Survey Susceptibility to Groundwater Flooding map identifies the Application Site with a limited potential for groundwater flooding.

4.4.44 A Drainage Design Philosophy has been prepared (document reference 20305S-RPS-00-RP-D-9605) in accordance with the Sustainable Drainage System (SuDS) hierarchy. Soakaway testing has been undertaken in the location of the infiltration pond and concluded that infiltration rates would not be adequate for a shallow-based infiltration drainage solution. However, a deeper borehole suggested higher infiltration rates could be achieved below approximately 3m bgl in the West Marly Chalk Formation and Upper Green Sand Formation subject to regulatory approval.

4.4.45 A site-specific flood risk assessment (FRA) has been undertaken and demonstrates that the risk of flooding will not increase as a result of the proposed development. As such, it is not likely that a flooding event would significantly affect the proposed development.

4.4.46 Given the absence of surface watercourses within or adjacent to the Application Site, and the predominantly very low risk of flooding, significant adverse effects are considered unlikely to occur. On this basis, a separate chapter to assess the effects of the proposed development on hydrology and flood risk is considered unnecessary. SBC has agreed with this approach to scope out hydrology and flood risk out of the EIA.

4.4.47 Further detail on hydrology and flood risk effects from the proposed development are summarised in Chapter 8 Other Environmental Effects and the flood risk assessment is appended to the ES (see Volume 3 Appendix 8.4) to demonstrate that no significant adverse effects will occur.

Geology and Ground Conditions

4.4.48 The British Geological Survey (BGS) maps indicate that the ground conditions underlying the Application Site comprise Made Ground deposits of variable thickness and composition. The Made Ground is directly underlain by bedrock of the West Melbury Marly Chalk Formation which is subsequently underlain at depth by the Upper Greensand Formation. This was confirmed by a Phase 2 investigation in July 2020. Both the Chalk and the Greensand comprise important groundwater resources and are classified as Principal Aquifers. There are no Source Protection Zones within 2km of the site.

4.4.49 A further ground investigation was undertaken at the Application Site in October 2020. Groundwater not encountered during the investigation or subsequent monitoring visits and is deemed to present at a depth greater than 10m bgl. Gas monitoring identified that concentrations of methane were below the detection limit of the machine and low concentrations of carbon dioxide were recorded. The assessment concluded that no specific gas protection measures are required.

4.4.50 None of the contaminant concentrations in the soil samples analysed exceeded the Generic Assessment Criteria derived for the protection of human health receptors. Widespread, gross or potential mobile contamination impacts were not identified at the Application Site.

4.4.51 Asbestos samples were found in eight samples of the Made Ground collected across the Application Site. Further targeted surveys are proposed post submission based on the summary approach in Volume 3 Appendix 8.5. The results of the surveys will be used to inform mitigation measures (where required) and will be agreed with SBC .to mitigate potential risks to human health.

4.4.52 A CoCP will be implemented during construction that will include measures relating to the storage and use of oils and chemicals; spillage control measures and require a procedure to be in place should unexpected contamination be encountered.

4.4.53 The mitigation implemented during the construction phase will remove potential pathways with future site users and reduce the likelihood of potential contaminants leaching into the aquifer.

4.4.54 Given the results of the investigations, a separate ES chapter is not considered necessary. SBC agreed with the approach to scope this topic out of the EIA.

4.4.55 A summary of the ground conditions is provided in Chapter 8 Other Environmental Effects and the October 2020 investigation report is appended to the ES (see Volume 3 Appendix 8.5).

Climate Change

4.4.56 The EIA Regulations require consideration of climate change. Although a separate climate change chapter is not proposed, climate change is considered throughout the ES. The proposed approach is set out in section 4.3.

Daylight, Sunlight and Microclimate

4.4.57 All the proposed works for the proposed development will be undertaken within the boundaries of the Application Site. Due to the location of the proposed works and the nature of the surrounding land use it is not considered likely that the proposed development will have significant effects in relation to daylight and sunlight. The nature of the proposed development is not likely to result in significant effects to the microclimate and will be considered in Chapter 6 Ecology and Biodiversity where appropriate. SBC agrees with the approach that a separate chapter to daylight, sunlight and microclimate is not necessary.

Material Assets

4.4.58 The EIA Regulations refer to 'material assets', including architectural and archaeological heritage. The phrase 'material assets' has a broad scope, which may include assets of human or natural origin, valued for socio-economic or heritage reasons. Material assets are in practice considered across a range of topic areas within an ES, in particular the topic areas historic environment and socio-economics chapters. Historic environment effects are assessed in this ES at Chapter 7, whilst effects relating to socio-economics have been scoped out as set out above. Therefore, a separate chapter on material assets is proposed to be scoped out of the assessment. SBC agrees with this approach.

Major Accidents and Disasters

4.4.59 The EIA Regulations require consideration of vulnerability to major accidents and/or disasters. The risk of major accidents and disasters is considered in the project description chapter of the ES as well as, each topic chapter assessing the likely environmental effects related to a major accident or disaster that could occur. As part of the Environmental Permit, an Accident Management Plan (AMP) will be prepared prior to operations commencing at the site which sets out the actions required in the event of an emergency or accident/incident. A system for recording and allocating appropriate follow-up for accidents, incidents and non-conformances will be established prior to operation. Therefore, a separate chapter assessing the risk of major accidents and disasters is not considered necessary. SBC agrees with the approach.

Residues and Emissions

4.4.60 Construction of the proposed development has the potential to lead to contamination of water and soil resources, as well as impacts on sensitive receptors from noise and dust. The CoCP (Volume 3 Appendix 2.1 of the ES) sets out measures to control construction impacts and provide a procedure for recording and resolving complaints.

4.4.61 During typical operation, there will be no process water discharges to sewer or surface water, other than the blow down from the AHU units. It will generally be of high quality, have a minor flow rate and will be free-flowing as it rains. The process water will discharge to sewer and will be

included in the Environmental Permit. Discharges to surface water will be restricted to run-off from the roof hardstanding and paved areas etc. and water would flow through the below ground surface water drainage system and into the infiltration pond before discharge to the ground. Runoff from car parking areas and the fuel storage area would pass through appropriate separators before outfall into the infiltration pond.

4.4.62 There will be times of the year when water is needed for cooling and this would generate small quantities of process wastewater. The management of this water is set out in the Drainage Design Philosophy (document reference 20305S-RPS-00-RP-D-9605).

4.4.63 An Environmental Permit will be in place for the operation of the diesel-fired emergency generators.

4.4.64 Any potential impacts with regard to the SSSI are considered in Chapter 6 Ecology and Biodiversity. On this basis, a separate chapter to assess the effects of residues and emissions from the proposed development is considered unnecessary and SBC agrees with this approach.

Waste

4.4.65 Demolition works would result in wastes, such as plasterboard, concrete, ceramics, timber and glass. Audits of the buildings and structures would be undertaken prior to demolition to identify salvageable/recyclable materials and to inform the demolition process to optimise material recovery. The proposed development would generate some operational waste in the form of normal office and visitor waste. This would include but is not limited to packaging, printer toners and cartridges, paper, plastic and food waste.

4.4.66 A Site Waste Management Plan is included in the CoCP (Volume 3 Appendix 2.1 of the ES) which predicts the likely waste streams and volumes to be generated during demolition and construction and identify the waste management action proposed for each different waste type. The overall objective would be to reduce the amount of waste generated during construction and sustainably manage waste that is generated. Waste would be reused or recycled where possible. Where recycling is not possible, waste would be disposed of at a permitted facility via an appropriately licensed waste carrier. Operational waste would be handled and managed in accordance with relevant legislation and duty of care requirements.

4.4.67 SBC agree that a separate chapter to assess the effects of waste from the proposed development is not necessary and the topic can be scoped out of the EIA.

Radiation and Heat

4.4.68 Radioactive materials will not be used in the construction or operation of the proposed development and therefore, are scoped out of the assessment.

4.4.69 Heat is generated from the data servers and other IT equipment in the Data Hall. Where required, excessive heat from the Data Hall is extracted to ensure the servers and computer processing equipment are maintained at an optimum efficiency. This is automatically managed by the Building Management System which constantly regulates internal temperatures. A series of central air shafts transfer the warmed air to roof-mounted plant either to discard or recirculate the air depending on the seasonal space heating and cooling requirements of the building. Modelling undertaken by the Applicant has shown that any heat from the facility has dispersed and dissipated by the time is passes the north façade of the building.

4.4.70 Any potential impacts with regard to the SSSI are considered in Chapter 6 Ecology and Biodiversity and an overview of the heating and cooling system is presented in Chapter 2 Project

Description. On this basis, a separate chapter to assess the effects of radiation and heat from the proposed development is considered unnecessary and SBC agrees with this approach.

4.5 Environmental Assessment Methodology

Relevant EIA Guidance

4.5.1 The EIA process has taken into account relevant government or institute guidance, including:

- Department for Communities and Local Government (2014) Planning Practice Guidance at http://planningguidance.planningportal.gov.uk;
- Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements. HMSO;
- Highways England et al. (2019) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 4. LA 104;
- Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment;
- Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report;
- Institute of Environmental Management and Assessment (2015a) Environmental Impact Assessment: Guide to Shaping Quality Development;
- Institute of Environmental Management and Assessment (2015b) Climate Change Resilience and Adaptation;
- Institute of Environmental Management and Assessment (2016) Environmental Impact Assessment: Guide to Delivering Quality Development;
- Institute of Environmental Management and Assessment (2017) Environmental Impact Assessment: Assessing Greenhouse Gas Emissions and Evaluating their Significance; and
- Institute of Environmental Management and Assessment (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach.

4.5.2 Other topic specific legislation and good practice guidance, including the National Planning Policy Framework (Ministry of Housing, Communities and Local Government, 2019b) has been considered and details of these can be found in the topic chapters within this ES.

4.6 Key Elements of the General Approach

4.6.1 The assessment of each environmental topic forms a separate chapter of the ES. For each environmental topic, the following have been addressed:

- methodology and assessment criteria;
- description of the environmental baseline (existing conditions);
- identification of likely effects;
- evaluation and assessment of the significance of identified effects, taking into account any measures designed to reduce or avoid environmental effects which form part of the project and to which the developer is committed; and

- Identification of any further mitigation measures envisaged to avoid, reduce and, if possible, remedy adverse effects (in addition to those measures that form part of the proposed development).

Methodology and Assessment Criteria

4.6.2 Each topic chapter provides details of the methodology for baseline data collection and the approach to the assessment of effects. Each environmental topic has been written by a specialist in that area.

4.6.3 Each topic chapter defines the scope of the assessment within the methodology section, together with details of the study area, desk study and survey work undertaken and the approach to the assessment of effects. The identification and evaluation of effects have been based on the information set out in Chapter 2: Project Description of this ES, EIA good practice guidance documents and relevant topic-specific guidance, where available.

Description of the Environmental Baseline Conditions (Including Future Baseline Conditions)

4.6.4 The existing and likely future environmental conditions in the absence of the proposed development are known as 'baseline conditions'. Each topic-based chapter will include a description of the current (baseline) environmental conditions. The baseline conditions at the Application Site and within the study area form the basis of the assessment, enabling the likely significant effects to be identified through a comparison with the baseline conditions.

4.6.5 The baseline for the assessment of environmental effects is primarily drawn from existing conditions during the main period of the EIA work in 2020.

4.6.6 The baseline for the assessment should represent the conditions that will exist in the absence of the project at the time that the project is likely to be implemented. The construction phase is estimated to take 10 – 12 months to complete and will comprise external construction and civils activities. This is forecast to commence in Q3 2021 (subject to the progress of the planning process). Further information about the construction programme assessed as part of the EIA process can be found in Chapter 2 (Project Description) of this ES.

4.6.7 Consideration has been given to any likely changes between the time of survey and the future baseline for the construction of the project from 2021 and for operation of the project. In some cases, these changes may include the construction or operation of other planned developments in the area. Where such developments are built and operational at the time of writing and data collection, these have been considered to form part of the baseline environment. Where sufficient and robust information is available, such as expected traffic growth figures, other future developments have been considered as part of the future baseline conditions. In all other cases, planned future developments are considered within the assessment of cumulative effects.

4.6.8 The consideration of future baseline conditions has also taken into account the likely effects of climate change, as far as these are known at the time of writing. This has been based on information available from the UK Climate Projections project (UKCP18), which provides information on plausible changes in climate for the UK (Environment Agency and Met Office, 2018) and on published documents such as the UK Climate Change Risk Assessment 2017 (Committee on Climate Change, 2016).

4.6.9 Climate data from the UKCP18 database has been compiled for a 25 km^2 grid square containing the site, based on a medium emissions scenario (RCP6.0)[1]. Mean air temperature and annual average precipitation data for the period 2020 to 2079 have been used to inform the consideration of how environmental conditions may change at the site and within the study area in future.

Limitations of the Assessment

4.6.10 Each topic chapter identifies any limitations identified in the available baseline data and whether there were any difficulties encountered in compiling the information required.

Mitigation Measures Adopted as Part of the Project

4.6.11 During the EIA process, environmental issues have been taken into account as part of an ongoing iterative design process. The process of EIA has therefore been used as a means of informing the design.

4.6.12 The project assessed within this ES therefore includes a range of measures that have been designed to reduce or prevent significant adverse effects arising. In some cases, these measures may result in enhancement of environmental conditions. The assessment of effects has taken into account measures that form part of the project.

4.6.13 The topic chapters set out the measures that form part of the project and that have been taken into account in the assessment of effects for that topic. These include:

- Measures included as part of the project design (sometimes referred to as primary mitigation);
- Measures to be adopted during construction to avoid and minimise environmental effects, such as pollution control measures. These measures would be implemented through the Code of Construction Practice (CoCP, see Appendix 2.1]); and
- Measures required as a result of legislative requirements.

Assessment of Effects

4.6.14 The EIA Regulations require the identification of the likely significant environmental effects of the project. This includes consideration of the likely effects during the construction and operational phases. The assessment is based on consideration of the likely magnitude of the predicted impact and the sensitivity of the affected receptor. The process by which effects have been identified and their significance evaluated is set out within each individual topic chapter. The overarching principles are set out below.

Sensitivity or Importance of Receptors

4.6.15 Receptors are defined as the physical or biological resource or user group that would be affected by a project. For each topic, baseline studies have informed the identification of potential environmental receptors. Some receptors will be more sensitive to certain environmental effects than others. The sensitivity or value of a receptor may depend, for example, on its frequency, extent of occurrence or conservation status at an international, national, regional or local level.

4.6.16 Sensitivity is defined within each ES topic chapter and takes into account factors including:

[1] RCP (representative concentration pathway) is a greenhouse gas concentration trajectory for which four scenarios are modelled for UKCP18: RCP2.6, RCP4.5, RPC6.0 and RCP8.5.

- Vulnerability of the receptor;
- Recoverability of the receptor; and
- Value/importance of the receptor.

4.6.17 Sensitivity is generally described using the following scale:

- High;
- Medium;
- Low; and
- Negligible.

4.6.18 In some cases, a further category of very high has been used.

Magnitude of Impact

4.6.19 Impacts are defined as the physical changes to the environment attributable to the project. For each topic, the likely environmental impacts have been identified. For each topic the likely environmental change arising from the project has been identified and compared with the baseline (the situation without the project). Impacts are divided into those occurring during the construction and operational phases.

4.6.20 The categorisation of the magnitude of impact is topic-specific but generally takes into account factors such as:

- Extent;
- Duration;
- Frequency; and
- Reversibility.

4.6.21 With respect to the duration of impacts, the following has been used as a guide within this assessment, unless defined separately within the topic assessments:

- Short term: A period of months, up to one year
- Medium term: A period of more than one year, up to five years; and
- Long term: A period of greater than five years.

4.6.22 The magnitude of an impact has generally been defined used the following scale:

- High;
- Medium;
- Low; and
- Negligible.

4.6.23 In some cases, a further category of 'no change' has been used.

Significance of Effects

4.6.24 Effect is the term used to express the consequence of an impact (expressed as the 'significance of effect'). This is identified by considering the magnitude of the impact and the sensitivity or value of the receptor.

4.6.25 The magnitude of an impact does not directly translate into significance of effect. For example, a significant effect may arise as a result of a relatively modest impact on a resource of national value, or a large impact on a resource of local value. In broad terms, therefore, the significance of the effect can depend on both the impact magnitude and the sensitivity or importance of the receptor.

4.6.26 Significance levels are defined separately for each topic. Unless separately defined in the topic chapters, the assessments take into account relevant topic specific guidance, based on the following scale and guidance:

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process with regard to planning consent. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity;
- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process;
- Moderate: These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor;
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project; and
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

4.6.27 The terms minor, moderate, major and substantial apply to either beneficial or adverse effects. Effects may also be categorised as direct or indirect, secondary, short, medium or long term, or permanent or temporary as appropriate.

4.6.28 Each chapter defines the approach taken to the assessment of significance. Unless set out otherwise within the chapter, topic chapters use the general approach set out in Table 4.1. For some topics, a simplified or quantitative approach is considered appropriate.

Table 4.1: Typical Assessment Matrix

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

4.6.29 Unless set out otherwise in each topic chapter, effects assessed as moderate or above are considered to be significant in terms of the EIA Regulations within this assessment.

Further Mitigation and Future Monitoring

4.6.30 Where required, further mitigation measures have been identified within topic chapters. These are measures that could further prevent, reduce and, where possible, offset any adverse effects on the environment.

4.6.31 Where relevant and necessary, future monitoring measures have been set out within the topic chapters.

Assessment of Cumulative Effects

4.6.32 The EIA Regulations require consideration of cumulative effects, which are effects on a receptor that may arise when the project is considered together with other proposed developments in the area.

4.6.33 The cumulative effects of the project in conjunction with other proposed schemes have been considered within each topic chapter of the ES. Other developments considered within the cumulative assessment include those that are:

- Under construction;
- Permitted, but not yet implemented;
- Submitted, but not yet determined; and
- Identified in the Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.

4.6.34 It is noted that developments that are built and operational at the time of submission are considered to be part of the existing baseline conditions.

4.6.35 Utility upgrade work (as understood at the time of preparation of this ES) associated with the future phases of the proposed development are also presented in Appendix 4.3 and the potential for cumulative effects is considered in each of the topic chapters.

Interrelationships

4.6.36 Each topic chapter considers whether or not there are any inter-related effects with other topics included within the EIA that have not already been considered in order to identify any secondary, cumulative or synergistic effects.

Summary Tables

4.6.37 Summary tables have been used to summarise the effects of the project for each environmental topic.

4.7 Consultation

4.7.1 The project team has undertaken consultation with, or requested information from, a number of organisations, including (but not limited to):

- North Wessex Downs Area of Outstanding Natural Beauty - Chapter 5: Landscape and Visual Resource;
- Natural England - Chapter 5: Landscape and Visual Resource and Chapter 6: Ecology and Biodiversity;

- Historic England -Chapter 7: Historic Environment;
- Swindon Borough Council (Landscape Officer) –Chapter 5: Landscape and Visual Resource,
- Swindon Borough Council (Ecology Officer) - Chapter 6: Ecology and Biodiversity;
- Swindon Borough Council (Conservation Officer) - Chapter 7: Historic Environment;
- Swindon Borough Council (Environmental Health Officer) – Noise and Vibration Assessment and Air Quality Assessment (Chapter 8: Other Environmental Effects);
- Wiltshire County Council (Archaeology Advisor to SBC) – Chapter 7:Historic Environment; and
- Local Highways Authority – Transport Assessment (Chapter 8: Other Environmental Effects).

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Local Planning Authority

4.7.2 The project lies within the administrative area of Swindon Borough Council. Several virtual meetings have been held with the LPA to discuss key aspects of the project, including a pre-application meeting on the 28 October 2020 and subsequent telephone discussions relating to the EIA screening and scoping processes.

4.7.3 Further to the above, topic specialists have consulted the relevant experts within SBC and their consultees on their approach to the EIA through the scoping process. Further information regarding consultation with topic specific organisations is detailed within the individual topic chapters and technical reports.

Public Consultation

4.7.4 A community engagement specialist, Tristan Fitzgerald Associates, has been commissioned by the Applicant to carry out engagement activities as the application is progressed to determination. In early March 2021 an information note was sent to leading members of Swindon Borough Council, local ward members and to the Parish Council to bring the development proposals to their attention and offer a way of finding out more detail regarding the proposals, outside of the formal application process.

4.7.5 On Monday, 8 March 2021 a further briefing meeting was held with three of the leading members of Swindon Borough Council to update on the pending application.

4.7.6 There will be further engagement with the local borough councillors representing Chiseldon and Wroughton, parish councils in Chiseldon and Wroughton and the local Member of Parliament post submission. Virtual meetings are also planned with borough councillors and members of the Parish Council.

4.7.7 Further information is set out in the Statement of Engagement submitted in support of this application and an update to ongoing engagement will be provided through a subsequent addendum.

5 LANDSCAPE AND VISUAL RESOURCES

Purpose and Scope

5.1.1 The purpose of this chapter is to identify and assess the landscape and visual effects which would result from the redevelopment of land to the north of Burderop Park (hereafter referred to as the Application Site) to provide a replacement data storage facility (the 'proposed development).

5.1.2 The central point of the Application Site is located at National Grid Reference (NGR) SU 16393 80489. The site is bounded to the north by Burderop Wood (an Ancient Semi-natural Woodland (AW)) a tree belt and farmland to the east and west and woodland to the south west. The B4005 Brimble Hill is adjacent to part of the site's western boundary.

5.1.3 This chapter provides an assessment of the effects of the proposed development on the existing landscape resources and receptors, as well as an assessment of the effects on visual receptors in the surrounding landscape. Where appropriate, measures are proposed to prevent, reduce or offset any adverse effects.

5.1.4 The assessment considers the effects of the proposed development on landscape and visual environment during the first winter following completion of the development (Year 1) after the landscape measures have been implemented, as a worst case. Thereafter, any adverse effects will lessen, as the proposed planting matures.

Study Area

5.1.5 The LVIA study area extends to 5 km radius from the outer edges of the Application Site and has been adopted due to the 15 m height of the flues. It is anticipated that any potential significant effects of the proposed development would be within this radius. The location of the Application Site and relevant landscape designations within the study area are shown on Figure 5.1.

5.1.6 In order to determine views of the proposed development, a computer-generated Zone of Theoretical Visibility (ZTV) has been mapped. The ZTV is defined as the theoretical area from which part of the project would potentially be visible and broadly defines the extent of potential visibility within the 5 km study area for both the landscape character and visual assessment. The ZTV is shown on Figures 5.4, 5.6 and 5.26.

5.2 Assessment Methodology

Planning Policy Context

5.2.1 As part of establishing the existing baseline environment, this assessment has reviewed and considered relevant planning policies within the currently adopted Local Development Plan for the Borough of Swindon (Table 5.2). Other documents, of material consideration, are reviewed in paragraphs 5.2.10 to 5.2.42.

National Planning Policy

National Planning Policy Framework (2019)

5.2.2 The National Planning Policy Framework (NPPF) was published in February 2019 by the Ministry of Housing Communities and Local Government and replaced the 2012 NPPF.

5.2.3 The NPPF emphasises the importance of sustainable development. Paragraph 7 states: *"The purpose of the planning system is to contribute to the achievement of sustainable development."*

5.2.4 NPPF paragraph 8 sets out the overarching objectives of the planning system. The objectives include and environmental objective at paragraph 8 c) *"to contribute to protecting and enhancing our natural, built and historic environment…".* The NPPF requires strategic policies within development plans to make provision for the *"conservation and enhancement of the natural, built and historic environment, including landscapes and green infrastructure…"* (paragraph 20 d). Non-strategic policies should set out more detailed policies for specific areas, including the allocation of sites, establishing design principles, as well as conserving and enhancing the natural environment (paragraph 28).

5.2.5 Section 12 of the NPPF is concerned with well-designed places. Paragraph 127 a) explains that developments will add to the overall quality of the area in the short and long-term. Paragraph 127 b) explains that developments should be "*visually attractive as a result of good architecture, layout and appropriate and effective landscaping*". Paragraph 127 c) requires that developments *"are sympathetic to local character and history, including the surrounding built environment and landscape setting. While not preventing or discouraging appropriate innovation or change …*". Developments should also *"establish or maintain a strong sense of place"* by using building types and materials *"to create attractive, welcoming and distinctive places to "… "work*" (paragraph 127 d). paragraph 128 stresses that *"design quality should be considered throughout the evolution and assessment of individual proposals" and that "permission should be refused for development that fails to take the opportunities available for improving the character and quality of an area…"* (paragraph 129).

5.2.6 Community Forests are discussed in NPPF, paragraph 142, *"…Community Forests offer valuable opportunities for improving the environment around towns and cities, by upgrading the landscape and providing for recreation and wildlife."* The NPPF notes that *"an approved Community Forest Plan may be a material consideration in…deciding planning applications."*

5.2.7 NPPF Section 15 Conserving and enhancing the natural environment, is of relevance to this assessment. Paragraph 170 explains that *"planning policies and decisions should contribute to and enhance the natural and local environment by:*

a) "protecting and enhancing valued landscapes …" and

b) "recognising the intrinsic character and beauty of the countryside…" including the benefits of trees and woodland.

5.2.8 Paragraph 172 states that *"Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to these issues".* The same paragraph also notes *"the scale and extent of development within these designated areas should be limited."*

5.2.9 Paragraph 175 c) explains that *"development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused unless there are wholly exceptional reasons and a suitable compensation strategy exists."*

Local Planning Policy

The Development Plan

5.2.10 The development plan relevant to this application is considered to consist of the Swindon Borough Local Plan 2026 (SBLP) (Swindon Borough Council (SBC) adopted March 2015) the Swindon and Wiltshire Joint Spatial Framework: Issues Paper (2017) and the Statement of Common Ground between the two authorities (ongoing).

5.2.11 These documents have been reviewed and planning policies, relevant to landscape and visual matters and to the proposed development are summarised in Table 5.1 below.

Table 5.1: Swindon Borough Local Plan 2026 relevant landscape planning policies

Plan Policy	Details
Policy DE1: High Quality Design	*"High standards of design are required for all types of development. Proposals for development should address the objectives of sustainable development through high quality design and place-making principles. To ensure this, proposals will be assessed against all of the following design principles:* *a. Context and character: in respect of:* • *Existing built characteristics;* • *Acknowledged features of importance; and* • *Existing site conditions.* *b. Layout, form and function of the development, in respect of:* • *Accessibility, connectivity, permeability, legibility, inclusivity, safety & security, efficiency and adaptability; and* • *Siting, orientation, scale, massing, materials and detailing."* The explanatory text requires all development proposals, of any scale, to meet the standards of high-quality design, across the borough. One of the criteria that development proposals will be assessed against is *"the place and setting of the development"* (SBLP, paragraph 4.8). Design principles – character and context, are outlined at SBLP paragraph 4.9. The explanatory text notes that *"each place has its own distinctive character and possesses inherent design assets and opportunities. As such all development must be in context with the existing natural built and historic environment and proposals must respond positively to enhance or create distinctive character and identity. Appreciating and responding to the context and character of a site and its surrounds requires the following aspects to be positively addressed by development."* These include "*Acknowledged features of importance (natural and historic) such as: landscape character, historic landscape*" … *"tree and hedgerow protection, protected habitats…*". The form of the development is discussed at SBLP paragraph 4.14. The explanatory text requires development proposals to create a strong contextual response to the existing site. The siting of the proposals will be required to respond positively to the existing context, including trees, landscape and topography and the character of the wider area. In terms of scale, the size of the built form must relate to its surroundings and respond to context, and not dominate or compromise amenity*, "in all cases the scale of development" … "should be justified"*. With regard to massing, "the combined effect of the height, bulk and silhouette of a building or group of buildings should *"be in keeping with the character and context of the area.*" The choice of materials must also "suit the context, character and end purpose(s)." … "contemporary materials that exhibit high performance and have sustainable credentials should be considered." The accompanying text explains that the visual impact of proposed development will be assessed, including important vistas and views. The impact on amenity also includes an assessment of light pollution where the development *"should be compatible with nearby land uses and not compromise amenity"* (SBLP, paragraph 4.17).
Policy EN1: Green Infrastructure Network	*a. "In accordance with the Swindon Borough Green Infrastructure Strategy development shall protect and enhance Green Infrastructure and assets as Identified in Appendix 4. This includes the requirement that development must provide for the protection and integration of visually important existing trees, hedges and woodlands. Development that would result in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland will only be permitted where the need for, and the benefits of, the development in that location clearly outweigh the loss."* The North Wessex Downs AONB is noted as a Green Infrastructure Setting, as is 'landscape character' (SBLP, Appendix 4).

Plan Policy	Details
	The explanatory text notes that the North Wessex Downs AONB is part of the "*beautiful landscape context*" and "*includes sections of the Ridgeway National Trail and is part of the Great Western Community Forest*" (SBLP, paragraph 4.323). Tree protection is considered in paragraph 4.326 and 4.327 of the SBLP. Noting that "*where trees, hedges or woodlands are present on or adjacent to a development site a full report to BS5837: 2012 'trees in relation to design, demolition and construction – recommendations' will be required when considering the proposal*."
Policy EN2: Community Forest	*"Development shall contribute towards the aims an objectives of the Great Western Community Forest (GWCF) in Swindon. This will be achieved by*: • *Ensuring a net increase in tree cover through the planting of new woodland and trees"* SBLP, paragraph 4.333 explains that the GWCF covers the whole of Swindon Borough. A Forest Plan sets out the objectives of the GWCF. One of the priorities is to achieve sustainable increase in tree and woodland cover across Swindon Borough (SBLP, paragraph 4.334).
Policy EN5: Landscape Character and Historic Landscape	a. *"Proposals for development will only be permitted when:* • *The intrinsic character, diversity and local distinctiveness of landscape within Swindon Borough are protected, conserved and enhanced;* • *The design of the development and materials used are sympathetic to the surrounding landscape;* • *Unacceptable impacts upon the landscape are avoided; and,* • *Where other negative impacts are considered unavoidable, they are satisfactorily mitigated* b. *In meeting the requirements of EN5a, applicants for development should demonstrate how they have taken into account Landscape Character Assessments and assessed the potential impact of the proposal upon the following attributes of the landscape* (amongst other matters)*:* • *existing landscape form, features, topography and character;* • *views, visual amenity and the landscape setting;* • *environmental amenity such as tranquillity & noise, pollution and light pollution* c. *The North Wessex Downs Area of Outstanding Natural Beauty (AONB) is a nationally recognised area of landscape protection. Proposals within the Borough which are within and or abut the North Wessex Downs AONB must accord with relevant criteria set out in the AONB Management Plan and 115 and 116 of the NPPF. Proposals outside the AONB should not adversely affect its setting."* The supporting text at paragraph 4.352, explains that *"landscape character and the historic landscape form an integral part of the green infrastructure of the Borough and that "development proposals should take account of their natural surroundings, incorporating and harmonising with the surroundings and the local landscape features." … "It is essential that new development should help sustain and/or create landscapes with a strong sense of place and local identity*" and takes into account a number of features, including views in and out of the development, visually sensitive skylines, as well as geological and topographical features. Paragraph 4.353 explains that as an AONB, the North Wessex Downs is a landscape of national importance and great weight should be given to conserving its landscape scenic beauty. Paragraph 4.354 requires developers to use the AONB Management Plan and Position Statements to inform development proposals.

Emerging Policy

Swindon Borough Local Plan 2036

5.2.12 Swindon Borough Council are currently carrying out a review of the Local Plan, for the period up to 2036. Limited weight can be given to these policies, but they provide insight on the future policies being considered. They are considered in more detail within the Planning Supporting Statement (document reference 20305S-RPS-XX-XX-RP-T-9701). The relevant landscape policies are outlined below.

5.2.13 Policy DM 2: Design of buildings – this policy requires high-quality, visually attractive buildings that are *"of a scale and design that is harmonious with other buildings and forms in the local area in terms of height and massing as well as frequency and proportion of fenestration, roof shapes, architectural elements, rhythms and patterns. Buildings of greater scale or design that challenge the context must be justified by the placemaking principles of DM1 and be supported at Design Review"* (1 a)).

5.2.14 Policy DM 28: Green Infrastructure – this include green infrastructure within the Borough that is not accessible to the public. The policy requires development to *"maintain, enhance and where possible provide additional green infrastructure"* (point 1.) and that development *"should not result in the loss of visually or ecologically important features including trees, hedges, woodlands and water courses. Existing trees, hedgerows and woodland should be sympathetically integrated into the design of development. Where the development would result in the loss of existing trees, hedgerows, woodland or watercourses, and this can be justified by the benefits of the development, the loss should be mitigated by new tree planting within the development of at least an equal quantum and standard"* (Point 2).

5.2.15 Policy DM 29: Great Western Community Forest – requires that development *"shall contribute towards the aims and objectives of the Great Western Community Forest (GWCF) in Swindon"* and that this will be achieved by: *"ensuring a net increase in tree cover through the planting of new woodland and trees"* amongst other measures.

5.2.16 Policy DM 33: Landscape – states that *"proposals for development will only be permitted when: the intrinsic character, diversity and local distinctiveness of landscape within Swindon Borough are protected, conserved and enhanced; the design of the development and materials used are sympathetic to the surrounding landscape; unacceptable impacts upon the landscape are avoided; and, where other negative impacts are considered unavoidable, they are satisfactorily mitigated"* (point 1). Applicants shall *"demonstrate how they have taken into account (amongst other matters: Landscape Character Assessments and assessed the potential impact of the proposal upon the following attributes of the landscape: existing landscape form, features, topography and character; views, visual amenity and the landscape setting; environmental amenity such as tranquillity and noise, pollution and light pollution"* (point 2). The policy also notes that *"National policy and legislation will be applied in assessing proposals within or affecting the setting of The North Wessex Downs Area of Outstanding Natural Beauty. Regard will be had to the North Wessex Downs AONB Management Plan in considering such applications."*

Relevant Guidance

National Planning Practice Guidance

5.2.17 The NPPF is supported by the National Planning Practice Guidance (NPPG) (DCLG, 2014) a web-based guidance resource that was introduced in 2014 in order to bring together existing planning practice guidance for England in an accessible and useable way. The Natural Environment section was updated in July 2017 and the Light Pollution section was updated November 2019. Only those sections of relevance to the Application Site are discussed below.

Natural Environment – Landscape (21st July 2019)

5.2.18 The NPPG explains, at paragraph: 036 (Reference ID: 8-036-20190721) that the NPPF requires that *"plans should recognise the intrinsic character and beauty of the countryside, and that strategic policies should provide for the conservation and enhancement of landscapes. This can include nationally and locally-designated landscapes but also the wider countryside."*

5.2.19 In the same paragraph, the NPPG requires that where landscapes have a particular, local, value planning policies should *"identify their special characteristics and be supported by proportionate evidence."* In addition, *"Plans can also include policies to avoid adverse impacts on landscapes and to set out necessary mitigation measures…"* Also "*The cumulative impacts of development on the landscape need to be considered carefully."*

5.2.20 The NPPG explains at paragraph: 037 (Reference ID: 8-037-20190721) that *"For a designated landscape, the relevant management plan will contain further information on the area's particular character and beauty."* Information within the North Wessex Downs AONB Management Plan is considered in paragraphs 5.2.28 to 5.2.36, below.

5.2.21 In the same paragraph the NPPG refers to using Landscape and Visual Impact Assessments to demonstrate the likely effects of a proposed development on the landscape. The character of the Application Site is set out in paragraphs 5.2.73 to 5.2.132 of this chapter.

5.2.22 Paragraph: 039 Reference ID: 8-039-20190721 notes that *"Section 11A(2) of the National Parks and Access to the Countryside Act 1949, section 17A of the Norfolk and Suffolk Broads Act 1988 and section 85 of the Countryside and Rights of Way Act 2000 require that 'in exercising or performing any functions in relation to, or so as to affect, land' in National Parks and Areas of Outstanding Natural Beauty, relevant authorities 'shall have regard' to their purposes for which these areas are designated."*

5.2.23 Paragraph: 040 Reference ID: 8-040-20190721 notes that *"Management plans for National Parks, the Broads and Areas of Outstanding Natural Beauty do not form part of the statutory development plan, but they help to set out the strategic context for development. They provide evidence of the value and special qualities of these areas."* Information within the North Wessex Downs AONB Management Plan is considered in paragraphs 5.2.28 to 5.2.36, below.

5.2.24 Paragraph: 041 Reference ID: 8-041-20190721 explains that *"The National Planning Policy Framework makes clear that the scale and extent of development in these areas should be limited, in view of the importance of conserving and enhancing their landscapes and scenic beauty."*

Light Pollution (1 November 2019)

5.2.25 The NPPG explains in paragraph: 001 (Reference ID: 31-001-20191101) that *"artificial lighting needs to be considered when a development may increase levels of lighting or would be sensitive to prevailing levels of artificial lighting."*

5.2.26 The NPPG notes, in the same paragraph, that *"Artificial light is not always necessary. It has the potential to become what is termed 'light pollution' or 'obtrusive light', and not all modern lighting is suitable in all locations. It can be a source of annoyance to people, harmful to wildlife and undermine enjoyment of the countryside or the night sky, especially in areas with intrinsically dark landscapes."* The Application Site is not located in an intrinsically dark landscape.

5.2.27 The NPPG at paragraph: 002 (Reference ID: 31-002-20191101) requires that consideration should be given to whether the proposed lighting significantly affects sensitive receptors, e.g. residents. The Application Site is not located in an area that lies adjacent to residential development.

North Wessex Downs Area of Outstanding Natural Beauty documents

North Wessex Downs Area of Outstanding Natural Beauty (AONB) Management Plan 2019-2024 (North Wessex Downs AONB Partnership, 2019)

5.2.28 The site lies within the North Wessex Downs AONB. Areas of Outstanding Natural Beauty are designated by the Government for the purpose of ensuring that the special qualities of the finest landscapes in England, Wales and Northern Ireland are conserved and enhanced. The primary purpose of the AONB designation is to conserve and enhance the natural beauty of the area.

5.2.29 The Special Qualities of the landscape of the North Wessex Downs AONB are:

- *"Remote high chalk plains, plunging scarps and open downlands filled with flowers;*
- *Scattered farmsteads and settlements in a landscape seemingly unchanged for centuries;*
- *Mixed fields and arable production;*
- *A rich mix of semi-natural woodlands, wood pasture with veteran trees and plantations; and*
- *River valleys with grazed pastures, water meadows and wetlands."*

5.2.30 The current plan is the North Wessex Downs AONB Management Plan 2019-2024. The Key Issues, AONB Objectives and Policies of the North Wessex Downs Partnership are set out at paragraph 2.36 of the AONB Management Plan. With regard to the Application Site, the Key Issues with the potential to have significant influence on the AONB's Landscape Special Qualities are:

c) *"The need to … where possible, extend chalk grassland habitat;*

o) *Intense pressure for development throughout the AONB and its setting that threatens the character and quality of its landscape and risks merging of small settlements, encroachment by larger settlements and changes the scale and nature of development boundaries."*

5.2.31 The Landscape Strategic Objectives for 2019-2024 are set out at paragraph 2.37 of the Management Plan, the one relevant to the Application Site is:

- *"S.01: maintain and enhance the tranquillity and distinctive landscape character of the North Wessex Downs and its setting with a focus on the contribution from agriculture and forestry, development and infrastructure."*

5.2.32 Paragraph 2.38 sets out the AONB Landscape Policies. Those of relevance to the Application Site and this assessment are set out below:

- *"LA 02: Seek to identify and address the main LA 03 factors that threaten the special qualities of the AONB landscape, e.g." … "built development;*
- *LA 03: Use the North Wessex Downs Integrated Landscape Character Assessment to inform policy and decision making across the AONB and its setting;*
- *LA 06: Ensure that all development in or affecting the setting of the AONB conserves and enhances the character, qualities and heritage of the North Wessex Downs landscape."*

5.2.33 A statement on the same page as the policies states "*Development pressure threatens the character and the quality of the AONB*."

5.2.34 Chapter 7 relates to Development within the AONB. The perceptual qualities of remoteness and tranquillity are discussed at paragraphs 7.15 and 7.16. The Management Plan notes that the *"sense of remoteness and tranquillity is fundamental to the character of the North Wessex Downs AONB"* and that the *"dark night skies contrast dramatically with the surrounding urban areas."*

New developments that individually or cumulatively threaten these perceptual qualities, by materially increasing lighting, noise and/or activity in the countryside are likely to be opposed.

5.2.35 The key issues regarding development that are of relevance to the Application Site are:

d) "The loss of rural character through suburbanising influences from new development (new fencing, lighting, signage, parking areas, paved footpaths …

g) Impact on dark skies and tranquillity of high-powered external lighting, especially where poorly directed …

j) Unsuitable development of redundant previously developed and part-developed sites within the North Wessex Downs, especially redundant airfields and military sites (e.g. Wroughton) and the impact upon landscape quality …

o) Development that results in a material loss of tranquillity and/or impact on the dark night skies within the North Wessex Downs or its setting.

q) Development that does not provide for appropriate mitigation …"

5.2.36 Paragraph 7.39 details the AONB's development policies. Those of relevance to the proposed development are:

- *"DE.01: Encourage all proposals for new development, redevelopment and re-use to conserve and enhance the natural beauty of the North Wessex Downs. Oppose forms of development that fail to conserve and enhance the character and quality of the AONB and its setting and to make reference to the AONB's published guidance.*
- *DE.02: Encourage high standards of design, comprehensive landscaping where required…and innovation that respect…the AONB and its setting and specific AONB policy.*
- *DE.05: Encourage the consideration of landscape, including historic landscape, impacts at the earliest opportunity in the planning process through preparation of Landscape and Visual Impact Assessment, Landscape and Visual Appraisal and Environmental Impact Assessment reports as appropriate to the location.*
- *DE.08: Avoid and reduce light pollution, including control of lighting schemes or other developments that threaten the integrity of dark night skies over the North Wessex Downs."*

Supplementary Planning Documents

5.2.37 There are a number of Supplementary Planning Documents (SPDs), which accompany the SBLP. Those which are pertinent to this assessment, particularly in relation to landscape, are considered in paragraphs 5.2.35 to 5.2.42, below.

Swindon Borough Green Infrastructure Strategy 2012-2026 Revised Consultation Draft (SBC, 2011)

5.2.38 Green Infrastructure (GI) is the interconnected network of parks, woodlands, waterways and open spaces that help sustain Swindon's environmental health, economy, and quality of life.

5.2.39 Green Infrastructure provides not only publicly accessible spaces, but also: productive areas for food, wood products, and energy crops; places for wildlife to thrive and natural systems to function; and a sense of place and cultural landscape. The GWCF initiative forms part of the GI strategy. The vision for the GI network includes enhancing landscape character and respecting local distinctiveness.

5.2.40 Land ownership throughout the GI network varies and not all sites or all parts of a corridor or network will necessarily be publicly accessible. The GI Strategy notes that *"Away from urban Swindon, the land through which corridors run is largely in private ownership as farmed land."*

5.2.41 Burderop Wood, to the north of the Application Site, is identified as a GI Site (GI Strategy, Figure 17). The Application Site lies within a GI Cluster (GI Strategy, Figure 17) and falls within one of the SB GI strategic links (GI Strategy, Figure 15) which is also a Regional GI Corridor (GI Strategy, Figures 16 and 17).

Great Western Community Forest: Forest Plan 2002-2027 (SBC, 1994)

5.2.42 The Great Western Community Forest (GWCF) is a long-term programme to enrich landscapes in and around Swindon. The Forest covers over 168 square miles, stretching from the North Wessex Downs to the River Thames. The primary aim is to increase tree cover to an average of 30% across the project area, working in urban, urban fringe and rural landscapes. The Application Site lies within the GWCF Area 05.

Community Forest Supplementary Planning Guidance (SBC, 2004)

5.2.43 Swindon Borough Council produced the Supplementary Planning Guidance (SPG) on the Great Western Community Forest to ensure that its aims and objectives are incorporated into development proposals (where it is acceptable in principle) and not compromised.

Swindon Borough Landscape Character Areas SPG (SBC, 2004)

5.2.44 This is discussed in more detail in paragraphs 5.2.94 to 5.2.97, below.

Summary of planning policy and guidance

5.2.45 The key themes that the relevant planning policy seeks to achieve are:

- high quality design;
- protection of the special qualities of the North Wessex Downs AONB:
- tree retention, as part of the Great Western Community Forest and Ancient Woodland, in particular;
- prevention of light pollution; and
- suitable mitigation for any adverse effects that might occur.

Study Area

5.2.46 The LVIA study area extends to 5 km radius from the outer edges of the Application Site and has been adopted due to the 15 m height of the flues. It is anticipated that any potential significant effects of the proposed development would be within this radius. The location of the Application Site and relevant landscape designations within the study area are shown on Figure 5.1.

5.2.47 In order to determine views of the proposed development, a computer-generated Zone of Theoretical Visibility (ZTV) has been mapped. The ZTV is defined as the theoretical area from which part of the project would potentially be visible and broadly defines the extent of potential visibility within the 5 km study area for both the landscape character and visual assessment. The ZTV is shown on Figure 5.3.

Baseline Methodology

5.2.48 A combination of desk-based research and fieldwork was undertaken to establish the legislative, landscape and visual context of the Application Site. This included

- a desk-based review of legislative and planning context relevant to the Application Site and landscape and visual issues associated with the proposed development;
- a combination of desk-based study and fieldwork has been used to determine both the landscape and the visual baseline conditions;
- a Zone of Theoretical Visibility (ZTV) has been generated (based on the 15 m high flues) to show the extent of theoretical visibility of the proposed development and the landscape areas that might be indirectly affected;
- fieldwork was undertaken on the Application Site in August 2020. The representative viewpoint photography was taken in November 2020 and January 2021;
- the visual context of the proposed development was established, including the extent of views from public footpaths, residential properties, commercial properties, recreational areas/open space, roads and other receptors; and
- the representative viewpoints were identified using the ZTV. They were confirmed or adjusted through fieldwork, with additional viewpoints being added where it was thought it would aid the better understanding of the baseline visual resources and therefore, the assessment.

Consultation

5.2.49 Table 5.2 below provides a summary of the consultation undertaken with Statutory Consultees, regarding landscape and visual matters.

Table 5.2: Summary of Consultation Undertaken with Statutory Consultees Regarding Landscape and Visual Matters

Date	Consultee and Issues Raised	How/ Where Addressed
6 October 2020 Email	J. Hughes (Natural England) (NE) to J. Aykroyd (Arcadis) In response to a series of emails between the two parties. Discusses SSSI primarily and provides information of the set back from the Ancient Woodland (15 m). No reference to landscape character or visual matters.	This has been resolved in the project design – the locational aspect of the built development on the Application Site, as illustrated on the Landscape strategy drawings in Appendix 5B.
12 November 2020 Email	C. Demmar (RPS) to P. Eggleton (SBC Email informed P. Eggleton that representative viewpoint photography had been taken from *"a number of publicly accessible locations within the ZTV, all of which are within or on the boundary of the North Wessex Downs AONB. The locations (and ZTV) are shown on the attached plan. The number of locations is not exhaustive, but, are chosen to be a representative selection from geographically diverse, 'sensitive' locations. I trust that these are acceptable to you, but please let me know if there is a particularly sensitive viewpoint that you feel could not be represented by one of those on the plan."*	The representative viewpoint locations are illustrated on Figure 5.26 and the panoramic photography is at Figure 5.27 to 5.32.
16 November 2020 Email	C. Demmar (RPS) to J Moult (NE) via consultations@naturalengland.org.uk Sending ZTV with locations of the representative viewpoint photography that had been undertaken to date. Requesting comments on the locations.	-
30 November 2020 EIA Screening Matrix	P. Eggleton (SBC) EIA Screening Matrix, received, from SBC. EIA required	

Date	Consultee and Issues Raised	How/ Where Addressed
	"*The screening opinion relates to a new proposal for employment development on a site which is already in use for a similar purpose. The main differences are that the replacement building would have a substantially greater footprint and would be higher. There is clearly potential for significant effects with regard to ….the position within the AONB and although well screened when the trees are in leaf, it is evident that it will be visible from sensitive views within the AONB and these may be more significant during the winter months.* *Although there is comprehensive tree screening, a significant effect on the character and appearance of the AONB is difficult to conclusively rule out, particularly with the site being illuminated*".	The effects of the proposed development on the AONB are assessed in sections 5.3 and 5.4 of this chapter. .
9 December 2020 Pre-application Advice	Swindon Borough Council: P. Eggleton (Case Officer) The pre-application advice was given in response to an enquiry by the Applicant on the 21st October 2020. The pre-application advice raised the location of the Application Site within the North Wessex Downs Area of Outstanding Natural Beauty (AONB) on the first page, *"The Swindon Local Plan policies do not support large scale development in the AONB. Policy EN5 sets out that the AONB is a nationally recognised area of landscape protection. Proposals within the Borough which are within and or abut the AONB must accord with relevant criteria set out in the AONB Management Plan and paragraph 115 and 116 (now 172 and 173) of the NPPF. Great weight should be given to conserving and enhancing landscape and scenic beauty in AONB's, which have the highest status of protection. To satisfy Policy EN5, the proposal must therefore also satisfy the requirements of the AONB Management Plan and the NPPF. The NPPF is clear that in the AONB, planning permission should be refused for major development other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest"* (page 1, second paragraph). The visual impact is a primary concern of SBC *"With regard to the visual impact of the development on the AONB and the area generally, it will be necessary to demonstrate that there would be no significant harm at any time throughout the year. Appropriate protection and ongoing management measures for existing trees and vegetation will be necessary as well as any further enhancements to the existing screening. Detailed schemes for lighting in particular will be required. Given the loss of vegetation and the scale of development, combined with the limited potential for additional planting, contributions to the Great Wester[n] Community Forest may be necessary in accordance with Policy EN2"* (page 2, fifth paragraph). *"…it will be essential to limit any conflict with other polices of the development plan and the NPPF; to provide mitigation where compliance cannot be achieved and provide enhancements where*	The relevant landscape and visual policies are noted at paragraphs 5.2.25 to 5.2.33 of this chapter. The relevant NPPF policies are considered at paragraphs 5.2.2 to 5.2.9. The special qualities and the landscape character of the North Wessex Downs AONB is set out at paragraphs 5.2.86 to 5.2.93. The visual baseline is set out at paragraphs 5.2.133 to 5.2.150, with representative viewpoints described in Table 5.8. The visual impact of the proposed development during the construction phase is assessed at paragraphs 5.4.25 to 5.4.66. The visual impact during the operation of the proposed data centre is assessed at paragraphs 5.5.26 to 5.5.68. The Great Western Community Forest (GWCF) is identified at paragraph 5.2.39. The effects on the GWCF during the construction phase are

Date	Consultee and Issues Raised	How/ Where Addressed
	possible; and achieve other benefits that can be included in the final balancing exercise" (page 3, fourth paragraph).	assessed at paragraphs 5.4.22 to 5.4.24.
	The visual impact of the development is again highlighted at the fifth paragraph of page 3 *"…there are clearly a number of matters that would contribute towards a positive assessment with regard to the proposal representing exceptional circumstances, such as the existing land use and the apparent level of visual containment. Notwithstanding the wide array of other concerns, the efficient re-use of this existing site, the increased employment levels and the benefits to ICT, would, subject to a positive finding with regard to visual impact, suggest that there is potential in policy terms for the principle of resisting such a development, in this AONB location, to be overcome…"*	The effects on the GWCF during the operation of the proposed development is assessed at paragraphs 5.5.21 to 5.5.23. Landscape proposals are described in paragraphs 5.3.7 to 5.3.13. Figure 5.45 provides an overview of the landscape proposals. Appendix 5B is a detailed landscape strategy.
	Other concerns of SBC include the effect on the character of the North Wessex Downs AONB, which would have to be neutral, positive or adequately mitigated (page 3, sixth paragraph).	The effects on the character and special qualities of the North Wessex Downs AONB during the construction phase are assessed at paragraphs 5.4.10 to 5.4.14.
	With regard to planning policy, the Pre-application Advice notes the requirements to ensuring acceptability in terms of visual impact and amenity contained in Swindon Borough (SB) Local Plan Policy IN3 (page 12, third paragraph). The Pre-application Advice explains that this demonstrates that landscape and design are key considerations for any ICT development proposals (page 12, fourth paragraph).	The effects on the character and special qualities of the North Wessex Downs AONB during the operation of the proposed development are assessed at paragraphs 5.5.9 to 5.5.13.
	This requirement is detailed further in SB Local Plan Policy EN5: Landscape Character and Historic Landscape, which states that *"unacceptable impacts on the landscape will be avoided"* (page 12, sixth paragraph).	
	As the Application Site lies within the North Wessex Downs AONB, the proposals must accord with the relevant criteria set out in the AONB Management Plan and paragraph 172 of the National Planning Policy Framework (NPPF). Any development within the AONB should include an assessment of the effects on the landscape of the designated area and the extent to which any adverse effects can be moderated (NPPF paragraph 172, c)).	
	SB Local Plan Policy DE1: Design and Amenity requires high standards of design. Key considerations being the impact of the proposed development's visual appearance on the existing context and character (within the AONB) and in terms of amenity, light pollution (page 14, first, second and third paragraphs).	The existing light levels are considered at paragraph 5.2.128 and illustrated on Figure 5.8.
	The main issues, outlined on pages 16 and 17 of the Pre-application Advice, include: • *"Impact on the character of the site and surrounding area, with particular regard to AONB."*	The details of the proposed lighting are described at paragraphs 5.3.3 to 5.3.6. The proposed lighting layout is illustrated on document reference 20305S-CON—XX-XX-RP-E-9735 accompanying this application.
	Under Assessment and Conclusions, the Pre-application Advice (page 17 onwards) explains *"The Swindon Local Plan policies do not support large scale development in the AONB. Policy EN5 sets out that the North Wessex Downs Area of*	The effects of the proposed lighting on landscape character is assessed at paragraph 5.5.24.

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	Outstanding Natural Beauty is a nationally recognised area of landscape protection. Proposals within the Borough which are within and or abut the North Wessex Downs AONB must accord with relevant criteria set out in the AONB Management Plan and paragraph 115 and 116 (now 172 and 173) of the NPPF" (first paragraph). It expands *"To satisfy Policy EN5, the proposal must therefore also satisfy the requirements of the AONB Management Plan and the NPPF. These are clear that great weight should be given to conserving and enhancing landscape and scenic beauty in AONB's, which have the highest status of protection"* (second paragraph). Further *"The [AONB] Management Plan has the objectives of maintaining the integrity and value of the special qualities of the area; identify and promote the special qualities and features that contribute to the local distinctiveness…"* (third paragraph). Consideration of major applications within the AONB should include an assessment of *"c) any detrimental effect on the environment…and the extent to which that could be moderated"* (paragraph 3). With regard to the visual impact of the Proposed Development on the AONB and the area in general, the Pre-application Advice explains that *"it will be necessary to demonstrate that there would be no significant harm at any time throughout the year. Appropriate protection and ongoing management measures for existing trees and vegetation will be necessary as well as any further enhancements to the existing screening. Detailed schemes for lighting in particular will be required. Given the loss of vegetation and the scale of development, combined with the limited potential for additional planting, contributions to the Great Wester Community Forest may be necessary in accordance with Policy EN2. This requires a net increase in tree cover through the planting of new woodland and trees; creating or enhancing habitats for biodiversity, including built structures in accordance with Polices EN1 and EN4; and ensuring access to local woodlands and opportunities for communities and businesses to benefit from GWCF"* (page 18, fourth paragraph). The importance of visual impact on the AONB is reiterated on page 19, sixth paragraph *"…Notwithstanding the wide array of other concerns, the efficient re-use of this existing site, the increased employment levels and the benefits to ICT, would subject to a positive finding with regard to visual impact, suggest that there is potential in policy terms for the principle of resisting such a development, in this AONB location."*	The effects of the proposed lighting on visual receptors is assessed at paragraph 5.5.66.
9 December 2020 Pre-application Advice	Natural England (NE): Comments provided as part of EIA screening application – reported in Pre-application Advice from SBC NE notes that the Application Site lies within the North Wessex Downs AONB. It explains that *"...Natural England advises that sufficient information on the potential impacts of this proposal*	The effects on the character and special qualities of the North Wessex Downs AONB during the construction phase are assessed at paragraphs 5.4.10 to 5.4.14. The effects on the character and special qualities of the North

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	upon these designated sites/areas is submitted with any subsequent planning application" (page 5, second paragraph). Further NE notes *"This development proposal may have environmental impacts on … local landscape character that may be sufficient to warrant an EIA. Information on ancient woodland, ancient and veteran trees is set out in Natural England/Forestry Commission standing advice"* (page 5, third paragraph).	Wessex Downs AONB during the operation of the proposed development are assessed at paragraphs 5.5.9 to 5.5.13
9 December 2020 Pre-application Advice	SBC Landscape - comments within the Pre-application Advice from SBC *"Any application must be accompanied by an appropriately detailed Landscape and Visual Impact Assessment. To that end, and on the basis that the site is well screened, the proposed viewpoints as suggested thus far, subject to the suggested additional point, are acceptable. However, if the ZTV and subsequent assessment shows that there is increased visibility over the perimeter vegetation, then we would want to see this included in the LVIA"* (page 7, eighth paragraph). *"It is also important that any emerging proposals include for a scheme of tree planting to compensate adequately for any that are lost. The current (apparent) lack of visibility is largely based on the extent and density of perimeter vegetation. It is important therefore that appropriate protection and ongoing management measures are put in place to ensure the longevity of this important feature"* (page 7, ninth paragraph).	This chapter includes a full LVIA. The location of the agreed representative viewpoints, including an additional viewpoint requested later by SBC are illustrated on Figure 5.26 and described in Table 5.8. Landscape proposals are described in paragraphs 5.3.7 to 5.3.13. Figure 5.45 provides an overview of the landscape proposals. Appendix 5B is a detailed landscape strategy.
5 January 2021 Letter in response to Scoping Report	From J. Hughes (NE) to P. Eggleton (SBC) The letter emphasises the need for a full EIA. *"Case law and guidance has stressed the need for a full set of environmental information to be available for consideration prior to a decision being taken on whether or not to grant planning permission. Annex A to this letter provides Natural England's advice on the scope of the Environmental Impact Assessment (EIA) for this development"* (third paragraph). Annex A to the letter provides advice related to EIA scoping requirements. Section 3 of the Annex is concerned with Designated Landscapes and Landscape Character. *"Nationally Designated Landscapes* *As the development site is within North Wessex downs AONB, consideration should be given to the direct and indirect effects upon this designated landscape and in particular the effect upon its purpose for designation within the environmental impact assessment, as well as the content of the relevant management plan for North Wessex Downs.* *Landscape and visual impacts* *Natural England would wish to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. The EIA should include assessments of visual effects on the surrounding area and*	Both direct and indirect effects on the character and special qualities of the North Wessex Downs AONB - during the construction phase at paragraphs 5.4.10 to 5.4.14 and during the operation of the proposed development are assessed at paragraphs 5.5.9 to 5.5.13. These details are provided on Figures 5.1 to 5.6, as well as Figure 5.26. Paragraphs 5.2.2 to 5.2.45 provide details of the planning policies and management plans

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	landscape together with any physical effects of the development, such as changes in topography. *The EIA should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.* *Natural England supports the publication Guidelines for Landscape and Visual Impact Assessment, produced by the Landscape Institute and the Institute of Environmental Assessment and Management in 2013 (3rd edition). The methodology set out is almost universally used for landscape and visual impact assessment.* *In order to foster high quality development that respects, maintains, or enhances, local landscape character and distinctiveness, Natural England encourages all new development to consider the character and distinctiveness of the area, with the siting and design of the proposed development reflecting local design characteristics and, wherever possible, using local materials. The Environmental Impact Assessment process should detail the measures to be taken to ensure the building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit.* *The assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. In this context Natural England advises that the cumulative impact assessment should include other proposals currently at Scoping stage. Due to the overlapping timescale of their progress through the planning system, cumulative impact of the proposed development with those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application."* Section 3 also sets what is required in the way of Heritage Landscapes. It notes that *"The assessment should refer to the relevant National Character Areas which can be found on our website. Links for Landscape Character Assessment at a local level are also available on the same page."* Section 5 of Annex A sets out the type of project to be considered in a cumulative and in-combination impact assessment.	relevant to landscape and visual resources. The landscape and visual baseline of the Application Site and the surrounding area are described in paragraphs 5.2.73 to 5.2.132 as well as Table 5.8. The proposed development including the lighting and landscape proposals are summarised paragraphs 5.3.1 to 5.3.13. The potential changes at the construction phase are described in paragraphs 5.4.1 and 5.4.2. The potential changes at the operation phase are outlined at paragraphs 5.5.2 to 5.5.3. Details of the proposed development Drawing accompanying this application (document reference 20305S-RPS-00-XX-DR-A-9501). The LVIA within this chapter is based on the *Guidelines for Landscape and Visual Impact Assessment: Third Edition*. The landscape proposals using locally native species and mixes are set out at paragraphs 5.3.7 to 5.3.13. Details are found within Appendix 5B to this chapter. A cumulative effects assessment is set out at paragraphs 5.6.1 to 5.6.3 and Table 5.9 of this chapter. For the location of the cumulative development see Appendix 4.3. Heritage and historic landscapes are considered in ES, Chapter 7: Historic Environment.
15 January 2021 Scoping Opinion	From P. Eggleton (SBC) to RPS *"Landscape and Visual Effects* *Comment –* *- The statement in para 5.14* [of the Scoping Report] *'Given its past and current use, the proposed development of the Application Site as a data centre*	The effects on the character and special qualities of the North Wessex Downs AONB during the construction phase are assessed at paragraphs 5.4.10 to 5.4.14.

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	would not have a likely significant effect on landscape character or the Special Qualities of the North Wessex Downs AONB' cannot be agreed based on the information currently available. *- In 5.15 the statement 'viewpoints used in the assessment have been agreed with Swindon Borough Council' should include the additional view point to the east of Burderop House. If the ZTV and subsequent assessment shows that there is increased visibility over the perimeter vegetation, then we would want to see this included in the LVIA.* *- Any emerging proposals should include for a scheme of tree planting to compensate adequately for any that are lost.* *- Given the evident conflict with national policy with regard to major development in the AONB, any application would need to take opportunities to enhance and conserve. With regard to the development plan, Policy EN5 sets out that unacceptable impacts upon the landscape will be avoided. Part c of the policy specifically requires that proposals within the AONB must accord with relevant criteria set out in the AONB Management Plan and paragraph 115 and 116 of the NPPF (2012) (Paragraphs 115 and 116 of the NPPF 2012 have since been replaced by Paragraph 172, and footnote 55 of the NPPF 2019.) These matters should be fully addressed in the Planning Statement."*	The effects on the character and special qualities of the North Wessex Downs AONB during the operation of the proposed development are assessed at paragraphs 5.5.9 to 5.5.13. The location of the agreed representative viewpoints, including the additional viewpoint requested by SBC are illustrated on Figure 5.26 and described in Table 5.8. The panoramic photography is at Figure 5.27 to 5.32. The additional viewpoint (12) does not lie within the ZTV (see Figure 5.26). The landscape proposals are described at paragraphs 5.3.7 to 5.3.13 and illustrated on Figure 5.45. A detailed landscape strategy is at Appendix 5B to this chapter.
20 January 2021 Email	From P. Eggleton (SBC) to C. Demmar and J. Smith (RPS) *"Apologies, I provided* [contact details for] *the wrong landscape colleague* [A. Norris]. *"I am not certain whether there will be any visibility of the site given the tree belt but as I mention in the email, the view towards the site, also includes the listed Hall so ruling out conclusively that there will be no visibility, including from night-time glow, would be" beneficial, particularly but not exclusively with regard to the heritage issues."*	The location of the agreed representative viewpoints, including the additional viewpoint requested by SBC are illustrated on Figure 5.26 and described in Table 5.8. The panoramic photography is at Figure 5.27 to 5.32. The additional viewpoint (12) does not lie within the ZTV (see Figure 5.26).
3 February 2021 Meeting	J. Hughes and J. Stobhart (Natural England) with C. Russell, T. Oliver and C. Demmar (RPS) Landscape and Visual Resource CD provided a summary of the Application Site, explaining that the site was previously occupied by a US Air Force hospital and later as a psychiatric hospital with much of the site covered with buildings. When these buildings were demolished, much of the rubble was left on site and the topography in some areas of the site has been altered considerably from the original landform. There is very little original vegetation on the Application Site and many of the existing trees were planted as part of the hospital	

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	development or as part of the current data centre campus layout.	
	CD presented the viewpoints used in the assessment, explained why they had been included and that SBC had been consulted. JS asked if CD had spoken to the AONB officer to agree the viewpoints. CR explained that RPS didn't have the AONB officer's details and that they had not responded to Scoping Report. JS suggested that the AONB should be contacted to confirm the acceptability of the viewpoints proposed.	The AONB Landscape Officer has been contacted see items in consultation table, below.
	CD presented the wirelines and photomontages from close-up views, from the Public Right of Way and key viewpoints, which demonstrated that the replacement data centre would be hard to distinguish in the wider context and that significant visual impacts were unlikely to occur.	These are at Figures 5.33 to 5.44.
	JS explained that the redevelopment of the Application Site would have impacts on the landscape character of the AONB as a result of increasing the footprint of development. The change in character resulting from the proposed development is not in line with NPPF paragraph 172, in which there is a requirement to conserve and enhance the landscape and scenic beauty of nationally designated landscapes. While this might not be achievable on the Application Site, JS explained that the this could be done by proposing offsite works that would meet some of the objectives of the AONB management plan e.g. through annual contributions to local landscape enhancement schemes. The AONB would be best to advise on local priorities. CD suggested the Great Western Community Forest project, within the AONB and JS agreed that would be an appropriate scheme.	A revised Landscape Strategy for the proposed development is illustrated at Figure 5.45. The landscape proposals are described in section 5.3 of this chapter. The effects on landscape character during the construction phase are assessed at paragraphs 5.4.6 to 5.4.24. The effects on landscape character during the operation and maintenance phase are described in paragraphs 5.5.5 to 5.5.25.
	The Grassland Management Speciation was emailed to JS and JH before the meeting to provide the opportunity to see the mitigation proposals. JS commented on the proximity of the proposed development to Burderop Wood SSSI and Ancient Woodland and explained that all aspects of the development (including the fence line) would have to be a minimum of 15 m from the Ancient Woodland. If this requirement was not met then Natural England would object to the proposal.	A revised Grassland Management Scheme is illustrated on Drawing no. 20305S-RPS-00-XX-DR-A-9535 XX. A revised Landscape Strategy, illustrating the layout in relation to the Ancient Woodland is illustrated on Figure 5.45.
	JS noted that the Application Site includes a relatively large area of neutral unimproved grassland, which is a priority habitat in the UK and is in decline. The ecological value of the grassland is given greater importance because it is contiguous with the SSSI to the north, provides a mosaic of habitats and is located within the AONB. The location of the replacement data centre and associated infrastructure would lead to a substantive loss of this grassland habitat. JS stated the current layout demonstrates that the ecological constraints on the Application Site have not been given adequate consideration or weight in	The assessment of the effects on ecology and nature conservation is set out in Chapter 6: Ecology and Nature Conservation.

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	the location of the building or the associated infrastructure. In addition, JS questioned the purpose of the road around the perimeter of the Application Site and suspected that a second development was proposed in the west of the site (currently shown as retained/enhanced grassland on the Grassland Management Specification). JS considered that the proposed mitigation (i.e. the infiltration pond in the east and the retained grassland in the west) would be fragmented and separated by development (the road and the building) therefore, its ecological value would be lower compared to a continuous habitat and would not be an adequate replacement for the loss of the existing grassland.	A revised Landscape Strategy for the proposed development is illustrated on Figure 5.45. A revised Grassland Management Scheme is illustrated on Drawing no. 20305S-RPS-00-XX-DR-A-9535
	JS stated that the Application Site was not the best site for a building this size due to the loss of the grassland habitat and suggested the adjacent land to the south east would be more appropriate. CR pointed out that the land to the south east is greenfield land, whereas the Application Site is previously developed land and there were other environmental and technical reasons to justify why the site had been selected.	
	If the data centre building had to be on the Application Site, JS suggested that the building should be moved to the west to reduce the loss of the existing grassland and allowing a larger area of grassland habitat to be created that was contiguous with the proposed infiltration pond and the SSSI to the north. CD explained that the topography in the west of the Application Site was much higher and that this would lead to greater visual impacts on the AONB and the setting of nearby heritage assets.	A revised Landscape Strategy for the proposed development is illustrated on Figure 5.45.
	JS questioned the validity of the biodiversity loss calculations and stated that there was likely to be a greater loss than is currently being predicted. JS acknowledged that the Defra Matrix 2 tool could be problematic, he would like to review the data used in the biodiversity matrix.	The assessment of the effects on ecology and nature conservation is set out in Chapter 6: Ecology and Nature Conservation.
	JS stated that Natural England would object to the proposed development based on the current layout and that strong justification is needed for why the Application Site has been selected, the technical reasons behind the design and an explanation of the alternatives considered. JS stated that if the grassland could not be retained and 10% BNG could not be provided on the Application Site then the client would have to look at replacing the grassland habitat elsewhere. The priority should be to AVOID the loss of the grassland habitat and only where there is no alternative, seek to provide a replacement functional habitat in a suitable location off site.	A revised Landscape Strategy for the proposed development is illustrated on Figure 5.45.
4 February 2021 Email	C. Demmar (RPS) to R. Davies, Landscape Officer, North Wessex Downs AONB To agree representative viewpoints.	

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5 February 2021 Emails	R. Davies (NWD AONB) to C. Demmar (RPS)	
	Confirming that she is the correct contact at the AONB. Requesting plan/map of those viewpoints agreed with SBC. Knows area well.	Figures sent by File Transfer and plan sent by email on the 5th February 2021
	Requested height of proposed buildings, plus plan/photomontage of building.	No response received.
12 February 2021 Email	From P. Eggleton (SBC) to J. Smith (RPS) in response to receiving the draft ES.	
	"Please find below comments from our Policy Team.	
	"I have also had responses from Environmental Health with regard to noise; and our Landscape Officer. They are happy with the approach taken in the respective chapters."	Noted
9 March 2012 Discretionary Advice Service Meeting	Natural England, with C. Russell and T. Oliver (RPS) addressing points raised in the meeting with NE on the 3rd February.	
	Summary:	
	Alternative layouts query – further information required on the assessment of the adjoining off-site field.	A detailed breakdown of grassland areas Biodiversity Net Gain (BNG) condition will be prepared for grasslands showing the level of enhancement proposed. This is included as Appendix 6.3 of Chapter 6: Ecology and Nature Conservation.
	Grassland classifications and conditions. The site has areas of relatively high value grassland, but which do not qualify as 'lowland meadow' a habitat of principle importance.	
	Grassland / soils translocation Where there are no alternatives the safeguarding and translocation of vegetation and soils would be acceptable.	An outline Grassland Translocation and Soil Management Method Statement has been prepared and forms Appendix 6.6 to Chapter 6
	Off-site compensation for the loss of grassland will remain a requirement for the development.	
	NE had been in touch with the Landscape Officer at the North Wessex Downs AONB.	The scale of off-site compensation will need to be reviewed following agreeing the fine details in the BNG calculations.

Assessment Criteria and Assignment of Significance

Relevant Guidance

5.2.50 As a matter of best practice, this assessment has been undertaken based on the relevant guidance on landscape and visual impact assessment (LVIA) described in the following documents:

- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3) (Landscape Institute and Institute of Environmental Management & Assessment, 2013);

- Landscape Character Assessment Guidance for England and Scotland (The Countryside Agency and Scottish Natural Heritage, 2002); and
- An Approach to Landscape Character Assessment (Natural England, 2014).

Distinction Between Landscape and Visual Effects

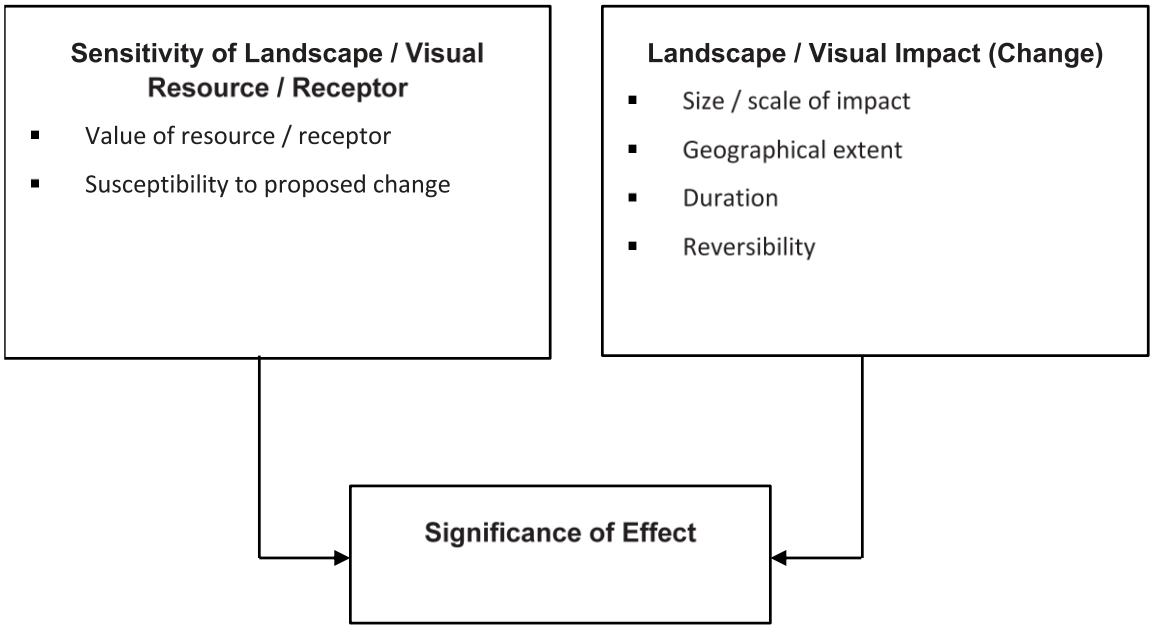
5.2.51 As set out in the GLVIA3 landscape and visual effects are assessed separately, although the procedure for assessing each is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:

- Landscape effects relate to the effects of the proposed development on the physical and other characteristics of the landscape and its resulting character and quality.
- Visual effects relate to the effects on views experienced by visual receptors (e.g. residents, footpath users, tourists etc) and on the visual amenity experienced by those people.

Assessment Criteria and Assignment of Significance of Effects

5.2.52 The Guidelines for Landscape and Visual Impact Assessment: Third Edition (Landscape Institute and Institute of Environmental Management and Assessment, 2013) (GLVIA3) sets out broad guidelines rather than detailed prescriptive methodologies. The methodologies tailored for the assessment of this development is based on GLVIA3 guidance, which recommends that an LVIA *"concentrates on principles and process"* and *"does not provide a detailed or formulaic recipe"* to assess effects, it being the *"responsibility of the professional to ensure that the approach and methodology are appropriate to the task in hand"* (preface to GLVIA3). The effects on the landscape resources or visual receptors (people) are assessed by considering the proposed change in the baseline conditions (the impact of the proposal) against the type of landscape resource or visual receptor (including the importance and sensitivity of that resource or receptor). The methodology is set out in detail below and summarised in Diagram 5.1. These factors are determined through a combination of quantitative (objective) and qualitative (subjective) assessment using professional judgement.

Diagram 5.1: Assessment Methodology Summary



Sensitivity

Sensitivity of landscape receptors

5.2.53 The sensitivity of a landscape receptor is a combination of "*judgements of their susceptibility to the type of change or development proposed and the value attached to the landscape*" (GLVIA, para 5.39). For the purpose of this assessment, susceptibility and value of landscape receptors are defined as follows:

- Landscape susceptibility*: "the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular landscape type or area, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposed change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies"* (GLVIA, para 5.40).
- Value of the landscape receptor: *"The value of the Landscape Character Types or Areas that may be affected, based on review of designations at both national and local levels, and, where there are no designations, judgements based on criteria that can be used to establish landscape value; and, the value of individual contributors to landscape character, especially the key characteristics, which may include individual elements of the landscape, particularly landscape features, notable aesthetic, perceptual or experiential qualities, and combinations of these contributors"* (GLVIA, para 5.44).

5.2.54 Sensitivity is not readily graded into bands. However, descriptions of landscape susceptibility and value are set out in Table 5.3 below.

Table 5.3: Definitions of Landscape Sensitivity

Sensitivity	Typical Descriptors	
Very High	Exceptional landscape quality, no or limited potential for substitution. Key elements / features well known to the wider public.	Nationally/internationally designated/valued landscape, or key elements or features of nationally/internationally designated landscapes.
High	Strong/distinctive landscape character; absence of landscape detractors.	Regionally/nationally designated/valued countryside and landscape features.
Medium	Some distinctive landscape characteristics; few landscape detractors.	Locally/regionally designated/valued countryside and landscape features.
Low	Absence of distinctive landscape characteristics; presence of landscape detractors.	Undesignated countryside and landscape features.
Negligible	Absence of positive landscape characteristics. Significant presence of landscape detractors.	Undesignated countryside and landscape features.

Sensitivity of visual receptors

5.2.55 Visual receptors are always people. The sensitivity of each visual receptor (the particular person or group of people likely to be affected at a specific viewpoint) "*should be assessed in terms of both their susceptibility to change and in views and visual amenity and also the value attached to particular views*" (GLVIA, para 6.31). For the purpose of this assessment, susceptibility and value of visual receptors are defined as follows:

- Visual susceptibility: *"The susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of: The occupation or activity of people experiencing views at the particular locations; and, the extent to which their attention or interest may therefore be*

focused on the views and the visual amenity they experience at particular locations" (GLVIA, para 6.32).

- Value of views: Judgements made about the value of views should take account of: *"recognition of the value attached to particular views, for example in relation to heritage assets, or through planning designations; and, indicators of value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment (such as parking places, sign boards or interpretive material) and references to them in literature or art…"* (GLVIA, para 6.37).

5.2.56 Sensitivity is not readily graded in bands and GLVIA notes, with regards to visual sensitivity, that the division of who may or may not be sensitive to a particular change "*is not black and white and in reality, there will be a gradation in susceptibility to change*" (GLVIA, para 6.35). In order to provide both consistency and transparency to the assessment process, however, Table 5.4, below defines the criteria which have guided the judgement as to the intrinsic susceptibility and value of the resource/receptor and subsequent sensitivity to the proposed development.

Table 5.4: Definitions of Visual Sensitivity

Sensitivity	Typical Descriptors	
	Visual Receptor Susceptibility	Value of View
Very High	Observers, drawn to a particular view, including those who have travelled from around Britain and overseas to experience the views.	See paragraph 5.2.52 and 5.53, above
High	Observers on the public rights of way network in the countryside are more sensitive to visual change.	See paragraph 5.2.52 and 5.53, above
Medium	Observers enjoying the countryside from vehicles on quiet/promoted routes or pedestrians on less scenic/urban rights of way are moderately sensitive to visual change.	See paragraph 5.2.52 and 5.53, above
Low	Observers in vehicles or people involved in outdoor activities where attention is not focused on landscape are less sensitive to visual change.	See paragraph 5.2.52 and 5.53, above
Negligible	Observers in vehicles or people involved in frequent or frequently repeated activities are less sensitive to visual change.	See paragraph 5.2.52 and 5.53, above

Magnitude of Impact

Magnitude of impact on landscape resources and receptors

5.2.57 The magnitude of impact or change affecting landscape receptors depends on the size or scale, geographical extent of the area influenced and its duration and reversibility. These factors are described below:

- Size or scale: *"The extent of the existing landscape elements that will be lost, the proportion of the total extent that this represents and the contribution of that element to the character of the landscape…; the degree to which aesthetic or perceptual aspects of the landscape are altered either by removal of existing components of the landscape or by addition of new ones…*" and, *"whether the effect [impact] changes the key characteristics of the landscape, which are critical to its distinctive character"* (GLVIA, para 5.49).
- Geographical extent: Distinct from scale or size, this factor considers the geographical area over which the landscape impacts will be felt, it might, for example, be a moderate loss of landscape receptors or character over a large area, or a large loss of receptors or character over a very localised area. At para 5.50 GLIA3 notes that *"in general effects* [impacts] *may*

have an influence at the following scales, although this will vary according to the nature of the project and not all may be relevant on every occasion: at the site level within the development site itself; at the level of the immediate setting of the site; at the scale of the landscape type or character area within which the proposal lies; and, on a larger scale, influencing several landscape types or character areas." For the purposes of this LVIA, the assessment considers the impact of the proposed development on the published landscape character areas, both at local (SBC and North Wessex Downs AONB) and national level, i.e. the third and fourth landscape scales.

5.2.58 Duration and reversibility: Duration is categorised as short, medium or long-term. GLVIA explains that as there are no standard lengths of time within these categories, the appraisal must state what these are and why these have been chosen (GLVIA, para 5.51). Reversibility is described as "*a judgement about the prospects and practicality of the particular effect being reversed in, for example, a generation*" (GLVIA, para 5.52). Projects can be considered to be permanent (irreversible), partially reversible or fully reversible. For the purposes of this assessment the proposed development is considered to be permanent.

Magnitude of impact on visual receptors

5.2.59 As with the magnitude of landscape impacts, the magnitude of impact or change affecting visual receptors depends on the size or scale, geographical extent of the area influenced and its duration and reversibility. These factors are described below:

- Size or scale: Judgements need to take account of: *"the scale of the change [impact] in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the proposed development; the degree of contrast or integration of any new features or changes in the landscape with existing or remaining landscape elements and characteristics in terms of form, scale and mass, line, height, colour and texture; and, the nature of the view of the proposed development, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpses"* (GLVIA, para 6.39).
- Geographical extent: This will vary from viewpoint to viewpoint and will reflect: *"the angle [orientation] of view in relation to the main activity of the receptor; the distance of the viewpoint from the proposed development; and, the extent of the area over which the changes [impacts] would be visible"* (GLVIA, para 6.40).

5.2.60 Duration and reversibility of visual effects: As with landscape impacts, duration should be categorised as short, medium or long-term and projects considered to be permanent (irreversible), partially reversible or fully reversible (GLVIA, para 6.41). For the purposes of this appraisal the impacts on views of the proposed development are considered to be permanent.

5.2.61 The magnitude of the predicted impact has been described using criteria outlined above and Diagram 5.1 and detailed in methodology below. Magnitude of impact has been classified on a five-point scale (Large, Medium, Small and Negligible,). The definitions of terms relating to the magnitude of impact are set out in Table 5.5, below.

Table 5.5: Example Definitions of Magnitude of Impact

Magnitude of Impact	Typical Descriptors	
	Landscape Resource	Visual Resource
Large	Total loss or addition or/very substantial loss or addition of key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of dominant, uncharacteristic	Complete or very substantial change in view, dominant involving complete or very substantial obstruction of existing view or complete change in character and

Magnitude of Impact	Typical Descriptors	
	elements with the attributes of the receiving landscape.	composition of baseline, e.g., through removal of key elements.
Medium	Partial loss or addition of or moderate alteration to one or more key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of elements that may be prominent but may not necessarily be substantially uncharacteristic with the attributes of the receiving landscape.	Moderate change in view: which may involve partial obstruction of existing view or partial change in character and composition of baseline, i.e. pre-development view, through the introduction of new elements or removal of existing elements. Change may be prominent but would not substantially alter scale and character of the surroundings and the wider setting. Composition of the views would alter. View character may be partially changed through the introduction of features which, though uncharacteristic, may not necessarily be visually discordant.
Small	Minor loss or addition of or alteration to one or more key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of elements that may not be uncharacteristic with the surrounding landscape.	Minor change in baseline, i.e. pre-development view, – change would be distinguishable from the surroundings whilst composition and character would be similar to the pre-change circumstances.
Negligible	Very minor loss or addition of or alteration to one or more key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of elements that are not uncharacteristic with the surrounding landscape approximating to a 'no-change' situation.	Very slight change in baseline, i.e. pre-development view, – change barely distinguishable from the surroundings. Composition and character of view substantially unaltered.

Significance of effects

5.2.62 It is recognised that new development will lead to some landscape and visual effects. However, it should be stressed that not all landscape and visual effects arising will be significant.

5.2.63 GLVIA3 explains, at paragraph 5.55, that a staged approach can be adopted when assessing landscape significance "*susceptibility to change and value can be combined into an assessment of sensitivity for each receptor, and size/scale, geographical extent and duration and reversibility can be combined into an assessment of magnitude for each effect. Magnitude and sensitivity can then be combined to assess overall significance*."

5.2.64 Within this assessment, the assessment of significance has taken the following into account (as appropriate):

- reference to regulations or standards;
- reference to best practice guidance;
- reference to policy objectives;
- reference to criteria, for example designations or protection status;
- outcomes of consultation to date; and
- professional judgement based on local / regional / specialist experience.

5.2.65 Significance varies depending on the receptor's sensitivity and the magnitude of impact of the project. The distance to the development can be a major factor in determining the magnitude of the impact. Those resources or receptors closer to the project are likely to experience a greater significance of effects than those further away.

5.2.66 A significant effect would not necessarily mean that the effect is unacceptable in planning terms. What is important is that the likely effects of any proposal are transparently assessed and

understood in order that the determining authority can bring a balanced and well-informed judgement to bear when making any decision. This judgement should be based upon weighing up the benefits of the proposal against the anticipated effects, both positive and negative.

5.2.67 The matrix, at Table 5.6, has been used to guide the assessment of effects. Where the matrix provides a choice of level of effects, e.g., Minor to Moderate, the assessor has exercised professional judgement in determining which of the levels is more appropriate.

Table 5.6: Assessment Matrix

Sensitivity	Magnitude of Impact			
	Negligible	Small	Medium	Large
Negligible	Negligible	Negligible to Minor	Negligible to Minor	Minor
Low	Negligible to Minor	Negligible to Minor	Minor	Minor to Moderate
Medium	Negligible to Minor	Minor	Moderate	Moderate to Major
High	Minor	Minor to Moderate	Moderate to Major	Major to Substantial
Very high	Minor	Moderate to Major	Major to Substantial	Substantial

5.2.68 The significance of effect on landscape, views and visual amenity has been described according to the five-point scale shown in the above matrix (Substantial, Major, Medium, Minor or Negligible). A description of these terms is provided in Table 5.7, below.

Table 5.7: Definitions of Significance Criteria

Magnitude	Typical Descriptors Landscape Resource	Visual Resource
Substantial	Where proposed changes would be uncharacteristic and/or would significantly alter a landscape of exceptional landscape quality (e.g., internationally designated landscapes), or key elements known to the wider public of nationally designated landscapes (where there is no or limited potential for substitution nationally).	Where proposed changes would be uncharacteristic and/or would significantly alter a view of remarkable scenic quality, within internationally designated landscapes or key features or elements of nationally designated landscapes that are well known to the wider public.
Major	Where proposed changes would be uncharacteristic and/or would significantly alter a valued aspect of (or a high quality) landscape.	Where proposed changes would be uncharacteristic and/or would significantly alter a valued view or a view of high scenic quality.
Moderate	Where proposed changes would be noticeably out of scale or at odds with the character of an area.	Where proposed changes to views would be noticeably out of scale or at odds with the existing view.
Minor	Where proposed changes would be at slight variance with the character of an area.	Where proposed changes to views, although discernible, would only be at slight variance with the existing view.
Negligible	Where proposed changes would have an indiscernible effect on the character of an area.	Where proposed changes would have a barely noticeable effect on views/visual amenity.

5.2.69 Those effects of Moderate and below are not considered to be significant. Those effects to be Major and over are considered to be significant.

Limitations of the Assessment

5.2.70 The visual assessment is based on analysis of OS mapping of the site and surrounding area, and on field survey and analysis of views towards the Application Site from publicly accessible viewpoints in the surrounding landscape. Although every effort has been made to include viewpoints in sensitive locations and locations from which the proposed development would be most visible, not all public viewpoints from which the proposed development would potentially be seen have necessarily been included in the assessment. Where impacts to residential and other private views (e.g. commercial occupiers) are noted, these have necessarily been estimated.

5.2.71 The fieldwork and visual assessment were undertaken during summer 2020 when deciduous trees were in leaf, and late autumn 2020 when deciduous vegetation had lost most of its leaves. The late autumn photography has allowed an accurate projection of the 'worst case' scenario, i.e. the most visible conditions. However, visibility on winter days can be more limited due to weather conditions. Judgements have necessarily been made regarding the summer situation when vegetation is in full leaf for some of the locations.

Baseline Environment

Landscape Baseline

5.2.72 This section sets out the context of the Application Site within the surrounding landscape, with reference to the published national and local landscape character assessments as well as the North Wessex Downs AONB landscape character assessment. Paragraphs 5.2.96 to 5.2.129 describe the location, topography and drainage, land use, vegetation cover, existing rights of way and existing landscape character of the Application Site. The Application Site its location and context, are shown at Figure 5.1 and in the Application Site character photographs at Figures 5.10 to 5.25.

Landscape character

5.2.73 In 1997 there was a significant change in government attitudes towards landscape conservation. Whereas, prior to this, landscape conservation efforts focussed on designated and protected areas, such as AONBs and locally designated, e.g. Special Landscape Areas, the new approach recognised that landscape character exists everywhere and that all areas deserve consideration.

5.2.74 The European Landscape Convention (Council of Europe, ratified 2006) (ELC) requires that each party (member state) *"establish and implement landscape policies aimed at landscape protection, management and planning…"* through the adoption of specific measures (Article 5). Landscape Protection is defined in Article 1d as *"actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity."* The specific measures set out at Article 6 require, amongst other matters, each party to undertake an analysis of the characteristics and the forces and pressures on its landscapes (Article 6C, 1a (ii)) and *"to assess the landscapes identified taking into account the specific values assigned to them by the interested parties and the population concerned*" (Article 6C, 1b).

5.2.75 Landscape character areas and landscape character types can be defined at a variety of scales and a substantial amount of published information is available at the national, county and district scales. The principal published information for the Application Site comprises Natural England's national landscape characterisation of England (Natural England, 2015) and characterisations undertaken at the district level, contained within the Swindon Borough Council Landscape Character Assessment Supplementary Planning Guidance (SBC, 2004).

5.2.76 While the National Character Areas have been referred to below and illustrated on Figure 5.2, the Swindon Borough Landscape Character Assessment has been used when considering the

potential landscape effects of the proposed development as this study is the most up to date and detailed available published assessment. The Swindon Borough landscape character areas that fall within the study area are shown on Figure 5.3.

National landscape character

5.2.77 Natural England divides England into 159 distinct natural areas or National Character Areas (NCAs). Each NCA is defined by a unique combination of landscape, biodiversity, geodiversity and cultural and economic activity. Their boundaries follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment. At a national level, the Application Site includes an area of NCA 108: Upper Thames Clay Vales, and a small section of NCA 116: Berkshire and Marlborough Downs (Figure 5.2). As the Application Site lies on the northern escarpment of the downs, it has more characteristics in common with NCA 116 than NCA 108, despite more of the Application Site lying within NCA 108.

5.2.78 The key characteristics of NCA 108, pertinent to the Application Site and the immediate surrounding area are:

- *"…many examples of historic parkland in this NCA. There are many heritage features…"*
- *" …Market towns and villages are strung along the spring lines of the … Downs. Major routes include … a network of roads including the … M4 and The Ridgeway National Trail …"*

5.2.79 The key characteristics of NCA 116 found at the Application Site and in the immediate area are:

- *"Uplifted mass of Chalk …edged by an extensive, complex escarpment."*
- *"Small areas of species-rich chalk grassland scattered on the scarps…"*
- *"High density of monuments, many being prominent landmarks across the arable uplands including stone circles, hill forts, barrows, chalk-cut horse figures and historic routeways."*
- *"Recreation focused on limited areas of open access land, well-known heritage features … and historic routeways, including the Ridgeway National Trail …"*

5.2.80 A further National Character Area, NCA 109: Midvale Ridge passes immediately to the north of the M4 within the northern part of the study area. There would be no direct characterising effects upon this NCA as a result of the proposed development and the effects on this NCA are not considered further.

Landscape character of the North Wessex Downs AONB

5.2.81 The special landscape qualities of the North Wessex Downs AONB are set out in the Management Plan (*North Wessex Downs Area of Outstanding Natural Beauty Management Plan 2019-2024*, North Wessex Downs AONB Partnership, 2019) at Chapter 2. These are:

- *"Remote high chalk Plains, plunging scarps and open downlands filled with flowers;*
- *Scattered farmsteads and settlements in a landscape seemingly unchanged for centuries;*
- *Mixed fields and arable production;*
- *A rich mix of ancient semi-natural woodlands, wood pasture with veteran trees, and plantations; and*
- *River valleys with grazed pastures, water meadows and wetlands".*

5.2.82 The entire Application Site lies within the North Wessex Downs AONB Landscape Character Area (LCA) 5B Chiseldon to Wanborough Plain (Figure 5.5). The plain is formed by the eroded Lower Chalk, which extends as a ledge at the foot of the high downs and linked to a distinctive steep escarpment.

5.2.83 Key characteristics of the Downs Plain and Scarp Landscape Character Type (LCT 5) of which LCA 5B is one example, that are present at the Application Site or its immediate surroundings are:

- *"underlain by the eroded surface of the Lower Chalk…"*
- *"airfields and redundant military sites are a particular feature."*

5.2.84 Key characteristics of the Scarp that are present at the Application Site or its immediate surroundings are:

- *"a dramatic landform feature marking the northern edge of the AONB and creating a very visible horizon and skyline from the lower lying clay Vales to the north and west.*
- *mosaic of pasture, woodland and parkland in close proximity, forming a richly textured landscape pattern.*
- *western scarp extensively wooded with linear hanger woods and estate land with many trees.*
- *Bronze Age round barrows are characteristically located on the skyline in positions meant to be seen from below. Iron Age hillforts are also a feature of the scarp top.*
- *the prehistoric route of the Ridgeway running along much of the scarp top remains well used to this day as a National Trail. It links many archaeological sites, which are all important visitor 'honeypots."*

5.2.85 Key management requirements to conserve and enhance the distinctive and contrasting character of the Downs Plain and associated Scarp, relevant to the Application Site, are:

- *"The distinct landform and clear skyline;*
- *the mix of landcover including woodland, pasture and historic parklands;*
- *the Ridgeway and unique collection of archaeological sites*
- *…opportunities for habitat restoration;*
- *restoration of landscape character by considering opportunities for further woodland planting, particularly on the plain."*

5.2.86 The AONB Landscape character assessment notes that *"Consideration should also be given to the impact of development on the boundary of the North Wessex Downs on views from the higher ground of the Downs Plain and Scarp"* (paragraph 12.16).

5.2.87 The Application Site lies within AONB Landscape Character Area (LCA) 5B: Chiseldon - Wanborough Plain. Burderop Wood, that abuts the northern boundary of the Application Site lies within LCA 5E: Clyffe Pypard to Badbury Wooded Scarp. LCA 5E also abuts the southern boundary of the Application Site.

5.2.88 A largely unsettled landscape, the LCA description notes the World War 2 Ministry of Defence hospital site/American base hospital that was present on the Application Site and to the west of Brimble Hill (road). The base was vacated in 1965 and the hospital was used as a psychiatric hospital by the local NHS Trust. It ceased being a hospital the early 1990s.and was demolished soon after. The current configuration of the Application Site, with the Alpha, Beta and Gamma data centres was developed in the early to mid-1990s. Further details on the history of the Application Site are set out in Chapter 7: Historic Environment of the ES.

5.2.89 The Key Characteristics of LCA 5B: Chiseldon to Wanborough Plain present on the Application Site or in its immediate surroundings are:

- *"settlement is limited to the lateral modern expansion of the scarp top village of Chisledon with only the small hamlet of Draycot Foliat on the Plain and infrequent and widely dispersed farm buildings.*

- *20th century military installations, including Wroughton Airfield and a First World War camp near Draycot Foliat, are dominant and defining features of the area."*

5.2.90 The key management objectives of the LCT are repeated in the description of the LCA. It repeats the requirement *"particular consideration should be given to the impact of development on both the character of the area and views gained from the higher ground in this area."*

5.2.91 The description of LCA 5E Clyffe Pypard to Badbury Wooded Scarp describes a scarp that *"is distinguished by a large number of estates, such as at Compton Basset, Burderop, Elcombe and Salthrop, with houses located at the foot of the slope and associated farmland and parkland."* It also notes that *"Fields are small and bounded by hedgerows which, together with the parkland and scarp top woodlands, creates a more enclosed intimate landscape contrasting strongly with the open and expansive character and long views from the scarp summit."* The wooded skyline is also noted as an important feature. The description of this LCA more accurately describes the Application Site than the LCA that it actually lies in.

5.2.92 The key characteristics of LCA 5E: Clyffe Pypard to Badbury Wooded Scarp present on the Application Site or in its immediate surroundings are:

- *"small fields, bounded by hedgerows which, combined with the high woodland cover and parkland, create an enclosed intimate landscape.*
- *large number of estates (e.g. Burderop, Elcombe and Salthrop) with houses located at the foot of the slope and associated estate farmland and parkland.*
- *the wooded skyline is an important feature in views from surrounding land."*

5.2.93 A key management requirement is *that "Consideration should be given to the impact of new development beyond the AONB boundary on both the character of the AONB and in views from the higher ground."*

Swindon Borough and Wiltshire County Landscape Character

5.2.94 The descriptions of the Landscape Character Areas, within Swindon, are set out in Swindon Borough Landscape Character Areas Supplementary Planning Guidance (SBC, 2004). The boundaries of the Swindon LCAs are identical to the AONB LCAs. The Application Site lies within Swindon Borough LCA v: Downs Plains, while Swindon Borough LCA iv: Scarp wraps around the Application Site to the north and the south. These LCAs and other SB LCAs are illustrated on Figure 5.3.

5.2.95 The key characteristics for LCA v: Downs Plains, that are present on the Application Site or in its immediate surroundings are:

- *"Lies between the Lower and Middle Chalk escarpments.*
- *Settlements generally relate to military developments, e.g. Wroughton Airfield,*
- *M4 runs east-west through the area around Foxhill.*
- *Ridgeway runs east/west.*
- *Disused Wroughton Airfield from World War II."*

5.2.96 The key characteristics for LCA iv: Scarp, that are present on the Application Site or in its immediate surroundings are:

- *"Substantial woodlands covering the scarp west of Chiseldon (Burderop Wood).*
- *Numerous hedgerows/standard trees.*
- *Several large country houses and associated parkland (Burderop House).*
- *The M4 forms the northern boundary of the area at Burderop.*

- *Small scale fields generally enclosed by hedgerows with standard trees."*

5.2.97 Wiltshire County LCA Marlborough Downs lies within the study area to the south of the Application Site (Figure 5.3).

Site Description

5.2.98 Please refer to the character photographs C1 to C31 (Figures 5.10 to 5.25) and the Character Viewpoint Location Plan (Figure 5.9).

Location, Land Use and Development Context

5.2.99 The Application Site is located, approximately 1.2 km south of the outer edge of Swindon, separated from it by the M4 motorway, which runs at the foot of the scarp slope.

5.2.100 It lies 1.6 km to the west of Chiseldon, and 600 m to the west of the hamlet of Hodson. Overtown a loose conglomeration of properties, including: Ex-MOD housing; a modern residential community; a farm; and a large house, lies 715 m to the south west of the Application Site. The town of Wroughton lies 980 m to the west of the Application Site.

5.2.101 Burderop Park (house and business park) 220 m to the south and Lodge Farm 200 m to the east of the Application Site are the closest individual properties. The car park areas for the business park lie to the north of the entrance avenue to the business park, between the business units and the Application Site.

5.2.102 The Application Site is currently a secure site, surrounded by palisade fences, with a spine road linking three large data centre buildings. At the entrance is a single storey reception building and close to this on the northern side of the spine road is a group of ancillary buildings and small car park.

5.2.103 The entire area of the Application Site has been previously developed, starting as a United States Air Force hospital circa 1950. It was then taken over by the local NHS trust as a psychiatric hospital. In 1992 its use changed to a data centre campus. The full history of the Application Site and surroundings is reported in ES, Chapter 7: Historic Environment, accompanying this application.

Topography

5.2.104 The Application Site is gently undulating the highest point is in the north west at over 178 m AOD and the lowest point is in the south, adjacent to Alpha, at just over 169 m AOD. In general, the land is higher in the north and lower in the south and east. Alpha as well as Beta and Gamma (the two eastern data centre buildings) have been cut into the landscape and the land immediately around Beta and Gamma lies between just over 169 m AOD to just over 172 m AOD.

5.2.105 The extreme northern edge of the Application Site, adjacent to Burderop Wood, is steep and forms part of the southern (upper) edge of the scarp slope. The slope falls away, to the north, towards the vales below and to the east, the land gently slopes down. To the south there is a small valley, which runs in a steep sided vale; further to the south the land rises gently across the plain and rises steeply to over 265 m AOD at Barbury Castle and the high downs. To the south west the land rises gently, whereas to the north west of the Application Site, at Ladder Hill, the land falls steeply away and forms part of the northern scarp slope to the downs.

Hydrology and Drainage

5.2.106 A small stream rises in woodland to the south east of the Alpha data centre building. It is joined by another small watercourse arising to the north of Burderop Farm Dairy and then the stream runs east, past a small pond, curling north around the hamlet of Hodson and then south towards Chiseldon. It crosses under the M4 and runs into Coate Water lake, south of Swindon.

5.2.107 A small watercourse rises at Coombe Bottom and flows into a reservoir to the south of Wroughton, through the town, under the M4 and joins the River Ray at West Leaze. The Ray flows north on the western side of Swindon and joins the River Thames to the east of Cricklade.

Vegetation of the Application Site

5.2.108 The majority of the Application Site has a land cover of mature trees in grassland, with natural regeneration within the grassland in the northern part of the site. Environmental Statement, Chapter 6: Ecology and Nature Conservation, contains details of the species of the grassland and other areas of vegetation, such as the line of mature trees roughly running east to west, through the centre of the Application Site. The Tree Survey (Volume 3 Appendix 5.3) contains details of the size, approximate age and species of trees.

Vegetation of the Surrounding Area

5.2.109 The Application Site is bounded to the north by Burderop Wood, an Ancient Semi-natural Woodland (AW), a tree belt and farmland to the east, a tree belt and farmland to the south east, tree belts and woodland to the south-west and a tree belt with the B4005 Brimble Hill beyond to the south of the western boundary, with a tree belt and farmland adjacent to the northern section of the western boundary.

Access and Infrastructure

5.2.110 The major road corridor within the study area is the M4 Motorway, that runs roughly east to west to the north of Burderop Wood, separating the Downs from the vales and the outskirts of Swindon. M4 Junction 15 lies approximately 2.5 km to the north-east of the Application Site. The A4361 crosses the M4 on an over-bridge approximately 1.8 km to the north west of the Application Site. The B4005, Brimble Hill connects the Application Site to Wroughton (west) and Chiseldon (east). A public bridleway runs along the northern section of the western boundary of the Application Site. This bridleway links Brimble Hill to Swindon, as it crosses the M4 on a footbridge, approximately 1 km to the north of the Application Site (Figure 5.26). No public rights of way cross the Application Site.

Landscape Value

Designated Landscapes

5.2.111 The Application Site lies within the North Wessex Downs AONB a nationally designated landscape. Therefore, the value of the landscape is considered to be High.

5.2.112 The main house and elements of the buildings within the grounds of Burderop Park are listed. However, the parkland surrounding the house is not a Registered Park and Garden. Indeed, the modern commercial buildings (soon to be replaced with a residential development) lie between the house and the Application Site. Environmental Statement, Chapter 7: Historic Environment, contains further details of details of historic assets within the vicinity of the Application Site.

5.2.113 As part of the baseline description of the study area the value of the landscape that would be affected by the proposed developed has been established. The NPPF at paragraph 170 states that "*Planning policies and decisions should contribute to and enhance the natural and local environment by; protecting and enhancing valued landscapes.*"

5.2.114 GLVIA3 defines value as *"the relative value that is attached to different landscapes by society, bearing in mind that a landscape may be valued by different stakeholders for a whole variety of reasons… A review of existing landscape designations is usually the starting point to understanding landscape value..."* Not all of the AONB is of the same quality or contains the special qualities of the AONB, or the key characteristics of the AONB landscape type. GLVIA3

Box 5.1, identifies a range of factors to consider when establishing value. These are also useful in identifying the particular qualities present within the Application Site, albeit within the AONB.

Landscape Quality

5.2.115 Landscape quality, or condition, measures the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, how intact the landscape is and the condition of individual elements.

5.2.116 The Application Site has had various developments on it, including a hospital and currently three data centre buildings and the landform has been altered over time by these developments. As a result, the trees within the central areas of the Application Site are less mature than those in the surrounding landscape. The location of the trees is also associated with current, or recent-past use of the land, rather than historic land use. Therefore, the landscape within the Application Site is not an intact landscape and is not typical or representative of a character type.

Scenic Quality

5.2.117 This measures the degree to which the landscape appeals primarily to the visual senses.

5.2.118 The Application Site is surrounded by woodland or mature tree belts, which lends the site a sense of enclosure. Trees in grassland are a feature of the site, which is pleasant, but not notable or unusual.

Rarity and Representativeness

5.2.119 Rarity is concerned with the presence of rare features and elements in the landscape or the presence of a rare character type or elements within a site and its surroundings which are considered particularly important examples, which are worthy of retention.

5.2.120 As described in paragraph 5.2.116, above, the landscape at the Application Site is a result of the previous development on it. The landscape is not representative of a particular type, nor is it rare. There are some interesting, individual trees, but no rare species (see Appendix 5C: Tree Survey and ES, Chapter 6: Ecology and Biodiversity, for more details).

Conservation Interests

5.2.121 This considers the presence of features of wildlife, earth science, historical and cultural interest that can add value to a landscape.

5.2.122 The landscape of the Application Site is not representative of a particular type, nor is it rare. There are some interesting, individual trees, but no rare species (see Appendix 5.3: Tree Survey and ES Chapter 6: Ecology and Nature Conservation, for more details). The history of the Application Site and surroundings is reported in ES, Chapter 7: Historic Environment, accompanying this application. However, there are no known historical or cultural elements or characteristics in the landscape of the Application Site that should be conserved.

Recreational Value

5.2.123 This considers any evidence that the landscape is valued for recreational activity where experience of the landscape is important.

5.2.124 There is no public access to the Application Site. Therefore, it has no direct recreational value. Public bridleway WR36 runs parallel to the western boundary of the Site (see Figure 5.26). The bridleway is separated by a wide tree belt and is at a different level to the Application Site. However, the secure fencing and the reception building can be seen from the footpath. The Application Site does not add anything to the experience of the walker/rider traversing the route.

Perceptual Aspects

5.2.125 A landscape may be valued for its perceptual qualities, notably wildness and/or tranquillity.

5.2.126 Tranquillity, a perceptual aspect of landscapes, is defined differently by different organisations. The Landscape Institute defines it as *"a state of calm and quietude associated with peace"* (Glossary, GLVIA). The Countryside Agency (now Natural England) and Scottish Natural Heritage described it as *"a composite feature related to low levels of built development, traffic, noise and artificial lighting"* (paragraph 7.23, Landscape Character Assessment: Guidance for England and Scotland, 2002). The Campaign to Protect Rural England (CPRE) prefers to define it as *'undisturbed land'*.

5.2.127 The CPRE have produced a Tranquillity Map for England. The tranquillity map for the Application Site and surrounding areas is included in this chapter as Figure 5.7. As can be seen, the Application Site lies within an area that is towards the middle to lower (less tranquil) range of the spectrum.

5.2.128 The CPRE have also produced Dark Skies mapping for England. The mapping for the Application Site is illustrated at Figure 5.8. The Application Site is situated in an area that mostly experiences mid-range light levels (2-4 NanoWatts/cm^2/sr), which is the mid-range of light levels, with a small area (adjacent to Burderop Wood) falling into a lower light level range.

Associations

5.2.129 This considers any evidence of artistic endeavours and historic events that contribute to the perceptions of the natural beauty of an area.

5.2.130 The Application Site was previously used as a US Air-Force hospital, and later a psychiatric hospital. The history of the Application Site and surroundings is reported in ES, Chapter 7: Historic Environment.

5.2.131 There is a potential association (raised in the Pre-application Advice given by SBC) *"In addition to the more obvious heritage assets within the overall historic landscape context, worthy of mention is Ladder Lane (aka Jacobs Ladder – Bridleway WR36). This is to the immediate west of the site and its significance and experience as a historic route within the wider historic landscape and with potential historic association to 'Jefferies Land' - referring to the author Richard Jefferies (1848-1887)"* (Pre-application Advice, page 8, third paragraph). The potential for this association is discussed in more detail in ES, Chapter 7: Historic Environment.

5.2.132 No artistic endeavours have been found to be associated with the Application Site.

Visual Baseline

Zone of Theoretical Visibility (ZTV)

5.2.133 Areas from which views of the Application Site would theoretically be possible were determined by means of the ZTV analysis (Figure 5.26). Selected visual receptors located within the ZTV are likely to experience visual change were identified through fieldwork, and their sensitivity established in accordance with best practice guidance.

5.2.134 The ZTV indicates that potential views of the proposed development would be experienced from a limited number of directions, notably from high ground to the east and south and from lower-lying land to the south west. From all but one direction, only the upper parts of the main data centre building will be visible, due to the woodland or dense tree belts surrounding the Application Site. The exception to this is from the public bridleway WR36, which lies adjacent to the western boundary of the site. Views into the Application Site from this location are limited by topography (the bridleway is at a lower elevation than the Application Site) and by the belt of vegetation that

lies between the bridleway and the Application Site. As the main building is set back from this boundary, only the upper parts will be seen, but glimpses of the ancillary buildings will be possible.

5.2.135 The extent of the ZTV (and study area for the visual assessment) is limited to a 5 km buffer from the boundary of the Application Site. Although the proposed development could theoretically be visible from specific points beyond 5 km in periods of very good visibility, it is considered unnecessary to extend the study area because over 5 km the degree of visual change would be negligible and not significant.

5.2.136 Table 5.8 below lists each of the viewpoints included in the study and describes the existing view from each. It also sets out the distance from the Application Site and the perceived sensitivity of the visual receptors at that location.

5.2.137 Photographs were taken in November 2020 when visibility was good. The photographs were taken with a digital camera with a 50 mm lens (equivalent focal length) at approximately 1.6 metres high. Viewpoint locations are shown on Figure 5.26 and photographs are presented on Figures 5.27 to 5.32.

Views from Residential Properties

5.2.138 In the planning system no individual has the right to a view. The Landscape Institute has provided guidance on residential visual amenity in Landscape Institute Technical Guidance Note 2/19 Residential Visual Amenity Assessment (LI TGN 2/19).

5.2.139 Views of the proposed data centre development would neither overwhelm existing properties within the study area or the proposed residential development at Burderop Park, nor render these properties so *"unattractive a place to live that planning permission should be refused"* (Inspector Kingaby, Burnthouse Farm Wind Farm, APP/D0515/A/10/2123739, Inspector's Report, paragraph 119) (also at paragraph A1.6 of LI TGN 2/19). Inspector Kingaby noted that *"There needs to be a degree of harm over and above identified substantial effect to take a case into the category of refusal in the public interest. Changing the outlook from a property is not sufficient"* (Inspector's Report, paragraph 120) (also at paragraph A1.7, LI TGN 2/19). The Inspector, in the Langham Wind Farm decision, noted that *"The planning system controls development in the public interest, and not in the private interest. The preservation of open views is a private interest"* (Langham Wind Farm Appeal Decision APP/D2510/A/10/2130539) (also at LI TGN 2/19, paragraph A1.11).

5.2.140 None of the existing data centre or ancillary buildings are visible from surrounding residential properties. All but the upper section of the proposed development would be screened from residential properties within the study area. The distance to the closest property that lies within the ZTV is 200 m (Lodge Farm). As such, no residential properties have the potential to experience a degree of harm over and above substantial (as set out in paragraph 5.2.136, above) to make considering private views a public interest matter. As such, private views are not considered further in this chapter.

Views from Public Rights of Way, Access Land and Public Open Space

5.2.141 Reference to Ordnance Survey 1:25,000 mapping and web based definitive interactive map for Swindon Borough Council at https://maps.swindon.gov.uk/sbcatmycouncil.aspx has confirmed the extent and status of public rights of way (PROW) in the immediate vicinity of the Application Site. These are illustrated on Figure 5.26, as are areas of Access Land within the study area. Due to the woodland surrounding the Application Site, there are no open views of the Application Site from these PRoW, areas of Access Land or any areas of Public Open Space (POS) including Barbury Castle Country Park. However, glimpsed views of the Application Site can be gained from the public footpath WR25, to the south of Overtown and public bridleway WR36

5.2.142 Other more distant public rights of way in the surrounding area that lie within the ZTV include those within the parish of Wanborough: WA8, WA9 and WA3. Within the parish of Liddington

these include LN13 (The Ridgeway National Trail) LN14, LN18 and LN21. Within the parish of Chiseldon, these include CH31, CH36 and CH39. Within the parish of Wroughton these include WR27 (The Ridgeway National Trail) and WR44.

5.2.143 Barring bridleway WR36, which runs parallel to the western boundary of the Application Site, the existing buildings on the Application Site are not visible from the surrounding landscape, due to the topography of the Application Site and the surrounding woodland and tree belts. Bridleway WR36 lies at a lower level than the Application Site and as such, only a section of the existing reception building (closest building to the bridleway) is visible.

5.2.144 It should be noted that some rights of way are byways and also coincide with routes of the cycleway network, such as byway CH28, which is also National Cycle Route 45. Just as pedestrians, cyclists using these routes are considered to have a High sensitivity to the proposed development at the Application Site.

Views from Surrounding Road Network

5.2.145 There are some dynamic views of the Application Site from minor roads within the ZTV. These include The Old Ridgeway, which runs north east to south west to the north of Draycot Foliat. The most southerly and elevated part of the single-track road from Overtown to Barbury Castle Country Park lies within the ZTV. Small sections of the minor road that runs west to east, from Wroughton Airfield to Beranburh Field (residential development) lie within the ZTV, as does a section of the minor road running north east to south west, from Brimble Hill to Overtown House. Although the latter two roads are closer to the site than the other roads, views have more restricted visibility, towards the Application Site due to lower elevations and more intervening vegetation, including tall hedgerows and vegetation around and within residential areas.

5.2.146 People travelling in vehicles along these minor roads within the AONB will have a Medium sensitivity to the proposed data centre.

5.2.147 Cyclists using the National Cycle Routes routed along minor roads will experience similar views to those people in vehicles, albeit from a slightly higher perspective. Cyclists on roads are considered to have a Medium sensitivity. Cyclists on National Cycle Routes are considered to have a High sensitivity to the proposed development.

Views from Commercial Property

5.2.148 Receptors at the workplace are considered to be Low sensitivity and currently include the closest visual receptors at Burderop Park. However, the modern office development within the park (the 'Halcrow pavilions' and car parks) is soon to be demolished, the house converted to flats and the commercial areas to become a small residential development. There are currently no views of the existing buildings and once the commercial use ceases, there will be no views of the proposed development by commercial or other receptors.

5.2.149 The closest commercial receptors (after the operations at Burderop Park cease) are the Alexandra House hotel and Overtown Manor bed and breakfast. Currently they have a view of the woodland surrounding the Application Site. As they are on the edges of the ZTV people within the properties might have a glimpse of the proposed building, but any potential views will not be significant. As such these receptors are not considered further in this chapter.

Representative Viewpoints

5.2.150 The visual assessment includes an assessment of 12 representative viewpoints described in Table 5.8 and illustrated on Figure 5.26. A ZTV with proposed representative viewpoint locations was submitted to SBC. A response to pre-application advice was received from SBC requesting an additional viewpoint, however, this was later discounted, as it lay outside the ZTV. The ZTV with proposed representative viewpoint locations was also submitted to Natural England for agreement.

No response has been received to date. In addition to the ZTV fieldwork has been used to identify and consider all of the main visual receptors within the vicinity of the Application Site. The representative viewpoint panoramas are at Figures 5.27 to 5.32.

Table 5.8: Description of Views from Representative Viewpoints

Viewpoint and Location	Distance from Application Site	Receptor and Sensitivity	Description
1: View south west from children's play area at Upper Wanborough (Figure 5.27)	4.5 km	Medium: Children playing on the equipment and people using the football pitch.	Distant, elevated view towards the Application Site (screened by woodland) across the sports pitch. The Great Western Hospital is seen in the midground, between the vegetation that surrounds the play area. Chiseldon is also visible in the midground.
2: View south west from public footpath WA3, to the south of Wanborough (Figure 5.27)	4.5 km	High: Walkers on the public rights of way network.	Distant view towards the Application Site (screened by woodland) across farmland. Vehicles on the M4 motorway are visible in the midground, between the hedgerow vegetation.
3: View west from junction of public footpath LN18 with The Ridgeway (road) north of Liddington Castle hillfort (Figure 5.28)	3.8 km	High: Walkers on the public rights of way network. Medium: Cyclists on a non-designated route. Medium: People travelling in motor vehicles through the AONB.	View across open arable fields towards the Application Site (screened by woodland). The view includes Chiseldon and Swindon.
4: View west from triangulation point and viewing platform at Liddington Castle hillfort (Figure 5.28)	4.4 km	High: People accessing Liddington hillfort via a permissive path and stopping at the viewing platform	Distant, elevated view adjacent to a viewing table, erected in 2000, to mark the turn of the millennium. The triangulation point and table are located on top of eastern ramparts of Liddington hillfort. The Application Site is screened by woodland.
5: View west-north west from The Ridgeway National Trail, south of Liddington Castle hillfort (Figure 5.29)	4.8 km	High: Walkers on The Ridgeway National Trail.	Elevated view, across arable farmland. The view towards the Application Site is largely obscured by the higher land in the foreground. Tops of trees are seen in the midground. These are potentially trees within the woodland
6: View north east-north from the northernmost point of Barbury Castle hillfort (Figure 5.29)	4.0 km	High: Visitors to Barbury hillfort, accessed from The Ridgeway National Trail.	Distant, elevated views across arable farmland towards the Application Site. The Application Site is screened by woodland. The urban area of Swindon is seen, beyond the woodland, in the distance.
7: View north east-north from Barbury Castle Country Park (Figure 5.30)	3.9 km	Medium: People engaged in outdoor pursuits at Barbury Castle Country Park	Elevated view from the northern boundary of the main field forming Barbury Castle Country Park. The view towards the Application Site is across predominantly arable farmland. The Application Site is screened by woodland. Swindon is seen in the distance.
8: View north from seating area adjacent to car park at Barbury Castle Country Park (Figure 5.30)	4.0 km	High: People sitting at a mapped panoramic viewpoint	Elevated view from a seating area adjacent to the car park at Barbury Castle Country Park. The view towards the Application Site is across predominantly arable farmland. The Application Site is screened by woodland. Swindon is seen in the distance.
9: View north east from public footpath WR25/minor road to the south of Overtown (Figure 5.31)	1.5 km	High: Walkers on the public rights of way network. Medium: Cyclists on a non-designated route.	Glimpsed view of the woodland surrounding the Application Site, across arable farmland with hedgerows marking the boundaries of the fields. Residences within Overtown are seen in the midground.

Viewpoint and Location	Distance from Application Site	Receptor and Sensitivity	Description
		Medium: People travelling in motor vehicles through the AONB.	
10: View north east from minor road, to the north of Overtown (Figure 5.31)	0.5 km	Medium: People travelling in motor vehicles through the AONB. Medium: Cyclists on a non-designated route.	Glimpsed view across an arable field, through a field gate. The woodland surrounding the Application Site is visible in the midground.
11: View east from public bridleway WR36, adjacent to Application Site (Figure 5.32)	10 m	High: People using the public rights of way network.	Glimpses of the Application Site are possible through the vegetation that lies between the public bridleway and the boundary of the Application Site. The bridleway lies at a lower elevation than the Site.
12: View north west-north from B4005 at entrance to Burderop Park (house) (Figure 5.32)	650 m	Medium: People travelling in motor vehicles through the AONB. Medium: Cyclists on a non-designated route	No views of the Application Site are obtained from this low-lying viewpoint. Intervening tree belts around Burderop Park and the woodland on either side of the small watercourse to the south of the Application Site prevent views of it.

Future Baseline Conditions

5.2.151 Having established the existing baseline character of the area, it should be noted that landscapes are dynamic and all subject to change.

Climate change

5.2.152 The Met Office UK Carbon Projections ('UKCP09') dataset provides probabilistic projections of change in climatic parameters over time for 25 km grid squares across the UK. Projected changes during low, medium and high future global greenhouse gas emissions scenarios have been reviewed for the period from 2020 up to 2069, encompassing the potential construction and operational periods of the proposed development.

5.2.153 The likely ranges of change in climatic parameters including precipitation, temperature, wind speed, humidity and frequency of extreme weather may affect the native flora, see paragraph 5.5.70. However, while this would not increase the sensitivity of receptors, it may affect the magnitude of impact, e.g. the proposed development may be more visible to people who only have semi-screened views at present, or it may increase the number of receptors, where tree-cover loss could enable views not currently possible. As this aspect of the effects of climate change is uncertain, it is difficult to predict the significance of effects.

Land-use change

5.2.154 The landscape is always changing to accommodate new development or removal of old. There is a need to accommodate change while maintaining and enhancing the quality of the landscape where possible. New development should respect the environment and its location by way of scale, design and landscape treatment. The Application Site itself has had various uses from the mid-part of the 20th Century, to the current day, summarised in paragraph 5.2.103 above and detailed in ES, Chapter 7: Historic Environment.

5.2.155 The future baseline for the study area includes the change from commercial development at Burderop Park to residential. The planning description is *"demolition of the pavilions, change of*

use of offices and ancillary buildings to 25 no. apartments/dwellings, erection of 52 no. dwellings, construction of new access and associated works."

5.3 Mitigation Measures Adopted as Part of the Project

Construction

5.3.1 Hoarding will be erected around the construction works in the north of the Application Site.

5.3.2 Trees to be maintained within the Application Site will be protected in line with the measures set out in the Tree Survey and Arboricutural Impact Assessment (see Volume 3 Appendix 5.3).

Operation

Lighting

5.3.3 Illustrative proposed lighting layout plans have been produced for the proposed development (document reference 20305S-CON—XX-XX-RP-E-9735). The detailed lighting proposals for the Application Site would be developed during the detailed design process.

5.3.4 The Application Site currently has three data centre buildings, plus a reception building and other ancillary buildings. An internal road, with bollard lighting connects the eastern and the southern data centres to the reception building and Brimble Hill. At the entrance to the Application Site there are low road lights and at the internal entrances to the data centres there is security lighting. The proposed development would replace the bollard lighting with street-lamp type lighting, along a reconfigured internal road and increase the security lighting along the security fences around the Application Site. The proposed site-wide security lighting strategy would seek to minimise light levels when practical, without compromise to safety and security. It is anticipated that energy use and light pollution would be minimised as far as possible by:

- Minimising potential for sky glow by reducing upward reflected light;
- Employing high quality luminaire optics and shields to precisely focus light; and
- Employing a lighting control system to intelligently switch lighting.

5.3.5 The scale of the lighting, i.e. the mounting heights of the luminaires, shall respond to the use of the route or space. Light fittings within the Application Site, including those used for security, to light roads, spaces and surface carparks, would be a maximum height of 8 m for road lighting at approximately 28-30 metres apart. to ensure that light trespass is avoided as far as possible and that the view of the Application Site is not compromised after dark.

5.3.6 The use LEDs is intended throughout to help minimise energy use, manage the lit image of the Application Site and limit light spill. Lighting control systems would allow lighting to be switched off according to the time of day. It is expected that the Application Site would be lit from dusk to dawn. This would ensure that an appropriate quantity of security light is delivered at all times, however light spill would be mostly retained within the Application Site boundary.

The Landscape Scheme

5.3.7 The landscape proposals have been designed as an integral part of the proposed development to provide treatment and landscape integration for the perimeter and internal part of the site, and mitigation to enhance landscape character and provide visual amenity for people using the public right of way, adjacent to part of the western boundary of the Application Site. The proposed landscape design comprises predominantly locally native tree (103 no. individual trees) shrub (approximately 1,230 m^2 as part of a woodland planting mix) hedgerow (100 m length) and

wildflower meadow planting, using translocated turf from the area being developed where possible.

5.3.8 Where possible the existing vegetation has been left undisturbed. However, where the proposed data centre and ancillary buildings are to be located grassland will be removed and translocated to the area where the Alpha data centre is currently located. When Alpha is demolished the translocated grassland will be established, using the methods described in the Outline Grassland Translocation and Soil Management Method Statement (Chapter 6, Appendix 6.7).

5.3.9 The tree, hedgerow and shrub mixes have been based on natural species associations for the soil type and species found in the adjacent, surrounding land, as the soils on the Application Site have been disturbed through previous and existing development. The existing species within the majority of the Application Site are not locally native species, or not locally native species in the correct ratio as those areas of naturally occurring woodland tree and shrub mixes in the surrounding area.

5.3.10 The Landscape Strategy of the proposed development is illustrated on Figure 5.45 of this chapter and detailed in Appendix 5.2, accompanying this Application. The landscape strategy is focused on the following key objectives:

- To provide a high-quality landscape setting for the buildings that enhance the site and compliment the Application Site's wider context.
- To strengthen the Application Site's containment by extending the areas of existing woodland surrounding the site, with areas of individual trees, hedgerow and meadow grass areas in order to increase the potential biodiversity value.
- To accommodate the drainage measures necessary within an attractive and naturalistic area of enhanced biodiversity, including native species trees and shrubs, wildflower meadow and wet grassland, with different habitat features associated with the attenuation pond including native species wetland and marginal planting.
- To retain the existing seed bank and increase the floristic diversity of the grassland.

5.3.11 Landscape proposals include the following features:

- retained and proposed woodland (to be underplanted / infilled where practicable);
- retained existing grassland to be enhanced (reseeded where required) and mown annually to maintain floristic diversity;
- close-mown grassland cut frequently to maintain a height of 75 mm for security purposes;
- local meadow grassland mix (Barbury Castle mix) maintained to 300 mm;
- local meadow grassland mix (Barbury Castle mix) mown annually in autumn to maintain floristic diversity;
- translocated turf from existing grassland mown annually in autumn to maintain floristic diversity;
- flood tolerant grassland within sides of attenuation pond, mown annually in autumn to maintain floristic diversity;
- pond edge wildflower mix, mown annually in autumn to maintain floristic diversity; and
- native species marginal planting within pond.

5.3.12 The positioning of the buildings and associated infrastructure will enable the retention of surrounding woodland and some areas of woodland and individual trees within the Application Site, which would be protected as necessary during construction and augmented using native species to extend the area of woodland within the Application Site.

5.3.13 The landscape proposals seek to improve the character of the Application Site and the surrounding landscape by establishing vegetation using native species predominantly appropriate to the local area, which will provide screening and connectivity to the surrounding area and as an enhancement to the existing site conditions.

5.3.14 All trees, shrubs and grass/wildflower mixes are to be sourced responsibly, in the first instance, from UK Nurseries / suppliers, where they have been propagated and/or grown on for a minimum of five years in the UK.

5.4 Assessment of Construction Effects

Introduction

5.4.1 The construction phase is estimated to take 10 to 12 months to complete and will comprise external construction and civils activities. This is forecast to commence at the end of Q3 2021 (subject to the progress of the planning process). At the end of that period all external construction activities and civils work will be completed.

5.4.2 The project is anticipated to utilise standard construction methodologies for infrastructure and buildings.

5.4.3 During site clearance (including the demolition of the existing, data centre buildings, Alpha, Beta and Gamma and the removal of trees) and construction, the Application Site would be surrounded by perimeter fencing / hoarding. The construction phase would require temporary site offices, storage materials and spoil and the use of cranes, resulting in a temporary change of character due to the intensity of use and movement. Following the installation of substructures and foundations the proposed superstructure and process equipment would be constructed, and mitigation planting would be implemented. It is the intention to reuse all spoil, arising from the reconfiguration of the site and the construction of the new data centre, on site where possible, keeping vehicle movements off site to a minimum, where possible.

5.4.4 The assessment of construction effects upon the landscape and visual resources assumes a 'worst- case scenario' whereby the tallest elements of the project would be constructed during the winter season, when deciduous trees are without leaf.

Landscape Effects

5.4.5 The potential effects on landscape elements, characteristics and character, during the construction phase, are set out in paragraphs 5.4.6 to 5.4.24 and summarised in Table 5.10.

National Character Areas

5.4.6 Temporary demolition and construction works would occur within both NCA 108 Upper Thames Clay Vales and NCA 116 Berkshire and Marlborough Downs (Figure 5.2).

5.4.7 The majority of the work would be undertaken in part of the Application Site that lies within NCA108. The direct impact of the temporary construction works would be on the section of NCA 108 that lies to the north of the existing spine road as well as in the area where the Alpha data centre is being demolished. As the whole site has been previously developed and recontoured, there is little natural planting remaining on the Application Site and the only natural contours are at the extreme edges of the Application Site, as there is a large amount of building rubble over most of the Application Site and the current buildings have been cut into the landscape (more detail is contained within the Ground Conditions Volume 3 Appendix 8.5). The direct demolition and construction impacts are considered to be Small. There will be no impact of the key characteristics of NCA108 (set out at paragraph 5.2.78). The indirect impacts on NCA 108, from

where it is visible are considered to be Negligible. NCA108 is considered to have a Medium sensitivity to the proposed temporary construction works.

5.4.8 The Negligible, direct impact of the work within NCA 116 (which covers the extreme south west of the Application Site) would be limited to a small amount of tree/scrub removal and erection of new perimeter fences. There will be Negligible indirect impacts on NCA116, as only the tallest elements of the plant will be visible from the surrounding countryside. However, when viewed from the highest viewpoints, to the south, plant, such as cranes, will be seen with the backdrop of the urban area of Swindon behind it. There will be no impact of the key characteristics of NCA116 (set out at paragraph 5.2.79). NCA 116 is considered to have a Medium sensitivity to the proposed temporary works.

5.4.9 Overall, the presence of construction vehicles and tall plant / machinery used for the temporary construction works is judged to have a **Minor adverse** effect on NCA 108. The temporary construction works will have a **Negligible adverse** effect on NCA 116. Neither of the temporary effects on the NCAs are judged to be significant.

North Wessex Downs AONB Landscape Character Areas:

5.4.10 Temporary demolition and construction works would occur within North Wessex Downs AONB Landscape Character Area (LCA) 5B: Chiseldon -Wanborough Plain (Figure 5.6). Those AONB LCAs that would be indirectly affected would be: AONB LCA 1A Marlborough Downs; AONB LCA 5B Chiseldon – Wanborough Plain; AONB LCA 5F Liddington to Letcombe Open Scarp; and AONB LCA 6C Wanborough Vale. The key characteristics of AONB LCA 5B and the AONB Landscape Character Type 5 (of which it is one) are set out in paragraphs 5.2.82 and 5.2.83, of this chapter.

5.4.11 Overall, the presence of construction vehicles and tall plant / machinery used for the temporary construction works at the Application Site would have a Medium direct impact, on AONB LCA 5B within the Application Site. As the whole of the Application Site has been previously developed and recontoured, there is little natural planting remaining on the Application Site. There will be no impact of the key characteristics of AONB LCA 5B (set out at paragraphs 5.2.82 and 5.2.83). AONB LCA 5B is considered to have a High sensitivity to the proposed temporary construction works.

5.4.12 All other impacts on the remaining AONB LCAs are indirect and, given the considerable amount of screening around the Application Site, would be Negligible in magnitude, depending on distance and direction. Direction alters the context of the construction works, e.g. from the southernmost AONB LCAs the construction works will form part of backdrop to the LCAs, which also includes the buildings of Swindon, or, in the case of those AONB LCAs to the north west, the larger buildings of Swindon form part of the middle distance context, between those character areas and Application Site. These, indirectly affected, AONB LCAs are considered to have a High sensitivity to the proposed temporary construction works.

5.4.13 The special landscape qualities of the AONB, detailed in paragraph 5.2.81, are not affected.

5.4.14 Overall, the presence of construction vehicles and tall plant / machinery used for the temporary construction works is judged to have a **Moderate adverse** significance of effect on North Wessex Downs AONB LCA 5B Chiseldon to Wanborough Plan and a **Minor adverse** significance of effect on all other AONB LCAs. None of these temporary effects are judged to be significant.

Swindon Borough and Wiltshire County Landscape Character Areas

5.4.15 The temporary demolition and construction works would occur within Swindon Borough LCA v Downs Plains. Those Swindon Borough (SB) LCAs that would be indirectly affected would be: SB LCA ii Vale of the White Horse; SB LCA iv Scarp; SB LCA v Downs Plains; and, SB LCA vi High

Downs (Figure 5.4). The Wiltshire (W) LCA that would be indirectly affected is W LCA Marlborough Downs, also illustrated on Figure 5.4.

5.4.16 The key characteristics of SB LCA v Downs Plains, present at the Application Site, are set out at paragraph 5.2.95. The majority of these characteristics are locational, which the construction work does not affect. The Application Site has been developed since the mid-Twentieth Century, as outlined in paragraph 5.4.7, above and detailed in ES Chapter 7: Historic Environment. The direct impacts on SC LCA v Downs Plains at the Application Site is considered to be Medium. There are also indirect impacts on SB LCA v. The sensitivity of the landscape character of SB LCA v to the proposed temporary construction work is considered to be Medium.

5.4.17 The indirect impacts on the remaining SB LCAs and W LCA Marlborough Downs (as with the AONB LCAs) differ. Given the considerable amount of screening around the Application Site, the impact would be Negligible. The sensitivity of these LCAs to these indirect impacts is considered to be Minor.

5.4.18 Overall, the presence of vehicles and tall plant / machinery used for the temporary construction work is judged to cause a **Moderate adverse** significance of effect. The remaining SBC LCAs and the W LCA are judged to experience **Negligible** effects. None of the temporary effects on these LCAs are judged to be significant.

Site and Immediate Surroundings

5.4.19 Although the Application Site lies within the North Wessex Downs AONB, this part of the AONB is a previously developed area of land. Its current use is as a data centre campus (see paragraph 5.2.103 and ES Chapter 7: Historic Environment). It does not have the same features, elements or characteristics as the undeveloped land on some of its boundaries, or, the upper scarp slopes within the study area. Given its disturbed landform and current use, the Application Site has a Medium sensitivity to the proposed construction works

5.4.20 The construction works would involve the removal of the existing data centres and ancillary buildings, removal of trees within the area to be developed, alteration to existing ground levels, the construction of the balancing pond and wildflower meadow, as well as the reconfiguration of the road layout within the Application Site. The temporary operations would occur largely in the north-east and south-west of the Application Site. The direct impact of the site clearance and the construction works on the character of the Application Site would be Medium.

5.4.21 The temporary significance of effects on the character of the Application Site would be **Moderate adverse**, which is not judged to be significant.

Great Western Community Forest

5.4.22 As described in paragraph 5.2.42, the Application Site lies within Area 05 of the GWCF. The demolition and construction works involve the removal of trees from the Application Site. This involves the loss of individual trees, groups of trees and the partial removal of groups of trees, a total loss of approximately 103 no. trees (see Appendix 5.3: Tree Survey and AIA for further details. The GWCF is considered to have a Medium sensitivity to the proposed construction works in this location.

5.4.23 The existing character of the GWCF, at the Application Site is open and is currently a data centre campus. However, the character will be affected, as landscape elements (the trees) will be removed and the replacement of the data centre buildings and reconfiguration of the Application Site will also affect character. Due to the character in the south remaining largely the same, barring the removal of Alpha, the impact of the construction phase on the GWCF is judged to be Medium.

5.4.24 The significance of the temporary construction works on the character of the GWCF is judged to be **Moderate adverse**, which is not judged to be a significant effect in the context of the wider GWCF area.

Visual Effects

5.4.25 Visual impacts would result from change to the appearance of the Application Site in its landscape context, resulting from the site clearance and construction works. A ZTV was produced to establish the extent to which the proposed development would theoretically be visible (Figure 5.26). Although the ZTV is for the finished building, the tallest construction plant would be visible. Where there would be the potential for an increased change of potential visual effects, such as movement on the skyline of elements of the taller plant, comparable to the finished data centre building, then these effects would be short-term and temporary whereas the operational phase effects would be long term and permanent.

5.4.26 The height of the cranes required to construct the buildings are anticipated to be slightly greater height than the 15 m flues (on which the ZTV was based). There would be views of this high-level construction plant from some locations. However, due to variation in the topography and level of vegetation cover around the Application Site, barring the tops of the cranes, other machines/plant would be screened from most locations, particularly those close by. There would be restricted views of lower level construction work directly into the entrance to the Application Site and filtered views from the bridleway that runs to the west of the Application Site. Even in these cases, any views would be screened in part by hoarding around the entirety of the Application Site. Vehicles accessing the Application Site are also considered, as part of the construction impacts. Visual impacts are always direct impacts.

Views from Residential Properties

5.4.27 As described in paragraph 5.2.138, in the planning system, no individual has the right to a view.

5.4.28 None of the existing data centre or ancillary buildings are visible from surrounding residential properties. All but the upper section of the proposed development would be screened from residential properties within the study area. The distance to the closest property that lies within the ZTV is 200 m (Lodge Farm). As such, no residential properties have the potential to experience a degree of harm over and above substantial (as set out in paragraph 5.2.139) to make considering private views a public interest matter. As such, private views are not considered further in this chapter.

Views from Public Rights of Way, Access Land and Public Open Space

5.4.29 Figure 5.26 indicates those Public Rights of Way (PRoW) and areas of Access Land along and within which views of the proposed temporary construction works might be possible.

Public Rights of Way

5.4.30 Due to the woodland surrounding the Application Site, there would be no open views of the Application Site from PRoW. However, glimpsed views of the construction works might be gained from sections of public footpath WR25, to the south of Overtown (Viewpoint 9, Figure 5.31) and sections of public bridleway WR36 (Viewpoint 11, Figure 5.32), located to the west of the Application Site. These views would be restricted by the hoarding that will surround the construction works within the Application Site. The sensitivity of people travelling along the PRoW is considered to be High, the impact of the temporary construction works is considered to be Negligible for those people walking along WR25 and Medium for those people travelling along WR36.

5.4.31 Sections of other more distant public rights of way in the surrounding area that lie within the ZTV include those within the parish of Wanborough: WA3 (Viewpoint 2, Figure 5.27) WA8 and WA9. Within the parish of Liddington these include LN13 (The Ridgeway National Trail) (Viewpoint 5, Figure 5.29) LN14, LN18 (Viewpoint 3, Figure 5.28) and LN21. Within the parish of Chiseldon, these include CH31, CH36 and CH39. Within the parish of Wroughton these include WR27 (The Ridgeway National Trail) and WR44. The sensitivity of people using the PRoW network to the proposed construction works is considered to be High. The magnitude of impact of the proposed construction works is considered to be Negligible.

5.4.32 People using PRoW Bridleway WR36 would experience a **Moderate adverse** significance of effect. All other receptors using the PRoW network, where the construction works would be visible, would experience **Minor adverse** significance of effects. None of these temporary effects are judged to be significant.

Access Land

5.4.33 Those people visiting the Access Land to the south of the study area, located on the upper scarp within the AONB would have elevated views of the proposed construction work from those areas facing north, but, limited views from Access Land that faces south. The people using these areas would have a High sensitivity to the proposed construction work, but the impact would be Negligible.

5.4.34 People using the north-facing area of Access Land would experience a **Minor adverse** significance of effect. People using the area of south-facing Access Land would experience **Negligible adverse** significance of effects. None of these temporary effects are judged to be significant.

Public Open Space

5.4.35 The sensitivity of those people within areas of Public Open Space (POS) such as that at Upper Wanborough children's play area and playing field (Viewpoint 1, Figure 5.27) to the proposed construction works will vary depending on the location of the POS and the presence of any intervening vegetation or buildings. The people using the POS are usually involved in some sort of recreation, be it working an allotment or playing a sport of some sort. These people are considered to have a Medium sensitivity to the proposed construction work. The impact on users of the POS would be Negligible.

5.4.36 The people visiting Barbury Country Park (Viewpoints 7 and 8, Figure 5.30) are considered to have a High sensitivity to the construction works, as the Country Park is located on the north-facing scarp to the south of the study area, with elevated views towards the Application Site. The impact on people visiting the Country Park would be Small.

5.4.37 People using POS would experience a **Minor adverse** significance of effect. People using the area of south-facing Barbury Country Park would also experience **Minor adverse** significance of effects. These temporary effects are judged not to be significant.

Views from Surrounding Road Network

5.4.38 Dynamic views of the plant undertaking the construction work at the Application Site from minor roads within the ZTV would be possible. The minor roads include The Old Ridgeway, which runs north-east to south-west to the north of Draycot Foliat. The most southerly and elevated part of the single-track road from Overtown to Barbury Castle Country Park lies within the ZTV. People travelling along small sections of the minor road that runs west to east, from Wroughton Airfield to Beranburh Field (residential development) might have views of the construction work, as might people travelling along a section of the minor road running north-east to south-west, from Brimble Hill to Overtown House. Views of the construction work from the latter two roads, although closer

than others, would be more restricted, due to lower elevations and more intervening vegetation, including tall hedgerows and vegetation around and within residential areas. People travelling along the B4005, Brimble Hill travelling east towards the entrance to the Application Site will have fleeting views of the construction vehicles entering and leaving the Application Site. The magnitude of impact of the construction works when viewed from these locations would vary between Negligible and Small, depending on the distance, orientation, intervening vegetation and context of the available view.

5.4.39 People travelling in vehicles along these minor roads within the AONB will have a Medium sensitivity to the proposed construction works data centre.

5.4.40 Cyclists using the National Cycle Routes routed along minor roads will experience similar views to those people in vehicles, albeit from a slightly higher perspective. Cyclists using the designated cycle routes are considered to have a High sensitivity to the temporary construction works at the Application Site. Cyclists using the road network are considered to have a Medium sensitivity to the temporary construction works.

5.4.41 People travelling in motor vehicles through the AONB would experience a **Negligible adverse to Minor adverse** significance of effect. Those cyclists using the designated cycle routes would experience **Minor adverse to Moderate adverse** effects. Cyclists using the general road network would experience **Negligible adverse to Minor adverse** effects. These temporary effects are not judged to be significant.

Views from Commercial Property

5.4.42 People at their place of work are considered to have a Low sensitivity and currently include the closest visual receptors at Burderop Park. However, the modern office development within the park (the 'Halcrow pavilions' and car parks) is soon to be demolished, the house converted to flats and the commercial areas to become a small residential development. There are currently no views of the existing buildings and once the commercial use ceases, there will be no views of the construction work at the Application Site, by commercial or other receptors.

5.4.43 The closest commercial receptors (after the operations at Burderop Park cease) are the Alexandra House hotel and Overtown Manor bed and breakfast. Currently they have a view of the woodland surrounding the Application Site. As they are on the edges of the ZTV people within the properties might have a glimpse of the tallest elements of the plant, but any potential views will not be significant. As such these receptors are not considered further in this chapter.

Representative Viewpoints

5.4.44 The 12 representative viewpoints are described in Table 5.8, and, illustrated on Figure 5.26. The representative viewpoint panoramas are at Figures 5.27 to 5.32. The effects on views from the 12 identified viewpoint locations, agreed during construction, are summarised in Table 5.10.

Viewpoint 1: View south-west from children's play area at Upper Wanborough

5.4.45 Representative Viewpoint 1 (Figure 5.27) lies approximately 4.5 km to the north-east of the Application Site. It might be possible to distinguish the tallest elements of plant constructing the data centre building. However, the amount of vegetation surrounding the play area would make it hard to distinguish, at this distance. The magnitude of impact is considered to be Negligible. The sensitivity of the people using the play area is Medium, as they will be involved in play and other sporting activities.

5.4.46 The significance of the temporary effect is judged to be **Negligible adverse**, which is not significant.

Viewpoint 2: View south-west from public footpath WA3, to the south of Wanborough

5.4.47 Representative Viewpoint 2 (Figure 5.27) lies approximately 4.5 km to the north-east of the Application Site. It might be possible to distinguish the tallest elements of plant constructing the data centre building. However, the amount of intervening vegetation would make it hard to distinguish, at this distance. The magnitude of impact is considered to be Negligible. The sensitivity of the walkers on the PRoW is High.

5.4.48 The significance of the temporary effect is judged to be **Minor adverse**, which is not significant.

Viewpoint 3: View west from junction of public footpath LN18 with The Ridgeway (road) north of Liddington Castle hillfort

5.4.49 Representative Viewpoint 3 (Figure 5.28) lies approximately 3.8 km to the east of the Application Site. It might be possible to distinguish the tallest elements of plant constructing the data centre building. However, the distance from the Application Site would make it hard to distinguish. The magnitude of impact is considered to be Negligible. The sensitivity of walkers is High, the sensitivity of cyclists and people in motor vehicles travelling through the AONB is considered to be Medium.

5.4.50 The significance of the temporary effect experienced by walkers is judged to be **Minor adverse.** The significance of temporary effects experienced by cyclists and people in motor vehicles is considered to be **Negligible adverse**. None of these temporary effects are judged to be significant.

Viewpoint 4: View west from triangulation point and viewing platform at Liddington Castle hillfort

5.4.51 Representative Viewpoint 4 (Figure 5.28) lies approximately 4.4 km to the east of the Application Site. From this elevated viewpoint, it would be possible to distinguish the tallest elements of plant constructing the data centre building. However, the distance from the Application Site would make it hard to distinguish and the plant would be seen with a backdrop of woodland and the higher land to the west of Swindon. The magnitude of impact is considered to be Negligible. The sensitivity of visitors to the hillfort is High.

5.4.52 The significance of the temporary effect is judged to be **Minor adverse**, which is not significant.

Viewpoint 5: View west-north west from The Ridgeway National Trail, south of Liddington Castle hillfort

5.4.53 Representative Viewpoint 5 (Figure 5.29) lies approximately 4.8 km to the east-south-east of the Application Site. From this elevated viewpoint, it might be possible to distinguish the tallest elements of plant constructing the data centre building. However, the distance from the Application Site and the intervening topography would make it hard to distinguish. The magnitude of impact is considered to be Negligible. The sensitivity of walkers of the National Trail is High.

5.4.54 The significance of the temporary effect is judged to be **Minor adverse**, which is not significant.

Viewpoint 6: View north east-north from the northernmost point of Barbury Castle hillfort

5.4.55 Representative Viewpoint 6 (Figure 5.29) lies approximately 4 km to the south west-south of the Application Site. From this elevated viewpoint, it would be possible to distinguish the tallest elements of plant constructing the data centre building. However, the distance from the Application Site would make it hard to distinguish and the plant would be seen with a backdrop of

the buildings of Swindon. The magnitude of impact is considered to be Negligible. The sensitivity of visitors to the hillfort is High.

5.4.56 The significance of the temporary effect is judged to be **Minor adverse**, which is not significant.

Viewpoint 7: View north east-north from Barbury Castle Country Park

5.4.57 Representative Viewpoint 7 (Figure 5.30) lies approximately 3.9 km to the south west-south of the Application Site. From this elevated viewpoint, it would be possible to distinguish the tallest elements of plant constructing the data centre building. However, the distance from the Application Site would make it hard to distinguish and the plant would be seen with a backdrop of the buildings of Swindon. The magnitude of impact is considered to be Negligible. The sensitivity of visitors to the country park is High.

5.4.58 The significance of the temporary effect is judged to be **Minor adverse**, which is not significant.

Viewpoint 8: View north from seating area adjacent to car park at Barbury Castle Country Park

5.4.59 Representative Viewpoint 8 (Figure 5.30) lies approximately 4 km to the south of the Application Site. From this elevated viewpoint, it would be possible to distinguish the tallest elements of plant constructing the data centre building. However, the distance from the Application Site would make it hard to distinguish and the plant would be seen with a backdrop of the buildings of Swindon. The magnitude of impact is considered to be Negligible. The sensitivity of people using the seating area is High.

5.4.60 The significance of the temporary effect is judged to be **Minor adverse**, which is not significant.

Viewpoint 9: View north east from public footpath WR25/minor road to the south of Overtown

5.4.61 Representative Viewpoint 9 (Figure 5.31) lies approximately 1.5 km to the south-west of the Application Site. It might be possible to distinguish the tallest elements of plant constructing the data centre building. However, the intervening vegetation and the low elevation of the viewpoint (in comparison to the Application Site) would make it hard to distinguish. Where views are possible, the magnitude of impact is considered to be Negligible. The sensitivity of walkers is High, the sensitivity of cyclists and people in motor vehicles travelling through the AONB is considered to be Medium.

5.4.62 The significance of the temporary effect experienced by walkers is judged to be **Minor adverse**. The significance of temporary effects experienced by cyclists and people in motor vehicles is considered to be **Negligible adverse**. None of these temporary effects are judged to be significant.

Viewpoint 10: View north east from minor road, to the north of Overtown

5.4.63 Representative Viewpoint 10 (Figure 5.31) lies approximately 0.5 km to the south-west of the Application Site. The view is at an acute angle and only gained by leaning over a field gate. It would be possible to distinguish the tallest elements of plant constructing the data centre building. However, the roadside hedgerow and the low elevation of the viewpoint (in comparison to the Application Site) would make it hard to gain this view. Where views are possible, they would be fleeting. The magnitude of impact is considered to be Negligible. The sensitivity of road users is Medium (people in vehicles travelling through the AONB and cyclists on a non-designated route).

5.4.64 The significance of the temporary effect is judged to be **Negligible adverse**, which are not significant.

Viewpoint 11: View east from public bridleway WR36, adjacent to Application Site

5.4.65 Representative Viewpoint 11 (Figure 5.32) lies approximately 10 m to the west of the Application Site. Due to the elevation of the PRoW, below that of the Application Site, the depth of intervening vegetation and the presence of the hoardings around the Application Site during construction, the magnitude of impact would be Medium. The sensitivity of people using the bridleway is High.

5.4.66 People using PRoW Bridleway WR36 would experience a **Moderate adverse** significance of effect. This temporary effect is not judged to be significant.

Viewpoint 12: View north-west-north from B4005, at junction of entrance to Burderop Park (house)

5.4.67 Representative Viewpoint 12 (Figure 5.32) lies approximately 650 m to the south-east-south of the Application Site. There may be glimpses of the tallest elements of the plan constructing the new data centre building, but it is unlikely that they would be distinguishable amongst the intervening trees. The impact of the construction works is considered to be Negligible. The sensitivity of the receptors to the potential change in views from this location would be Medium both for people in vehicles (as the road lies within the AONB) and Medium for cyclists.

5.4.68 These receptors would experience a **Negligible** adverse significance of effects. This temporary effect is not judged to be significant.

Further Mitigation

5.4.69 Proposed planting included in the Landscape Strategy for the proposed development should be incorporated where possible within the first phase of construction to allow it to have the best chance to mature and offer screening as early as possible within the development programme. No further mitigation is proposed.

Future Monitoring

5.4.70 Landscape management would be required for a period of five years following completion of the development to ensure that the newly planted areas become well established and meet their landscape potential. Management would include the replacement of dead, dying or damaged stock or those that fail to establish satisfactorily. Pruning that would be beneficial for plant growth, form and plant health would be promoted. A detailed Landscape Management Plan is provided as Appendix 5.2 to this chapter.

Accidents and/or Disasters

5.4.71 With respect to landscape, townscape and visual matters, potential accidents/disasters relevant to the construction phase of the proposed development are unlikely.

5.5 Assessment of Operational Effects

Introduction

5.5.1 This section considers the landscape and visual effects of the operational phase of the proposed development.

5.5.2 The proposed development would include the provision of a new large scale and high-quality building to a finished height of approximately 12 m (main building) and 15 m (stacks) above proposed ground level. The replacement data centre would create a distinguishable new element within the existing industrial / commercial setting in the study area. The proposed built

development would cover slightly less of the Application Site than the three existing data centres and ancillary buildings. Some existing on-site vegetation would be removed to allow for the development. Perimeter landscape features including an area of woodland would be retained and strengthened where possible. Existing site boundary security fencing would be replaced as part of the proposals and external lighting introduced to the site. New native woodland, shrubs, meadow / grassland, wetland and amenity planting and further ecological enhancement measures are proposed. Translocated wildflower turf will be introduced to the area previously occupied by the Alpha data centre building. A native hedgerow and ditch will separate this area from the rest of the site, with a field gate to allow access for management of the grassland.

5.5.3 A landscape strategy has been developed and the Illustrative Landscape Strategy is shown as Figure 5.45. Details are included in Appendix 5.2. The proposed use of native trees and shrubs will help to provide a link with existing perimeter woodland blocks to maintain a buffer between adjacent land uses and would help to screen the lower levels of the buildings within views from the local area once matured. External spaces within the site would be of good quality landscape design in terms of planting and the use of hard materials. The creation of a wildflower meadow replacing the Alpha data centre building will also move the built development further from surrounding buildings,

Predicted Landscape Effects

5.5.4 The likely effects on the landscape fabric and character during the operational phase at winter Year 1, i.e. the worst case, are summarised in Table 5.10 and described below. Photomontages have been produced for selected representative viewpoints, these are illustrated on Figures 5.33 to 5.44.

National Character Areas

5.5.5 The proposed development is located within both NCA 108 Upper Thames Clay Vales and NCA 116 Berkshire and Marlborough Downs (Figure 5.2).

5.5.6 The majority of the proposed development lies within NCA108. The direct impact of the proposed built development would be on the section of NCA 108 that lies to the north of the existing spine road. To the south of the spine road, these would be a car parking area. The area previously occupied by Alpha would be changed to a wildflower meadow. As described in paragraph 5.4.7, the whole site has been previously developed and recontoured and little natural planting remains on the Application Site. The direct impacts on the NCA are considered to be Negligible. The indirect impacts on NCA 108 will be from those elements of the data centre building that would be visible, i.e. the uppermost part of the building and the flues. From those locations of the NCAs that the building will be visible from, the indirect impact is considered to be Negligible. There will be no impact of the key characteristics of NCA108 (set out at paragraph 5.2.75). Due to the existing use as a data centre campus and the geographical extent of NCA108, it is considered to have a Medium sensitivity to the proposed development.

5.5.7 The Negligible, direct impact of the proposed development within NCA 116 would be limited to the erection of a new perimeter fence. There will be no indirect impacts on NCA116, i.e. No Change, from the replacement of the existing fence. When viewed from the highest viewpoints, to the south, the uppermost elements of the proposed data centre building would be visible, with the backdrop of the urban area of Swindon behind it (Viewpoint 6, Figure 5.41, for example) for areas of NCA 116 outside the application Site. These indirect impacts of the data centre building on NCA 116 would be Negligible. There will be no impact of the key characteristics of NCA116 (set out at paragraph 5.2.76). NCA 116 is considered to have a Medium sensitivity to the proposed development.

5.5.8 Overall, the proposed development is judged to have a **Negligible adverse** effect on both NCA 108 and NCA 116. These effects on the NCAs are not judged to be significant. These direct effects will reduce over time as the proposed planting matures.

North Wessex Downs AONB Landscape Character Areas:

5.5.9 The proposed development is located within North Wessex Downs AONB Landscape Character Area (LCA) 5B: Chiseldon - Wanborough Plain (Figure 5.6). Those AONB LCAs that would be indirectly affected would be: AONB LCA 1A Marlborough Downs; AONB LCA 5B Chiseldon - Wanborough Plain; AONB LCA 5F Liddington to Letcombe Open Scarp; and AONB LCA 6C Wanborough Vale. The key characteristics of AONB LCA 5B and the AONB Landscape Character Type 5 (of which it is one) are set out in paragraphs 5.2.84 to 5.2.86, of this chapter. A ZTV was generated and overlain on the AONB LCA, to establish which might be affected (Figure 5.6).

5.5.10 Overall and on balance, taking into account the beneficial effects of the replacement of the Alpha data centre building with a new wildflower meadow, the proposed development would have a Small direct impact, on AONB LCA 5B within the Application Site. As the whole of the Application Site has been previously developed and recontoured, there is little natural planting remaining on the Application Site (as described in paragraph 5.4.6). There will be no impact of the key characteristics of AONB LCA 5B, or Landscape Character Type 5. AONB LCA 5B is considered to have a High sensitivity to the proposed development.

5.5.11 All other impacts on the remaining AONB LCAs are indirect and, given the considerable amount of screening around the Application Site, would be Negligible. As described in paragraph 5.4.12, direction also alters the context, e.g. from the southernmost AONB LCAs the flues of the proposed data centre building will form part of backdrop to the LCAs, which also includes the buildings of Swindon (Viewpoint 6, Figure 5.41) or, in the case of those AONB LCAs to the north-west, the larger buildings of Swindon form part of the middle distance context, between those character areas and Application Site (Viewpoint 1, Figure 5.35). These, indirectly affected, AONB LCAs are considered to have a High sensitivity to the proposed development.

5.5.12 The special landscape qualities of the AONB, detailed in paragraph 5.2.81, are not affected.

5.5.13 Overall, the proposed development is judged to have a **Moderate adverse** significance of effect on North Wessex Downs AONB LCA 5B Chiseldon - Wanborough Plain (these direct effects will reduce over time as the proposed planting matures and the wildflower meadow becomes established) and a **Minor adverse** significance of effect on all other AONB LCAs. None of these effects are judged to be significant.

Swindon Borough and Wiltshire County Landscape Character Areas

5.5.14 The proposed development would lie within Swindon Borough LCA v Downs Plains. Those Swindon Borough (SB) LCAs that would be indirectly affected would be: SB LCA ii Vale of the White Horse; SB LCA iv Scarp; SB LCA v Downs Plains; and, SB LCA vi High Downs (Figure 5.4). The Wiltshire (W) LCA that would be indirectly affected is W LCA Marlborough Downs, also illustrated on Figure 5.4.

5.5.15 The key characteristics of SB LCA v Downs Plains, present at the Application Site, are set out at paragraph 5.2.92. The majority of these characteristics are locational, which the proposed development would not affect. On balance, taking into account the beneficial effects of the replacement of the Alpha data centre building with a new wildflower meadow, the direct impact on SB LCA v, at the Application Site is considered to be Small. There are also indirect impacts on SB LCA v. The sensitivity of the landscape character of SB LCA v to the proposed development is considered to be Medium.

5.5.16 The indirect impacts on the remaining SB LCAs and W LCA Marlborough Downs, as with the AONB LCAs, differ. Given the considerable amount of screening, provided by woodland and tree

belts surrounding the Application Site, the impact of the proposed development (the upper parts of the building and the flues) is considered to be Negligible. The sensitivity of these SB LCAs to these indirect impacts is considered to be Medium.

5.5.17 Overall, the proposed development would cause a **Minor adverse** significance of effect, the direct effects will reduce over time as the proposed planting matures. The remaining SBC LCAs and the W LCA are judged to experience **Negligible adverse** effects. None of the effects on these LCAs are judged to be significant.

Site and Immediate Surroundings

5.5.18 Although the Application Site lies within the North Wessex Downs AONB, this part of the AONB is a previously developed (latterly as a data centre campus) area of land and does not have the same characteristics as much of the rest of AONB. It does not have the special landscape qualities set out in the AONB Management Plan. Given its disturbed landform and current use, the Application Site has a Medium sensitivity to the proposed development.

5.5.19 The proposed built development would occur largely in the northern part of the Application Site, with the site of the existing Alpha data centre being replaced with a wildflower meadow.. On balance, the direct impact of the proposed development on the character of the Application Site would be Small.

5.5.20 The significance of effects on the character of the Application Site would be **Minor adverse**, which is not judged to be significant. The direct effects will reduce over time as the proposed planting matures.

Great Western Community Forest

5.5.21 As described in paragraph 5.2.39, the Application Site lies within Area 05 of the GWCF. The proposed development will involve the removal of trees from the Application Site. However, the development proposes the planting of 97 trees, as well as small areas of woodland and the development of a new wildflower meadow, the northern boundary of which would be a hedgerow with trees. The GWCF is considered to have a Medium sensitivity to the proposed development in this location.

5.5.22 The existing character of the GWCF, at the Application Site is not woodland and contains data centres. However, character will be affected, landscape elements will be removed, while the development of the data centre building and reconfiguration of the Application Site will also affect character. Due to the character in the south of the Application Site remaining largely the same, the impact on the GWCF is judged to be Medium.

5.5.23 The significance of the proposed development on the character of the GWCF is judged to be **Moderate adverse**, which is not judged to be a significant effect in the context of the wider GWCF area and given the amount of trees that are proposed as part of the development. These direct effects will reduce over time as the proposed planting matures.

Night-Time Landscape Effects

5.5.24 The CPRE has mapped the light levels for the whole of England. The CPRE map for the study area is illustrated at Figure 5.8. The levels are as described in paragraph 5.2.128. The proposed lighting is described in paragraphs 5.3.3 to 5.3.6. The proposed lighting will increase the level of light at the Application Site. However, the light level will not significantly increase and due to the depth of mature planting around the Application Site the light spill beyond the Application Site will be minimal. The magnitude of this impact is judged to be Small. The sensitivity of the night-time character to the increase in light level is considered to be Medium.

5.5.25 The significance of the effects of the increase in the lighting level is judged to be **Minor adverse**, which is not a significant effect.

Visual Effects

5.5.26 Visual impacts would result from change to the appearance of the Application Site in its landscape context, resulting from the proposed development. A ZTV was generated, using the height of the flues (15 m) to establish the extent to which the proposed development would theoretically be visible (Figure 5.26).

5.5.27 There would be views of the upper part of the data centre building and flues from some locations. However, due to variation in the topography and level of vegetation cover around the Application Site, lower buildings and all other associated infrastructure would be screened from views outside the Application Site, barring at the entrance to the new development. All visual impacts are direct.

Views from Public Rights of Way, Access Land and Public Open Space

5.5.28 The ZTV (Figure 5.26) indicates those PRoW, areas of Access Land and POS along and within which views of the proposed development might be possible.

Public Rights of Way

5.5.29 Due to the woodland surrounding the Application Site, there would be no open views of the Application Site from PRoW. However, glimpsed views of the flues of the data centre building might be gained from sections of public footpath WR25, to the south of Overtown (Viewpoint 9, Figure 5.31) and the lower buildings, closest to sections of public bridleway WR36 (Viewpoint 11, Figure 5.32), located to the west of the Application Site. These views would be restricted by intervening vegetation and, in the case of WR25, existing residential buildings. The sensitivity of people travelling along the PRoW is considered to be High, the impact of the proposed development is considered to be Negligible for those people walking along WR25 and Medium for those people travelling along WR36.

5.5.30 Sections of other more distant public rights of way in the surrounding area that lie within the ZTV include those within the parish of Wanborough: WA3 (Viewpoint 2, Figure 5.27) WA8 and WA9. Within the parish of Liddington these include LN13 (The Ridgeway National Trail) (Viewpoint 5, Figure 5.29) LN14, LN18 (Viewpoint 3, Figure 5.28) and LN21. Within the parish of Chiseldon, these include CH31, CH36 and CH39. Within the parish of Wroughton these include WR27 (The Ridgeway National Trail) and WR44. These people will see the uppermost part of the data centre building and flues and from lower-lying PRoW the flues only. The more elevated views will also include the built-up area of Swindon, either as a backdrop, or as part of the context of the wider view. The sensitivity of people using the PRoW network to the proposed development is considered to be High. The magnitude of impact of the proposed development is considered to be Negligible.

5.5.31 People using PRoW Bridleway WR36 would experience a **Moderate adverse** significance of effect. These effects will reduce over time as the proposed planting matures. All other receptors using the PRoW network, where the proposed development would be visible, would experience **Minor adverse** significance of effects. None of these effects are judged to be significant.

Access Land

5.5.32 Those people visiting the Access Land to the south of the study area, located on the upper scarp within the AONB would have elevated views of the upper parts of the proposed data centre building from those areas facing north, but, limited views from Access Land that faces south. The people using these areas would have a High sensitivity to the proposed development. Impacts would be Negligible.

5.5.33 People using the north-facing area of Access Land would experience a **Minor adverse** significance of effect. People using the area of south-facing Access Land would experience **Negligible adverse** significance of effects. None of these effects are judged to be significant.

Public Open Space

5.5.34 The sensitivity of those people within areas of POS, such as that at Upper Wanborough children's play area and playing field (Viewpoint 1, Figure 5.27) to the proposed development will vary depending on the location of the POS and the presence of any intervening vegetation or buildings. The people using the POS are usually involved in some sort of recreation, be it working an allotment or playing a sport of some sort. These people are considered to have a Medium sensitivity to the proposed development. The impact on users of the POS would be Negligible.

5.5.35 The people visiting Barbury Country Park (Viewpoints 7 and 8, Figure 5.30) are considered to have a High sensitivity to the proposed development, as the Country Park is located on the north-facing scarp to the south of the study area, with elevated views towards the Application Site. The impact on people visiting the Country Park would be Negligible as only the upper part and flues of the data centre building would be visible.

5.5.36 People using POS experience a **Negligible adverse** significance of effect. People using the area of south-facing Barbury Country Park would experience **Minor adverse** significance of effects. None of these effects are judged to be significant.

Views from Surrounding Road Network

5.5.37 Dynamic views of the upper part of the data centre building and its flues at the Application Site from some minor roads within the ZTV would be possible. The minor roads include The Old Ridgeway, which runs north-east to south-west to the north of Draycot Foliat. The most southerly and elevated part of the single-track road from Overtown to Barbury Castle Country Park lies within the ZTV. People travelling along small sections of the minor road that runs west to east, from Wroughton Airfield to Beranburh Field (residential development) might have views of the top of the proposed data centre building, as might people travelling along a section of the minor road running north-east to south-west, from Brimble Hill to Overtown House. Views of the proposed development from the latter two roads, although closer than others, would be more restricted, due to lower elevations and more intervening vegetation, including tall hedgerows and vegetation around and within residential areas. The magnitude of impact of the proposed development when viewed from these locations would vary between Negligible and Small, depending on the distance, orientation, intervening vegetation and context of the available view.

5.5.38 People travelling in vehicles along these minor roads, within the AONB will have a Medium sensitivity to the proposed development.

5.5.39 Cyclists using the National Cycle Routes routed along minor roads will experience similar views to those people in vehicles, albeit from a slightly higher perspective. Cyclists using the designated cycle routes are considered to have a High sensitivity to the proposed development. Cyclists using the road network are considered to have a Medium sensitivity to the proposed development.

5.5.40 People in motor vehicles travelling within the AONB would experience a **Negligible adverse to Minor adverse** significance of effects. Those cyclists using the designated cycle routes would experience **Minor adverse to Moderate adverse** effects. Cyclists using the general road network would experience **Negligible adverse to Minor adverse** effects. These effects are not judged to be significant.

Representative Viewpoints

5.5.41 The 12 representative viewpoints are described in Table 5.8, and, their locations illustrated on Figure 5.26. The representative viewpoint panoramas are at Figures 5.27 to 5.32. The effects on

views from the 12 identified viewpoint locations during operation are summarised in Table 5.10. The photomontage methodology is set out at Appendix 5A to this chapter.

Viewpoint 1: View south-west from children's play area at Upper Wanborough

5.5.42 Representative Viewpoint 1 (Figures 5.33 to 5.35) lies approximately 4.5 km to the north-east of the Application Site. It might be possible to distinguish the tallest elements of the data centre building. However, the amount of vegetation surrounding the play area would make it hard to distinguish, at this distance. The magnitude of impact is considered to be Negligible. The sensitivity of the people using the play area is Medium, as they will be involved in play and other sporting activities.

5.5.43 The significance of the effect is judged to be **Negligible adverse**, which is not significant.

Viewpoint 2: View south-west from public footpath WA3, to the south of Wanborough

5.5.44 Representative Viewpoint 2 (Figure 5.27) lies approximately 4.5 km to the north-east of the Application Site. It might be possible to distinguish the upper part and flues of the data centre building from this location. However, the amount of intervening vegetation would make it hard to distinguish, at this distance. The magnitude of impact is considered to be Negligible. The sensitivity of the walkers on the PRoW is High.

5.5.45 The significance of the effect is judged to be **Minor adverse**, which is not significant at this location.

Viewpoint 3: View west from junction of public footpath LN18 with The Ridgeway (road) north of Liddington Castle hillfort

5.5.46 Representative Viewpoint 3 (Figure 5.28) lies approximately 3.8 km to the east of the Application Site. It might be possible to distinguish the upper parts and flues of the data centre building. However, the distance from the Application Site would make it hard to distinguish. The magnitude of impact is considered to be Negligible. The sensitivity of walkers is High, the sensitivity of cyclists and people in motor vehicles travelling through the AONB is considered to be Medium.

5.5.47 The significance of the effect experienced by walkers is judged to be **Minor adverse**. The significance of effects experienced by cyclists and people in motor vehicles is considered to be **Negligible adverse**. None of these effects are judged to be significant.

Viewpoint 4: View west from triangulation point and viewing platform at Liddington Castle hillfort

5.5.48 Representative Viewpoint 4 (Figures 5.36 to 5.38) lies approximately 4.4 km to the east of the Application Site. From this elevated viewpoint, it would be possible to distinguish the upper parts and flues of the data centre building. However, the distance from the Application Site would make it hard to distinguish and the proposed development would be seen with a backdrop of woodland and the higher land to the west of Swindon. The magnitude of impact is considered to be Negligible. The sensitivity of visitors to the hillfort is High.

5.5.49 The significance of the effect is judged to be **Minor adverse**, which is not significant in this location.

Viewpoint 5: View west-north west from The Ridgeway National Trail, south of Liddington Castle hillfort

5.5.50 Representative Viewpoint 5 (Figure 5.29) lies approximately 4.8 km to the east-south-east of the Application Site. From this elevated viewpoint, it might be possible to distinguish the tops of the flues of the data centre building. However, the distance from the Application Site and the intervening topography would make them hard to distinguish. The magnitude of impact is considered to be No Change to Negligible. The sensitivity of walkers of the National Trail is High.

5.5.51 The significance of the effect is judged to be **None to Minor adverse**, which is not significant.

Viewpoint 6: View north-east-north from the northernmost point of Barbury Castle hillfort

5.5.52 Representative Viewpoint 6 (Figures 5.39 to 5.41) lies approximately 4 km to the south-west-south of the Application Site. From this elevated viewpoint, it would be possible to distinguish the upper parts and flues of the data centre building. However, the distance from the Application Site would make it hard to distinguish and the proposed development would be seen with a backdrop of the buildings of Swindon. The magnitude of impact is considered to be Negligible. The sensitivity of visitors to the hillfort is High.

5.5.53 The significance of the effect is judged to be **Minor adverse**, which is not significant.

Viewpoint 7: View north-east-north from Barbury Castle Country Park

5.5.54 Representative Viewpoint 7 (Figure 5.30) lies approximately 3.9 km to the south-west-south of the Application Site. From this elevated viewpoint, it would be possible to distinguish the upper part and flues of the data centre building. However, the distance from the Application Site would make it hard to distinguish and the proposed development would be seen with a backdrop of the buildings of Swindon. The magnitude of impact is considered to be Negligible. The sensitivity of visitors to the country park is High.

5.5.55 The significance of the effect is judged to be **Minor adverse**, which is not significant.

Viewpoint 8: View north from seating area adjacent to car park at Barbury Castle Country Park

5.5.56 Representative Viewpoint 8 (Figure 5.30) lies approximately 4 km to the south of the Application Site. From this elevated viewpoint, it would be possible to distinguish the upper part and flues of the data centre building. However, the distance from the Application Site would make it hard to distinguish and the proposed development would be seen with a backdrop of the buildings of Swindon. The magnitude of impact is considered to be Negligible. The sensitivity of people using the seating area is High.

5.5.57 The significance of the effect is judged to be **Minor adverse**, which is not significant.

Viewpoint 9: View north-east from public footpath WR25/minor road to the south of Overtown

5.5.58 Representative Viewpoint 9 (Figure 5.31) lies approximately 1.5 km to the south-west of the Application Site. It might be possible to distinguish the flues of the data centre building. However, the intervening vegetation and the low elevation of the viewpoint (in comparison to the Application Site) would make it hard to distinguish. Where views are possible, the magnitude of impact is considered to be Negligible. The sensitivity of walkers is High, the sensitivity of cyclists and people in motor vehicles travelling through the AONB is considered to be Medium.

5.5.59 The significance of the effect experienced by walkers is judged to be **Minor adverse**. The significance of temporary effects experienced by cyclists and people in motor vehicles is considered to be **Negligible adverse**. None of these effects are judged to be significant.

Viewpoint 10: View north-east from minor road, to the north of Overtown

5.5.60 Representative Viewpoint 10 (Figure 5.31) lies approximately 0.5 km to the south-west of the Application Site. The view is at an acute angle and only gained by leaning over a field gate. It would be possible to distinguish the flues on the data centre building. However, the roadside hedgerow and the low elevation of the viewpoint (in comparison to the Application Site) would make it hard to gain this view. Where views are possible, they would be fleeting. The magnitude of impact is considered to be Negligible. The sensitivity of road users is Medium (people in vehicles travelling through the AONB and cyclists on a non-designated route).

5.5.61 The significance of the effects is judged to be **Negligible adverse**, which are not significant.

Viewpoint 11: View east from public bridleway WR36, adjacent to Application Site

5.5.62 Representative Viewpoint 11 (Figure 5.32) lies approximately 10 m to the west of the Application Site. Due to the elevation of the PRoW, below that of the Application Site and the depth of intervening vegetation, parts of the lower, ancillary buildings of the proposed development would be visible. However, the larger data centre building would be screened by these lower buildings. The magnitude of impact would be Medium. The sensitivity of people using the bridleway is High.

5.5.63 People using PRoW Bridleway WR36 would experience a **Moderate adverse** significance of effect, which is not judged to be significant. These effects will reduce over time as the proposed planting matures.

Viewpoint 12: View north-west-north from public bridleway WR36, adjacent to Application Site

5.5.64 Representative Viewpoint 12 (Figures 5.42, 5.43 and 5.44) lies approximately 650 m to the south-east-south of the Application Site. There would be no potential views of the proposed development from this location, due to the elevation of the viewpoint in relation to the proposed development, as well as distance and intervening tree belts. There will be no impact of the proposed development.

5.5.65 The receptors at this location will not experience any visual effects from the proposed development

Night-Time Visual Effects

5.5.66 The CPRE has mapped the light levels for the whole of England. The CPRE map for the study area is illustrated at Figure 5.8. The levels are as described in paragraph 5.2.125. The proposed lighting is described in paragraphs 5.3.3 to 5.3.6. The proposed lighting will increase the level of light at the Application Site. However, the light level will not significantly increase and due to the depth of mature planting around the Application Site the light spill beyond the Application Site will be minimal. The magnitude of this impact is judged to be Small. The sensitivity of the night-time character to the increase in light level is considered to be Medium. The significance of the effects of the increase in the lighting level is judged to be **Minor adverse**, which is not a significant effect.

Further Mitigation

5.5.67 The proposed development incorporates a landscape strategy that is included as an integral part of the design (Appendix 5.2) and would be implemented as part of the proposals. No additional mitigation requirement has been identified.

Future Monitoring

5.5.68 Landscape management would be required for a period of five years following completion of the development to ensure that the newly planted areas become well established and meet their landscape potential. Management would include the replacement of dead, dying or damaged stock or those that fail to establish satisfactorily. Pruning that would be beneficial for plant growth, form and plant health would be promoted.

Accidents/Disasters

5.5.69 With respect to landscape, townscape and visual matters, potential accidents/disasters relevant to the operation phase of the proposed development are unlikely. There is a potential risk of introduced diseases affecting vegetation, for example ash dieback disease (Hymenocyphus fraxineus). In this case, and as a precautionary measure, ash has not been specified within proposed planting mixes.

Potential Changes to the Assessment as a Result of Climate Change

5.5.70 The likely ranges of change in climatic parameters including precipitation, temperature, wind speed, humidity and frequency of extreme weather may affect the native flora. However, while this would not increase the sensitivity of receptors, it may affect the magnitude of impact, e.g. the proposed development may be more visible to people who only have semi-screened views at present, or it may increase the number of receptors, where tree-cover loss could enable views not currently possible. Other species may thrive and replace any loss of vegetation. As this aspect of the effects of climate change is uncertain, it is difficult to predict the significance of effects.

5.6 Assessment of Cumulative Effects

5.6.1 Only those developments listed in Volume 3 Appendix 4.3: Cumulative Developments, that fall within the same landscape character area or within the ZTV are considered in Table 5.9, below. All others have been reviewed and would have no additional impacts on either the landscape resources and receptors or the visual resources and receptors.

Table 5.9: Cumulative Developments considered in the Assessment of Effects on Landscape and Visual Resources

Cumulative development	Distance from the site	Potential effects
Burderop Park, Wroughton, Swindon Planning reference: S/17/0128 S/19/0441 S/19/1765 S/20/0926 S/20/1234 Description of development: Demolition of the pavilions, change of use of offices and ancillary buildings to 25 no. apartments/dwellings, erection of 52 no. dwellings, construction of new access and associated works.	10 m	**Landscape resources and receptors:** During the construction phase the main effect that might occur is a temporal one – if the construction of the proposed development at the Application Site (programmed for Q3 2021) overlaps with the ongoing construction of the residential development at Burderop Park. The cumulative developments lie within the same landscape character areas as the proposed development within the Application Site – SB LCA v: Downs Plain and North Wessex Downs AONB LCA 5B Chiseldon-Wanborough Plain. There would be the potential for a temporary impact on these LCAs during the construction phase if the projects overlap. This would primarily be through an increase in construction traffic. This temporary effect is not considered to be significant Those people viewing the construction activities from more distant locations will experience a Negligible difference, due to the screening of the Burderop Park development. Those people of a High sensitivity would have a temporary **Minor adverse** significance of effect, at most, which is not significant.

Cumulative development	Distance from the site	Potential effects
Status: S/17/0128 - Under construction S/19/0441 - Under construction S/19/1765 - Under construction S/20/0926 - pending S/20/1234 - pending		During the operational phase of the proposed development there will be a Negligible impact on the LCAs as both the development at Burderop Park and the development at the Application Site are replacing existing buildings and while different/slightly larger, they are both on land that has been previously developed. The effect on landscape receptors is considered to be **Negligible adverse**, which is not significant. **Visual receptors:** If there is a temporal overlap of construction programmes there will be a temporary Medium impact on road users, both people in vehicles and cyclists using the B4005. These receptors both have a Medium sensitivity. The significance of the temporary effect on visual receptors would be **Moderate adverse**, which is not considered to be significant. During the operational phase of the proposed development there would be a Negligible cumulative impact on visual receptors, as the developments will be substantially screened by the woodland and tree belts that surround them. Even for High sensitivity receptors, the significance of the cumulative effect would be **Minor adverse**, which is not significant.
Burderop Park, Wroughton, Swindon Planning reference: S/19/1892 S/20/0924 Description of development: Erection of 6 no. additional dwellings. Status: S/19/1892 - approved S/20/0924 - pending	10 m	**Landscape resources and receptors:** During the construction phase the main effect that might occur is a temporal one – if the construction of the proposed development at the Application Site (programmed for Q3 2021) overlaps with the ongoing construction of the residential development at Burderop Park. The cumulative developments lie within the same landscape character areas as the proposed development within the Application Site – SB LCA v: Downs Plain and North Wessex Downs AONB LCA 5B Chiseldon-Wanborough Plain. There would be the potential for a temporary impact on these LCAs during the construction phase if the projects overlap. This would primarily be through an increase in construction traffic. This temporary effect is not considered to be significant Those people viewing the construction activities from more distant locations will experience a Negligible difference, due to the screening of the Burderop Park development. Those people of a High sensitivity would have a temporary **Minor adverse** significance of effect, at most, which is not significant. During the operational phase of the proposed development there will be a Negligible impact on the LCAs as both the development at Burderop Park and the development at the Application Site are replacing existing buildings and while different/slightly larger, they are both on land that has been previously developed. The effect on landscape receptors is considered to be **Negligible adverse**, which is not significant. **Visual receptors:** If there is a temporal overlap of construction programmes there will be a temporary Medium impact on road users, both people in vehicles and cyclists using the B4005. These receptors both have a Medium sensitivity. The significance of the temporary effect on visual receptors would be **Moderate adverse**, which is not considered to be significant. During the operational phase of the proposed development there would be a Negligible cumulative impact on visual receptors, as the developments will be substantially screened by the woodland and tree belts that surround them. Even for High sensitivity receptors, the significance of the cumulative effect would be **Minor adverse**, which is not significant.

Cumulative development	Distance from the site	Potential effects
Land at Langton Park, Wroughton, Swindon Planning reference: S/18/1033 Description of development: Erection of 18 no. dwellings with associated access, parking and landscaping. Status: S/18/1033 - approved	1.7 km	**Landscape resources and receptors:** During the construction phase the main effect that might occur is a temporal one – if the construction of the proposed development at the Application Site (programmed for Q3 2021) overlaps with the construction of the residential development at Langton Park. The cumulative development lies within the same landscape character areas as the proposed development within the Application Site – SB LCA v: Downs Plain and North Wessex Downs AONB LCA 5B Chiseldon-Wanborough Plain. There would be the potential for a temporary impact on these LCAs during the construction phase if the projects overlap. This would primarily be through an increase in construction traffic. This temporary cumulative effect is judged to be **Minor adverse**, which is not significant. During the operational phase of the proposed development there will be a **Negligible adverse** cumulative impact on the LCAs. The effect on landscape receptors is not considered to be significant. **Visual receptors:** If there is a temporal overlap of construction programmes there will be a temporary small impact on road users, both people in vehicles and cyclists using the B4005 and minor roads in the vicinity of the developments. These receptor groups both have a Medium sensitivity. The significance of the temporary cumulative effect on visual receptors would be **Minor adverse**, which is not considered to be significant. During the operational phase of the proposed development there would be a Negligible cumulative impact on visual receptors, as both developments will be either substantially screened by woodland and tree belts, or existing residential development. Even for High sensitivity receptors, the significance of the cumulative effect would be **Minor adverse**, which is not significant.
Land to the west of former electricity sub-station, Langton Park, Wroughton, Swindon Planning reference: S/20/0120 Project description: Erection of 30 no. dwellings with associated access, parking and landscaping. Status: S/20/0120 - approved	1.7 km	**Landscape resources and receptors:** During the construction phase the main effect that might occur is a temporal one – if the construction of the proposed development at the Application Site (programmed for Q3 2021) overlaps with the construction of the residential development at Langton Park. The cumulative development lies within the same landscape character areas as the proposed development within the Application Site – SB LCA v: Downs Plain and North Wessex Downs AONB LCA 5B Chiseldon-Wanborough Plain. There would be the potential for a temporary impact on these LCAs during the construction phase if the projects overlap. This would primarily be through an increase in construction traffic. This temporary cumulative effect is judged to be **Minor adverse**, which is not significant. During the operational phase of the proposed development there will be a **Negligible adverse** cumulative impact on the LCAs. The effect on landscape receptors is not considered to be significant. **Visual receptors:** If there is a temporal overlap of construction programmes there will be a temporary small impact on road users, both people in vehicles and cyclists using the B4005 and minor roads in the vicinity of the developments. These receptor groups both have a Medium sensitivity. The significance of the temporary cumulative

Cumulative development	Distance from the site	Potential effects
		effect on visual receptors would be **Minor adverse**, which is not considered to be significant. During the operational phase of the proposed development there would be a Negligible cumulative impact on visual receptors, as both developments will be either substantially screened by woodland and tree belts, or existing residential development. Even for High sensitivity receptors, the significance of the cumulative effect would be **Minor adverse**, which is not significant.

Cumulative Effects on Landscape and Visual Resources and Receptors

5.6.2 The potential effects on the landscape and visual resources and receptors are described in Table 5.9, above.

5.6.3 None of the cumulative developments identified in Table 5.9, above would have a significant adverse effect taken together with the proposed development at the Application Site, either at the construction or operational phases.

5.6.4 In addition, the consideration of cumulative effects has considered the various infrastructure upgrade works. These upgrades and infrastructure enhancements would be undertaken by the various statutory and licenced utility providers and would follow industry-standard construction methodologies and guidelines.

5.6.5 The main potential landscape and visual impacts associated with the infrastructure upgrade works would be related to the construction period for such works. No impacts on landscape character and visual receptors are predicted once the upgraded infrastructure is operational.

5.6.6 Works to install the upgrades would be undertaken by the utility providers and would follow standard construction methodologies. The works would be primarily underground therefore, there would be no long-term cumulative effects on landscape character or visual impacts. External modifications to the existing substations may be required (depending on the findings of future engineering requirements) but these are expected to be minor in nature.

5.7 Inter-relationships

5.7.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the construction and operation of the proposed development on the same receptor. The following assessments have been made.

Project lifetime effects

5.7.2 Assessment of the potential for effects that occur during more than one stage of the development's lifetime (construction or operation) to interact such that they may create a more significant effect on a receptor than when assessed in isolation for each stage.

5.7.3 There will be no additional effects on landscape and visual resources over the lifetime of the project. Indeed, as the planting matures any adverse effects will reduce.

Receptor-led effects

5.7.4 Assessment of the potential for effects via multiple environmental or social pathways to interact, spatially and temporally, to create a greater inter-related effect on a receptor than is predicted for each pathway (in its respective topic chapter) individually

5.7.5 The replacement of the three data centres, Alpha, Beta and Gamma with a single modern data centre will not change the Special Qualities of the North Wessex Downs AONB nor compromise the reasons for its designation. When taken into consideration with the other predicted changes, the effects on the characteristics and special qualities of the landscape, the AONB and on visual receptors would not be significant.

5.8 Summary of Effects

5.8.1 The likely effects from the proposed development of a replacement data centre at the Old Burderop Hospital site (currently a data centre campus) would not have any significant effects on landscape or visual resources and receptors.

5.8.2 The proposed development in this part of the North Wessex Downs AONB would not affect the special landscape qualities of the AONB or the key characteristics of the AONB landscape character areas that it lies within, or, those that it can be seen from. The proposed replacement data centre at this previously developed site and data centre campus, would not compromise the reasons for the designation of the AONB.

5.8.3 A summary of the effects on the identified landscape and visual resources and receptors is presented in Table 5.10, below.

5.9 References

Publications

European Union (2000, ratified 2006) *European Landscape Convention.*

Landscape Institute and Institute of Environmental Management and Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment: Third Edition*.

Landscape Institute (2019) *Landscape Institute Technical Guidance Note 06/19: Visual Representation of Development Proposals.*

Land Use Consultants (for the Countryside Agency) (2002) *North Wessex Downs Area of Outstanding Natural Beauty: Integrated Landscape Character Assessment, Technical Report.*

Ministry of Housing, Communications and Local Government (2019) *National Planning Policy Framework*.

North Wessex Downs Area of Outstanding Natural Beauty Partnership (2019) *North Wessex Downs, Area of Outstanding Natural Beauty Management Plan 2019-2024*.

Swindon Borough Council (2004) *Community Forest Supplementary Planning Guidance.*

Swindon Borough Council (2004) *Landscape Character Areas Supplementary Planning Guidance.*

Swindon Borough Council (2004) *Tree Protection on Development Sites Supplementary Planning Guidance.*

Swindon Borough Council (2011) *A Green Infrastructure for Swindon 2010-2026*

Swindon Borough Council (2015) *Swindon Borough Local Plan 2026.*

Web based resources

Ministry of Housing, Communications and Local Government, *National Planning Practice Guidance* (accessed March 2021).

Natural England, *National Character Area Profiles 108 and 116* (accessed November 2020).

Table 5.10: Summary of Likely Environmental Effects on Landscape and Visual Resources

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Construction phase							
Landscape resources and receptors							
NCA 108: Upper Thames Clay Vales	Medium	Removal of trees, replacement of existing data centres with one larger data centre. Replacement security fencing.	Short term Direct	Small	Minor adverse	Not significant	
NCA 116: Berkshire and Marlborough Downs	Medium	Replacement security fencing.	Short term Direct	Negligible	Negligible adverse	Not significant	
North Wessex Downs AONB LCA 5B: Chiseldon - Wanborough Plain	High	Removal of trees, replacement of existing data centres with one larger data centre. Replacement security fencing. No impact on the key characteristics of the AONB LCA or the Special Qualities of the AONB.	Short term Direct	Medium	Moderate adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
North Wessex Downs AONB LCAs 1A Marlborough Downs; AONB LCA 5B Chiseldon – Wanborough Plain; AONB LCA 5F Liddington to Letcombe Open Scarp; and AONB LCA 6C Wanborough Vale.	High	View of top of data centre potentially affecting landscape character. No impact on the key characteristics of the AONB LCA or the Special Qualities of the AONB.	Short term Indirect	Negligible	Minor adverse	Not significant	
Swindon Borough (SB) LCA v Downs Plains	Medium	Removal of trees, replacement of existing data centres with one larger data centre. Replacement security fencing.	Short term Direct	Medium	Moderate adverse	Not significant	
SB LCA ii Vale of the White Horse; SB LCA iv Scarp; SB LCA v Downs Plains; and, SB LCA vi High Downs. Wiltshire LCA Marlborough Downs	Minor	View of top of data centre potentially affecting landscape character.	Short term Indirect	Negligible	Negligible adverse	Not significant	
Great Western Community Forest	Medium	Removal of trees, replacement of existing data centres with one larger data centre. Replacement security fencing.	Short term Direct	Medium	Moderate adverse	Not significant	
Application Site characteristics	Medium	Removal of trees, replacement of existing data centres with one	Short term Direct	Medium	Moderate adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
		larger data centre. Replacement security fencing.					
Visual receptors							
Public Rights of Way	High	Bridleway WR36 - Removal of trees, construction of ancillary buildings behind hoarding. All others – the upper part of the tallest construction plant.	Short term Direct	Negligible to Medium (WR36)	Minor adverse to Moderate adverse (WR36)	Not significant	
Access Land	High	The upper part of the tallest construction plant.	Short term Direct	Negligible	Minor adverse	Not significant	
Public Open Space including Barbury Country Park	Medium to High (Barbury Country Park)	The upper part of the tallest construction plant.	Short term Direct	Negligible	Minor adverse	Not significant	
Road network	Medium to High (cyclists on National Cycle Routes)	Limited views of construction vehicles accessing and leaving the Application Site from specific locations. The upper part of the tallest construction plant.	Short term Direct	Negligible to Small	Negligible adverse to Moderate adverse (cyclists on National Cycle Routes)	Not significant	
Representative Viewpoint 1: View south-west from children's play area at Upper Wanborough	Medium	The upper part of the tallest construction plant.	Short term Direct	Negligible	Negligible adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Representative Viewpoint 2: View south-west from public footpath WA3, to the south of Wanborough	High	The upper part of the tallest construction plant.	Short term Direct	Negligible	Minor adverse	Not significant	
Representative Viewpoint 3: View west from junction of public footpath LN18 with The Ridgeway (road) north of Liddington Castle hillfort	High (walkers) Medium (people in vehicles and cyclists)	The upper part of the tallest construction plant.	Short term Direct	Negligible	Negligible adverse to Minor adverse (walkers)	Not significant	
Representative Viewpoint 4: View west from triangulation point and viewing platform at Liddington Castle hillfort	High	The upper part of the tallest construction plant.	Short term Direct	Negligible	Minor adverse	Not significant	
Representative Viewpoint 5: View west-north-west from The Ridgeway National Trail, south of Liddington Castle hillfort	High	The upper part of the tallest construction plant.	Short term Direct	Negligible	Minor adverse	Not significant	
Representative Viewpoint 6: View north-east-north from the northernmost point of Barbury Castle hillfort	High	The upper part of the tallest construction plant.	Short term Direct	Negligible	Minor adverse	Not significant	
Representative Viewpoint 7: View north-east-north from Barbury Castle Country Park	High	The upper part of the tallest construction plant.	Short term Direct	Negligible	Minor adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Representative Viewpoint 8: View north from seating area adjacent to car park at Barbury Castle Country Park	High	The upper part of the tallest construction plant.	Short term Direct	Negligible	Minor adverse	Not significant	
Representative Viewpoint 9: Viewpoint 9: View north-east from public footpath WR25/minor road to the south of Overtown	High (walkers) to Medium people in vehicles and cyclists)	The upper part of the tallest construction plant.	Short term Direct	Negligible	Negligible adverse to Minor adverse (walkers)	Not significant	
Representative Viewpoint 10: View north-east from minor road, to the north of Overtown	Medium	The upper part of the tallest construction plant.	Short term Direct	Negligible	Negligible adverse	Not significant	
Representative Viewpoint 11: View east from public bridleway WR36, adjacent to Application Site	High	Removal of trees, construction of ancillary buildings behind hoarding.	Short term Direct	Medium	Moderate adverse	Not significant	
Representative Viewpoint 12: View north-west-north from B4005, at junction of entrance to Burderop Park (house)	Medium	The upper part of the tallest construction plant.	Short term Direct	Negligible	Negligible adverse	Not significant	
Operational phase							
Landscape resources and receptors							
NCA 108: Upper Thames Clay Vales	Medium	New data centre, ancillary buildings, replacement fencing and tree	Long term Direct	Negligible	Negligible adverse	Not significant	The long-term effects on landscape character would reduce over time,

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
		and woodland planting. Establishment of a new wildflower meadow.					as the replacement planting matures.
NCA 116: Berkshire and Marlborough Downs	Medium	Replacement security fencing.	Long term Direct	Negligible	Negligible adverse	Not significant	The long-term effects on landscape character would reduce over time, as the replacement planting matures.
North Wessex Downs AONB LCA 5B: Chiseldon - Wanborough Plain	High	New data centre, ancillary buildings, replacement fencing and tree and woodland planting. Establishment of a new wildflower meadow. No impact on the key characteristics of the AONB LCA or the Special Qualities of the AONB.	Long term Direct	Small	Moderate adverse	Not significant	The long-term effects on landscape character would reduce over time, as the replacement planting matures.
North Wessex Downs AONB LCAs 1A Marlborough Downs; AONB LCA 5B Chiseldon – Wanborough Plain; AONB LCA 5F Liddington to Letcombe Open Scarp; and AONB LCA 6C Wanborough Vale.	High	View of flues and upper part of data centre. No impact on the key characteristics of the AONB LCA or the Special Qualities of the AONB.	Long term Indirect	Negligible	Minor adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Swindon Borough (SB) LCA v Downs Plains	Medium	New data centre, ancillary buildings, replacement fencing and tree and woodland planting. Establishment of a new wildflower meadow.	Long term Direct	Small	Minor adverse	Not significant	The long-term effects on landscape character would reduce over time, as the replacement planting matures.
SB LCA ii Vale of the White Horse; SB LCA iv Scarp; SB LCA v Downs Plains; and, SB LCA vi High Downs. Wiltshire LCA Marlborough Downs	Medium	View of flues and upper part of data centre.	Long term Indirect	Negligible	Negligible adverse	Not significant	
Great Western Community Forest	Medium	New data centre, ancillary buildings, replacement fencing and tree and woodland planting. Establishment of a new wildflower meadow.	Long term Direct	Medium	Moderate adverse	Not significant	The long-term effects on landscape character would reduce over time, as the replacement planting matures.
Application Site characteristics	Medium	New data centre, ancillary buildings, replacement fencing and tree and woodland planting. Establishment of a new wildflower meadow.	Long term Direct	Small	Minor adverse	Not significant	The long-term effects on landscape character would reduce over time, as the replacement planting matures.
Night time landscape effects	Medium	Lights within data centre campus.	Long term Direct	Small	Minor adverse	Not significant	
Visual receptors							

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Public Rights of Way	High	Bridleway WR36 - New data centre, ancillary buildings, replacement fencing and tree and woodland planting. All others – View of flues and upper part of data centre.	Long term Direct	Negligible and Medium (WR36)	Minor adverse Moderate adverse (WR36)	Not significant	The long-term effects on visual receptors would reduce over time, as the replacement planting matures.
Access Land	High	View of flues and upper part of data centre.	Long term Direct	Negligible	Negligible adverse to Minor adverse	Not significant	
Public Open Space including Barbury Country Park	Medium to High (Barbury Country Park)	View of flues and upper part of data centre.	Long term Direct	Negligible	Negligible adverse to Minor adverse (Barbury Country Park)	Not significant	
Road network	Medium High (cyclists on National Cycle Routes)	Limited views of new entrance and potentially of ancillary buildings. View of flues and upper part of data centre.	Long term Direct	Negligible to Small	Negligible adverse to Minor adverse Minor adverse to Moderate adverse (cyclists using National Cycle Routes)	Not significant	
Representative Viewpoint 1: View south-west from children's play area at Upper Wanborough	Medium	View of flues and upper part of data centre.	Long term Direct	Negligible	Negligible adverse	Not significant	
Representative Viewpoint 2: View south-west from public footpath WA3, to the south of Wanborough	High	View of flues and upper part of data centre.	Long term Direct	Negligible	Minor adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Representative Viewpoint 3: View west from junction of public footpath LN18 with The Ridgeway (road) north of Liddington Castle hillfort	High (walkers) Medium (people in vehicles and cyclists)	View of flues and upper part of data centre.	Long term Direct	Negligible	Negligible adverse to Minor adverse (walkers)	Not significant	
Representative Viewpoint 4: View west from triangulation point and viewing platform at Liddington Castle hillfort	High	View of flues and upper part of data centre.	Long term Direct	Negligible	Minor adverse	Not significant	
Representative Viewpoint 5: View west-north-west from The Ridgeway National Trail, south of Liddington Castle hillfort	High	Potential view of top of flues.	Long term Direct	No Change to Negligible	None to Minor adverse	Not significant	
Representative Viewpoint 6: View north-east-north from the northernmost point of Barbury Castle hillfort	High	View of flues and upper part of data centre.	Long term Direct	Negligible	Minor adverse	Not significant	
Representative Viewpoint 7: View north-east-north from Barbury Castle Country Park	High	View of flues and upper part of data centre.	Long term Direct	Negligible	Minor adverse	Not significant	
Representative Viewpoint 8: View north from seating area adjacent to car park at Barbury Castle Country Park	High	View of flues and upper part of data centre.	Long term Direct	Negligible	Minor adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Representative Viewpoint 9: Viewpoint 9: View north-east from public footpath WR25/minor road to the south of Overtown	High (walkers) to Medium people in vehicles and cyclists)	View of flues and upper part of data centre.	Long term Direct	Negligible	Negligible adverse to Minor adverse (walkers)	Not significant	
Representative Viewpoint 10: View north-east from minor road, to the north of Overtown	Medium	View of flues and upper part of data centre.	Long term Direct	Negligible	Negligible adverse	Not significant	
Representative Viewpoint 11: View east from public bridleway WR36, adjacent to Application Site	High	Limited views of ancillary buildings and replacement fencing. Views of new planting. Potential glimpses of parts of the data centre building.	Long term Direct	Medium	Moderate adverse	Not significant	The long-term effects on visual receptors would reduce over time, as the replacement planting matures.
Representative Viewpoint 12: View north-west-north from B4005, at junction of entrance to Burderop Park (house)	Medium	No views	Long term Direct	No Change	None	Not significant	
Night time visual effects	Medium	Lights within data centre campus	Long term Direct	Small	Minor adverse	Not significant	

7 HISTORIC ENVIRONMENT

7.1 Introduction

7.1.1 The purpose of this chapter of the Environmental Statement (ES) is to assess the effects of the redevelopment of land at the Old Burderop Hospital Site (hereafter referred to as the 'Application Site') to provide a replacement data storage facility (the 'proposed development') on all aspects of the historic environment, including buried archaeological remains, historic buildings and historic areas. In line with the terminology used in the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019), these resources are referred to as *'heritage assets'*. A heritage asset is defined as '*A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions because of its heritage interest*'.

7.1.2 The assessment addresses short-term construction effects as well as any longer-term effects resulting from the operation of the proposed development.

7.1.3 The assessment examines heritage assets within the Application Site and its immediate vicinity, together with any heritage assets of the highest level of significance located within a wider area over which it is considered possible that the proposed development could affect the significance of such assets as a result of change within their settings.

7.1.4 Planning policy and guidance of relevance to the Application Site and the proposed development insofar as it relates to the historic environment is also considered in this chapter.

7.2 Assessment Methodology

Planning Policy Context

National Planning Policy

7.2.1 The NPPF (Ministry of Housing, Communities and Local Government, 2019) provides advice to planning authorities regarding the protection of heritage assets within the planning process. The NPPF deals with all types of heritage assets in a single document. It takes an integrated approach to the historic environment, moving beyond a distinction between buildings, landscapes and archaeological remains. Further details are provided in Appendix 7.1 of this ES.

7.2.2 The strong message from the NPPF is that the effect of the proposed development on the significance of the heritage asset is the principal concern, rather than the effect on the asset itself.

Local Planning Policy

7.2.3 The Application Site lies within the administrative area of Swindon Borough Council. The adopted local plan for the area comprises the Swindon Borough Local Plan 2026 (adopted March 2015). The relevant policies are *EN5: Landscape Character and Historic Landscape* and *EN10: Historic Environment and Heritage Assets*; full details are provided in Appendix 7.1 of this ES.

7.2.4 The local plan is currently under review for the period to 2036, and in December 2019 Swindon Borough Council published the Regulation 19 Proposed Submission Draft Version of the new local plan. The public consultation on this draft ended on 31 January 2020. Full details of the policies relevant to historic environment in the Regulation 19 Proposed Submission Draft Version are provided in Appendix 7.1 of this ES.

Relevant Legislation and Guidance

7.2.5 Statutory protection for archaeological remains is principally enshrined in the Ancient Monuments and Archaeological Areas Act (1979) amended by the National Heritage Acts (1983; 2002). Nationally important archaeological sites are listed in a Schedule of Monuments and are afforded statutory protection.

7.2.6 The Planning (Listed Buildings and Conservation Areas) Act (1990) and the Town and County Planning Act (1990) provide statutory protection to listed buildings and their settings and present measures to designate and preserve the character and appearance of Conservation Areas.

7.2.7 A.3 Section 66 of the Planning (Listed Buildings and Conservation Areas) Act 1990 imposes a general duty as respects listed buildings in the exercise of planning functions. Subsection (1) provides that: *'In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses*'.

7.2.8 Historic Parks and Gardens, and Historic Battlefields, have received recognition under the National Heritage Acts. Such sites are described on Registers maintained by Historic England for the Department for Digital, Culture, Media and Sport (DDCMS), but such designation does not afford statutory protection.

7.2.9 The NPPF is supported by the web-based National Planning Practice Guidance (NPPG) (Ministry of Housing, Communities and Local Government, 2019). With regard to the section that deals with conserving and enhancing the historic environment, this was last updated on 23 July 2019 (section ID:18a). The NPPG provides advice on specific issues such as '*What is 'significance*'' and '*What is the setting of a heritage asset and how should it be taken into account?*'

7.2.10 More detailed guidance on the application of national planning policies with regard to the historic environment is provided in a suite of documents published by Historic England. The following documents are considered relevant to this chapter of the ES:

- Historic Environment Good Practice Advice in Planning Note 1: The Historic Environment in Local Plans (Historic England, 2015a);
- Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment (Historic England, 2015b); and
- Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (2nd edition, Historic England, 2017).

7.2.11 Additional more detailed guidance on specific topics is provided in a series of Historic England Advice Notes (HEANS). HEAN12 was published in October 2019 and provides advice on Analysing Significance in Heritage Assets.

7.2.12 Further details regarding the legislation and guidance relevant to this chapter is provided in Appendix 7.1 of this ES.

Study Areas

7.2.13 Data regarding designated heritage assets were initially gathered for a study area extending approximately 5 km from the centre of the Application Site (Figure 7.1). Assessment was then undertaken of those designated heritage assets whose significance could be affected as a result of the proposed development causing change within their settings, taking into account the computer-generated Zone of Theoretical Visibility (ZTV) for the proposed development (see Figure 7.1).

7.2.14 Where the ZTV indicated that there was no intervisibility between a designated heritage asset and the proposed development, no detailed assessment of impacts and effects has been undertaken. Consideration was given with regard to potential situations where both the proposed development and a designated heritage asset may be visible in the same view (but without intervisibility between the asset and the proposed development), however no such situations were identified.

7.2.15 Consideration was also given to potential situations in which the proposed development could impact on the significance of a designated heritage asset as a result of a non-visual change within its setting (e.g., noise, odour) but again no such situations were identified.

7.2.16 Data for non-designated heritage assets were acquired for an area extending approximately 1 km from the outer edge of the Application Site (see Figure 7.2).

7.2.17 The selection of these study areas was based on professional judgement and experience.

Baseline Methodology

7.2.18 The baseline studies were undertaken with regard to the relevant guidance issued by the Chartered Institute for Archaeologists (CIfA), specifically the following document:

- Standard and guidance for historic environment desk-based assessment (CIfA, 2020).

7.2.19 Data regarding known heritage assets (designated and undesignated) were sought from a number of sources including the Wiltshire and Swindon Historic Environment Record (HER) maintained by Wiltshire Council and the National Heritage List for England (maintained by Historic England). The Environment Agency LiDAR dataset (1 m DSM) was also consulted. A walkover of the Application Site and the surrounding area was undertaken in October 2020.

7.2.20 At the time of data collection, the Wiltshire and Swindon History Centre was closed due to the COVID-19 pandemic. As a result, it was not possible to consult any material held at this facility.

Consultation

7.2.21 A summary of all consultation with stakeholders or consultees (such as the local planning authority) is provided in **Table 7.1** below.

Table 7.1: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How/ Where Addressed
9 December 2020	Historic England	
Swindon Borough Council Pre-Application Advice	Concerned that the proposed development could result in a significant impact on the historic environment. In particular the impact on the following assets should be take into consideration: • Liddington Castle (Scheduled Monument) • Medieval remains at Overtown (Scheduled Monument) • Burderop House (Grade II* listed building) • Overton House (Grade II* listed building) • Hodson Conservation Area	The potential impacts on designated heritage assets as a result of change within their settings is presented in section 7.6 of this chapter.

Date	Consultee and Issues Raised	How/ Where Addressed
	• Badbury Conservation Area • Wroughton Conservation Area	
9 December 2020	Conservation Officer	
Swindon Borough Council Pre-Application Advice	Relevant legislative and policy considerations include the Planning (Listed Buildings and Conservation Areas) Act 1990, the National Planning Policy Framework and Local Plan Policies EN5 and EN10.	Relevant legislation and planning policies are summarised in section 7.2 of this chapter and further described in Appendix 7.1.
	Site is within the setting of the Grade II* listed mansion of Burderop Park and several other associated listed buildings, features and parkland, also other heritage assets as identified by Historic England. In addition to the more obvious heritage assets within the overall historic landscape context is Ladder Lane (aka Jacobs Ladder – Bridleway WR36). This is a historic route and with potential historic association to 'Jefferies Land' – referring to the author Richard Jefferies (1848-1887).	The potential impacts on designated heritage assets as a result of change within their settings is presented in section 7.6 of this chapter. The potential impacts on non-designated heritage assets (including Ladder Lane) is presented in section 7.6 of this chapter.
	The effect upon heritage assets and their setting are the main heritage considerations. Irrespective of any need for an Environmental Statement (ES) as part of an EIA requirement a Heritage Statement/Heritage Assessment (HS/HA) should be undertaken. It should fully utilise accepted guidance in its assessment and analysis of the historic environment.	This chapter of the ES, along with any Appendices, represents the Heritage Statement provided in support of the application. The assessment presented within this chapter has been prepared in accordance with all relevant guidance.
9 December 2020	Archaeology Advisor	
Swindon Borough Council Pre-Application Advice	This is clearly an area of archaeological interest and potential. There has been some prior development across the proposed development area, but the extent of archaeological survival is currently unknown as it has not been previously evaluated or assessed. I advise that a phased programme of archaeological evaluation is undertaken and reported on prior to determination of any planning application. This will need to take the form of a desk assessment, geophysical survey and trial trenching. If an EIA is deemed necessary, the results of the evaluation will need to inform the assessment of the impact of	The historic environment baseline presented within section 7.3 of this chapter represents the desk assessment referred to in the Pre-Application Advice. Visual examination of the Application Site along with review of the Ground Investigation Report for the proposed Development indicates the presence of recent 'made ground' across most of the Application Site, in excess of 3 m in thickness in some areas. This represents material generated from the demolition of former hospital buildings within the Application Site which was then used to landscape the area as part of works associated with

Date	Consultee and Issues Raised	How/ Where Addressed
	development on the archaeological resource.	the construction of the current data centres. The extent and depth of the 'made ground' means that geophysical survey and trial trenching are not appropriate methodologies for establishing the potential for the presence of features or deposits of archaeological interest. The made ground also contains asbestos which would be a health and safety concern with regard to trial trenching. This issue was discussed with the Archaeology Advisor to Swindon Borough Council in a telephone call on 19 January 2021 and in a second call on 04 March 2021. Pre-submission archaeological work would be very difficult and unlikely to provide meaningful results. A better approach would be to establish a more bespoke methodology for archaeological investigation that can be undertaken at post-consent stage. This is most likely to take the form of archaeological monitoring during removal of made ground in areas where this activity will result in the exposure of the underlying deposits. This archaeological work can be required through an appropriately worded condition attached to the planning consent.
15 January 2020 Swindon Borough Council Scoping Response	Development Control This is an area of some archaeological potential which has not been previously assessed or evaluated. The EIA chapter on cultural heritage will need to be based on a full assessment, including the results of fieldwork evaluation. I note that this is not referred to in the archaeology section of the Scoping Report.	The extent and depth of the 'made ground' means that geophysical survey and trial trenching are not appropriate methodologies for establishing the potential for the presence of features or deposits of archaeological interest. This issue was discussed with the Archaeology Advisor to Swindon Borough Council in a telephone call on 19 January 2021 and in a second call on 04 March 2021.
05 January Historic England Scoping Response	Our initial assessment shows the attached list of designated heritage assets within 2.5 km of the proposed development. We would draw your attention, in particular, to the following: • Medieval remains at Overtown (Scheduled Monument) • Burderop House (Grade II* listed building) • Overton House (Grade II* listed building) • Hodson Conservation Area	The assessment of potential impacts on designated heritage assets as a result of change within their settings is presented in section 7.6 of this chapter.

Date	Consultee and Issues Raised	How/ Where Addressed
	• Wroughton Conservation Area	
	We would also expect the Environmental Statement to consider the potential impacts on non-designated features of historic, architectural, archaeological or artistic interest, since these can also be of national importance and make an important contribution to the character and local distinctiveness of an area and its sense of place. This information is available via the local authority Historic Environment Record and relevant local authority staff.	The assessment of potential impacts on non-designated heritage assets is presented in section 7.6 of this chapter. The local authority Historic Environment Record has been consulted.
	We would strongly recommend that you involve the Conservation Officer and archaeological staff at Swindon Borough Council in the development of this assessment. They are best placed to advise on: local historic environment issues and priorities; how the proposal can be tailored to avoid and minimise potential adverse impacts on the historic environment; the nature and design of any required mitigation measures; and opportunities for securing wider benefits for the future conservation and management of heritage assets.	The relevant advisors at Swindon Borough Council have been consulted, either directly or through the process of consultation at pre-application and scoping stages.
	The assessment should also take account of the potential impact which associated activities (such as construction, servicing and maintenance, and associated traffic) might have upon perceptions, understanding and appreciation of the heritage assets in the area. The assessment should also consider, where appropriate, the likelihood of alterations to drainage patterns that might lead to in situ decomposition or destruction of below ground archaeological remains and deposits, and can also lead to subsidence of buildings and monuments.	Construction activities have been included within the assessment of impacts and effects presented in this chapter of the ES. The proposed development would not result in the alteration of drainage patterns.
	The scoping report suggests that there will be no adverse impacts, but does not consider a number of sites within the 2.5 km radius set out above. We would also request that due consideration is given to seasonal changes that will have an impact on visibility into and out of the site throughout the year.	Where designated heritage assets within 2.5 km of the Application Site are not included within the assessment presented in section 7.6 of this chapter, this is because the proposed development would not represent a change within their setting. This is explained within the chapter.
	Whilst the new housing development approved within Burderop Park will	

Date	Consultee and Issues Raised	How/ Where Addressed
	have an adverse impact on its setting, this should not pre-determine the potential for the Data Centre to further exacerbate or introduce new harm within the setting of the asset. Appropriate assessment should therefore be undertaken to explore this potential.	The assessment of likely impacts and effects relating to the heritage assets at Burderop Park takes account of the new housing development here which is currently under construction.

Assessment Criteria and Assignment of Significance

7.2.22 Appropriate baseline data have been collected with regard to known and potential heritage assets that could potentially be affected by the proposed development. The importance (or value) of each asset has been assessed, including the contribution made by the setting of the asset, and the likely magnitude of impact upon each asset has been considered using recognised methodologies and best practice.

7.2.23 Based on a matrix approach that measures asset value/importance alongside impact magnitude; professional judgement has been used to assess the significance of the effect of the proposed development on each identified asset. In a recent good practice note relating to the settings of heritage assets, Historic England has advised that '*Cases involving more significant assets, multiple assets, or changes considered likely to have a major effect on significance will require a more detailed approach to analysis, often taking place within the framework of Environmental Impact Assessment procedures. Each of the stages may involve detailed assessment techniques and complex forms of analysis such as viewshed analyses, sensitivity matrices and scoring systems. Whilst these may assist analysis to some degree, as setting and views are matters of qualitative and expert judgement, they cannot provide a systematic answer. Historic England recommends that, when submitted as part of the Design and Access Statement, Environmental Statement or evidence to a public Inquiry, technical analyses of this type should be seen primarily as material supporting a clearly expressed and non-technical narrative argument that sets out 'what matters and why' in terms of the heritage significance and setting of the assets affected, together with the effects of the development upon them*' (page 8, Historic England, 2017).

7.2.24 The types of heritage asset considered within this assessment include:

- Nationally designated heritage assets such as scheduled monuments, listed buildings and Registered Parks and Gardens of Special Historic Interest;
- Locally designated heritage assets such as Conservation Areas;
- Non-designated heritage assets, such as buried archaeological remains and other sites recorded on the HER, sites of former buildings or other features recorded on historic maps of the area or in primary and secondary documentary sources; and
- The overall historic landscape.

7.2.25 Heritage assets can be affected in a number of ways, principally:

- Physical loss of, or damage to, archaeological remains, historic buildings and historic landscapes;
- Changes within the settings of heritage assets resulting in loss of significance (of the asset); and
- Effects on the quality and integrity of the overall historic landscape.

7.2.26 In order to reach an understanding of the level of any effect that a project may have on a heritage asset, it is necessary to understand the importance or value of that asset. For example, is it important at a national level or at a local level?

7.2.27 In the NPPF, 'significance' (for heritage policy) is defined as: '*The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting*' (Ministry of Housing Communities and Local Government, 2019 Annex 2: Glossary).

7.2.28 These levels of interest broadly tie in with previous guidance from English Heritage (now Historic England) expressed in the document Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage, 2008). This provides guidance on understanding heritage values and also includes a section (Section 6) advising on how to assess heritage significance.

7.2.29 According to the guidance published by English Heritage (2008), heritage values fall into four inter-related groups:

- Evidential value – the potential of a place to yield evidence about past human activity;
- Historical value - this derives from the ways in which past people, events and aspects of life can be connected through a place to the present. This value tends to be illustrative (providing insights into past communities and their activities) or associative (association with a notable family, person, event or movement);
- Aesthetic value – this derives from the ways in which people draw sensory and intellectual stimulation from a place; and
- Communal value – this derives from the meaning of a place for the people who relate to it, or for whom it figures in their collective experience or memory.

7.2.30 Guidance on the issue of 'setting' in relation to heritage assets is provided in Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (2nd edition, Historic England, 2017). As with the NPPF the document defines setting as *'the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve*'. Setting is also described as being a separate term to curtilage, character and context.

7.2.31 The guidance emphasises that setting is not a heritage asset, nor a heritage designation, and that its importance lies in what it contributes to the significance of the heritage asset, or the ability to appreciate that significance. It also states that elements of setting may make a positive, negative or neutral contribution to the significance of the heritage asset, including below-ground archaeological remains.

7.2.32 While setting is largely a visual term, with views considered to be an important consideration in any assessment of the contribution that setting makes to the significance of an asset, and thus the way in which an asset is experienced, setting also encompasses other environmental factors including noise, vibration and odour. Historical and cultural associations may also form part of the asset's setting, which can inform or enhance the significance of a heritage asset.

7.2.33 For the purposes of Environmental Impact Assessment (EIA), a level of importance needs to be placed on each heritage asset that could potentially be affected by the project. This has been done using the assessment methodology described in this section of the chapter, which provides a basic framework for the assessment of impacts and effects. However, a more considered narrative regarding the values which help to establish that level of importance is presented within

the baseline description and assessment sections of the chapter. This is in line with the approach proposed by Historic England (see paragraph 7.2.23 above).

Assessment of Importance

7.2.34 There are no national government guidelines for evaluating the importance or significance (and hence the 'value') of heritage assets. For archaeological remains, the Department for Culture, Media and Sport (DCMS) (now DDCMS) adopted a series of recommended (i.e. non-statutory) criteria for use in the determination of national importance when scheduling ancient monuments (DCMS, 2013). The criteria include period, rarity, documentation, group value, survival/condition, fragility/vulnerability, diversity and potential and can be used as a basis for the assessment of the importance of historic remains and archaeological sites. However, the document also states that these criteria '*should not be regarded as definitive; but as indicators which contribute to a wider judgement based on the individual circumstances of a case*'.

7.2.35 The criteria described above could be used as a basis for the assessment of the importance of archaeological remains of less than national importance. However, the categories of regional and district/local importance are less clearly established than that of national importance, and implicitly relate to local, district and regional priorities which themselves will be varied within and between areas. Local, district and regional research agenda may be available and local plans may also assist in this process.

7.2.36 Clearly a high degree of professional judgement is necessary, guided by acknowledged standards, designations and priorities. It is also important to recognise that buried archaeological remains may not be well understood at the time of assessment and their importance can therefore be uncertain.

7.2.37 For historic buildings, assessment of importance is usually based on the designations used in the listing process. However, where historic buildings are not listed, or where the listing grade may be in need of updating, professional judgement may be used.

7.2.38 The criteria used in establishing the importance of historic buildings within the listing procedure include architectural interest, historic interest, close historic association (with nationally important people or events) and group value. Age and rarity are also taken into account; in general (where surviving in original or near-original condition) all buildings of pre-1700 date are listed, most of 1700-1840 date are listed, those of 1840-1914 date are more selectively listed, and thereafter even more selectively. Specific criteria have been developed for buildings of 20th century date.

7.2.39 At a local level, buildings may be valued for their association with local events and people or for their role in the community.

7.2.40 The only detailed guidance from any national agency regarding cultural heritage and EIA is from the Highways Agency and is expressed in Guidance Note 208/07, which previously formed part of the Design Manual for Roads and Bridges (DMRB), volume II, section 3, part 2, HA208/07 (Highways Agency et al., 2007). **Table 7.2** is primarily based on HA208/07 along with guidance on assessment published by the International Council on Monuments and Sites (ICOMOS, 2010), and has been used to inform the current assessment.

Table 7.2: Criteria used to determine the importance (sensitivity) of heritage assets

Heritage Importance (Sensitivity)	Criteria
Very High	Heritage assets of international importance. World Heritage Sites and the individual attributes that convey their Outstanding Universal Value.

Heritage Importance (Sensitivity)	Criteria
	Areas associated with intangible historic activities and areas with associations with particular innovations, scientific developments, movements or individuals of global importance. Assets that can contribute significantly to acknowledged international research objectives.
High	Heritage assets of national importance. Scheduled Monuments, Listed Buildings (Grade I, II*), Registered Historic Parks and Gardens (Grade I, II*), Registered Battlefields, Protected Wrecks, Protected Military Remains. Other listed buildings that can be shown to have exceptional qualities in their fabric or historical association not adequately reflected in the listing grade. Unscheduled sites and monuments of schedulable quality and/or importance including those discovered through the course of evaluation or mitigation. Archaeological assets that can contribute significantly to acknowledged national research objectives. Conservation Areas containing very important buildings. Undesignated structures of clear national importance. Designated and undesignated historic landscapes of outstanding interest, or high quality and importance and of demonstrable national value. Well-preserved historic landscapes, exhibiting considerable coherence, time-depth or other critical factors. Palaeogeographic features with a demonstrable high potential to include artefactual and/or palaeoenvironmental material, possibly as part of a prehistoric site or landscape. Undesignated sites of wrecked ships and aircraft that are demonstrably of equivalent archaeological importance to those already designated.
Medium	Heritage assets of regional importance. Conservation Areas, Grade II Listed Buildings and Registered Historic Parks and Gardens. Undesignated archaeological assets that can contribute to regional research objectives. Historic townscapes and landscapes with reasonable coherence, time-depth and other critical factor(s). Unlisted assets that can be shown to have exceptional qualities or historic association. Designated special historic landscapes. Undesignated historic landscapes that would justify special historic landscape designation, landscapes of regional value. Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factors. Prehistoric deposits with moderate potential to contribute to an understanding of the palaeoenvironment. Undesignated wrecks of ships or aircraft that have moderate potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation.
Low	Heritage assets with importance to local interest groups or that contribute to local research objectives. Locally Listed Buildings and Sites of Importance within a district level. Robust undesignated assets compromised by poor preservation and/or poor contextual associations. Robust undesignated historic landscapes. Historic landscapes with importance to local interest groups. Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations. Prehistoric deposits with low potential to contribute to an understanding of the palaeoenvironment.

Heritage Importance (Sensitivity)	Criteria
	Undesignated wrecks of ships or aircraft that have low potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation.
Negligible	Assets with little or no archaeological or historical interest due to poor preservation or survival. Buildings of no architectural or historic note; buildings of an intrusive character. Landscapes with little or no significant historical interest.
Unknown	The importance of the asset cannot be ascertained from available evidence.

Settings

7.2.41 The Historic Environment Good Practice Guide in Planning Note 3 (Historic England, 2017) advocates a systematic and staged approach to the assessment of the implications of development in terms of their effects on the settings of heritage assets.

7.2.42 **Stage 1** of the approach is '*identifying the heritage assets affected and their settings*'. This initial step was carried out by undertaking documentary research, assessing data sourced from the HER and national heritage datasets, through review of the ZTV for the proposed development (Figure 7.1) and by undertaking a field visit to the Application Site and its wider surrounds.

7.2.43 **Stage 2** requires consideration of '*whether, how and to what degree these settings make a contribution to the significance of the heritage asset(s)*'. The guidance states that this stage of the assessment should first address the key attributes of the heritage asset itself and then consider:

1) the physical surroundings of the asset, including its relationship with other heritage assets;

2) the way the asset is appreciated; and

3) the asset's associations and patterns of use.

7.2.44 Elements of a setting may make a positive or negative contribution to the value of a heritage asset, may affect the ability to appreciate that value, or may be neutral. The criteria for grading the contribution made by the setting to the importance of a heritage asset is set out in **Table 7.3** below.

7.2.45 Stage 3 involves assessing the effect of the proposed development on the importance of the asset(s). This stage of the assessment addresses the key attributes of the proposed development, such as its:

- Location and siting;
- Form and appearance;
- Additional effects; and
- Permanence.

7.2.46 **Stage 4** of the guidance should explore opportunities for '*maximising enhancement and minimising harm'*, while **Stage 5** is to '*make and document the decision and monitor outcomes*'.

Table 7.3: Criteria for establishing the contribution of setting to the importance of heritage assets

Contribution of Setting to Heritage Importance (Sensitivity)	Criteria
High	A setting which possesses key attributes which make a strong positive contribution to the understanding and/or appreciation of the values that embody its importance.

Contribution of Setting to Heritage Importance (Sensitivity)	Criteria
Medium	A setting which possesses some key attributes which make a positive contribution to the understanding and/or appreciation of the values that embody its importance
Low	A setting which possesses some attributes which make some/ little positive contribution to the understanding and/or appreciation of the values that embody its importance
None	A setting which makes a neutral or negative contribution to the understanding and/or appreciation of the values that embody its importance

7.2.47 As a result of the application of the staged approach, heritage assets are either 'scoped in' or 'scoped out' of further assessment. Where it has been identified that the setting of the heritage asset is such that there is no potential for its setting, and therefore the importance of the asset, to be affected by the presence of the proposed scheme, the asset is not considered further in the assessment.

7.2.48 The assessment of views, which often play a key part in assessing the perceived settings of heritage assets, was undertaken in accordance with the Landscape Institute's Guidelines for Landscape and Visual Impact Assessment (2013) and Technical Guidance Note 06/19 (2019).

7.2.49 It is important to note that there is no such thing as an impact or effect on the setting of a heritage asset: the impact is on the importance of the asset as a result of a change within its setting. Moreover, the setting of a designated heritage asset is not part of the designation. As GPA3 states: '*Setting is not itself a heritage asset, nor a heritage designation…its importance lies in what it contributes to the significance of the heritage asset or to the ability to appreciate that significance*'. (Historic England, 2017, paragraph 9, page 4).

Magnitude of Impact

7.2.50 The assessment of the magnitude of change (impact) is the identification of the degree of change arising from the proposed development. The assignment of a magnitude of impact is a matter of professional judgement. Impacts may be adverse, neutral or beneficial.

7.2.51 The magnitude of change (impact) on heritage assets has been assigned a value of High, Medium, Low, Negligible and No Change, which can be either adverse or beneficial. **Table 7.4** below presents criteria for determining the magnitude of adverse impacts, based on the assessment guides in the former DMRB (Highways Agency et al., 2007).

Table 7.4: Criteria for determining the magnitude of change (impact) - adverse

Magnitude of Impact	Physical	Setting
High	Complete destruction or a fundamental, substantial change of an asset or historic environment feature. Change to most or all key elements of the historic environment, such that the resource is totally altered.	A comprehensive and fundamental change to the key positive attributes of a heritage asset's setting, such that the setting is substantially or totally altered.
Medium	A considerable change or appreciable difference to the existing baseline. Changes to many key elements of the historic environment, such that the resource is clearly modified.	A considerable change to the key positive attributes of a heritage asset's setting such that its contribution to the importance of the asset is appreciably reduced.
Low	A minor change to the baseline condition of a heritage asset.	A limited change to the key positive attributes of a heritage asset's setting resulting in a slight but discernible

Magnitude of Impact	Physical	Setting
	Changes to the key elements of the historic environment, such that the asset is slightly altered.	reduction to its contribution to the asset's importance.
Negligible	A barely distinguishable change to the historic environment baseline.	A very slight change to the key positive attributes of a heritage asset's setting such that the change is barely distinguishable.
No Change	No loss or alteration or characteristics, features or elements; no observable impact.	No loss or alteration or characteristics, features or elements; no observable impact.

Significance of Effects

7.2.52 The assessment of the significance of an effect results from a consideration of the importance/ value of the asset, the contribution of its setting to that importance, and the degree of impact upon it as a result of the proposed development. Expressed as a simple equation:

Heritage Importance X Impact (of proposed development) = Effect

7.2.53 The interaction of the magnitude of change (impact) and the importance of the heritage asset results in the significance of effect, which is expressed as Substantial, Major, Moderate, Minor, Negligible, or No Change. The effect can be adverse, beneficial or neutral.

7.2.54 The matrix used for the assessment of the significance of effect is shown in **Table 7.5** below. Where the matrix provides a split in the level of effects, e.g. minor or moderate, the assessor has exercised professional judgement in determining which of the levels is most appropriate.

7.2.55 The intention of the EIA is to identify likely significant effects, although there is no published guidance on what level of effect is considered significant. As such, the methodology for this assessment has taken the view that any effects with a significance level of minor or less are considered to be **not significant** in EIA terms. It is not the purpose of EIA to identify all effects.

Table 7.5: Matrix used for the assessment of the significance of an effect

Sensitivity	Magnitude of Impact				
	No Change	**Negligible**	**Low**	**Medium**	**High**
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

7.2.56 The broad definitions of the terms used are as follows:

- ***Substantial***: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.

- ***Major***: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
- ***Moderate***: These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
- ***Minor***: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
- ***Negligible***: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

7.2.57 It is important to not make a direct correlation between EIA and NPPF processes in assessing impacts arising from a proposed development. The role of EIA is to identify likely significant effects, which can arise from Low, Medium, High or Very High impacts, and depend on the value/importance of a heritage asset. The NPPF looks at harm to, or loss of, the heritage significance of an asset, asking if the harm is substantial, or less than substantial, and sets up tests depending on the value/ importance of the asset. Substantial harm is a particularly high test. There is no direct correlation between the results and terminology of the NPPF process and those of the EIA process, and no current published guidance on this issue.

Limitations of the Assessment

7.2.58 No technical deficiencies or limitations in available data have been encountered in the compilation of the available evidence for the historic environment baseline. The lack of access to the Wiltshire and Swindon History Centre is not considered to be a significant issue. With the exception of the site visit, all of the work carried out in order to understand the baseline position has been desk-based; there have been no purposive site investigations. This is considered sufficient to form the basis of a robust assessment for EIA purposes.

7.3 Baseline Environment

Timescales used in this report

Prehistoric

Palaeolithic	900,000	-	12,000 BC
Mesolithic	12,000	-	4,000 BC
Neolithic	4,000	-	1,800 BC
Bronze Age	1,800	-	600 BC
Iron Age	600	-	AD 43

Historic

Roman	AD 43	-	410
Saxon/Early Medieval	AD 410	-	1066
Medieval	AD 1066	-	1485
Post-medieval	AD 1486	-	1799
Modern	AD 1800	-	Present

7.3.1 The baseline study has identified a number of known heritage assets within the defined study areas. These assets are indicated on Figures 7.1 and 7.2 and further details are presented within a Gazetteer (Appendix 7.2 of this ES).

Designated Heritage Assets

7.3.2 There are no designated heritage assets within the Application Site. The nearest Scheduled Monument is located approximately 800 m south west of the Application Site. This comprises the earthwork remains of medieval settlement to the south of Overtown House and Overtown Manor (Site **1**).

7.3.3 There is a group of Scheduled Monuments to the south of the Application Site and towards the edge of the 5 km study area. These include the Iron Age hillfort and an adjacent Bronze Age bowl barrow at Barbury Castle (Site **2**), a saucer barrow just to the west of the hillfort (Site **3**) and a group of three bowl barrows just a bit further to the west (Site **4**). The saucer barrow and the bowl barrows therefore represent a cemetery complex of probable Bronze Age date.

7.3.4 To the north of the hillfort is an earthwork enclosure of probable Roman date within which is a medieval or post-medieval dewpond (Site **5**), just beyond which is another Scheduled Monument which comprises two curvilinear earthwork enclosures linked by a linear earthwork *c*. 80 m in length (Site **6**). This group of features remains undated but is likely to be of later prehistoric or possibly Roman date.

7.3.5 To the south of Barbury Castle is a deserted medieval village which also includes some evidence of Roman activity (Site **7**). The remains of the medieval village include well-preserved building platforms along with hollow-ways and enclosures. East of Barbury Castle is an extensive late prehistoric field system overlain by an earthwork enclosure which could be much later in date (Site **8**). To the north of the field system is a pair of bowl barrows of probable Bronze Age date (Site **9**) whilst to the east is a single disc barrow that has been partially excavated and has been confirmed as being Bronze Age in date (Site **10**).

7.3.6 To the east of the Application Site and towards the edge of the 5 km study area is a second Iron Age hillfort – Liddington Castle (Site **11**). Just to the west of the hillfort is a length of earthwork ditch and bank which represents a boundary feature of probable Bronze Age date (Site **12**).

7.3.7 There are several other Scheduled Monuments within the 5 km study area but these lie outside of the ZTV for the proposed development (Figure 7.1) and have not been included within this assessment.

7.3.8 To the south of the Application Site and within the historic estate of Burderop Park is a group of listed buildings. The principal house – Burderop Park – is listed at Grade II* and comprises a building of early-mid 17th century date that was given a third storey and a square plan during the 18th century (Site **13**). The main façade is to the south, whilst a two storey service wing added to the north west corner in the 19th century but designed to appear 17th century in date is separately listed at Grade II (Site **14**).

7.3.9 North of the main house at Burderop Park, an early 18th century granary within the kitchen court is Grade II listed (Site **15**). This is single-storey, timber-framed with a stone roof and sits on staddle stones. The stone-capped brick walls on the north and east side of the kitchen court are also of 18th century date and are listed at Grade II along with an attached 19th century building (Site **16**). Just to the north west of the kitchen court is a trapezoidal walled kitchen garden enclosed by a similar early 18th century stone-capped red brick wall. These walls are listed at Grade II, along with gates and gatepiers on the south and east sides of the kitchen garden (Site **17**).

7.3.10 The view south from the principal house is framed by a pair of Grade II listed buildings. The western one of these (Site **18**) is L-shaped and comprises a residential building of late 17th century

date (Burderop Cottage) which was partly rebuilt in 1768, with adjoining stables to the north. The building on the eastern side (Site **19**) comprises a coach-house of late 17th century date (altered in the early 18th century) with a stable block to the north which balances the one on the western side.

7.3.11 A large house and grounds is recorded at Burderop in the mid-16th century, and there were probably buildings present before that date. In 1619 the estate was acquired by the Calley family and the present principal house was constructed in the early-mid 17th century – possibly as a drastic rebuilding of an earlier structure. The house and estate remained in the hands of the Calley family until the 1970s, at which time it was purchased by the engineering company Halcrow. The house was converted to provide office space and reception facilities, whilst three large, interconnected 'pavilions' were constructed just to the north-west of the house to provide additional office space. Large car parks were established to the west and south-west of the house.

7.3.12 Planning permission has been granted for the demolition of the three 'pavilions' built in the 1970s, along with the construction of a number of houses to the west and south-west of the principal house. The large car parks will also be removed as part of this redevelopment of the estate, which has recently commenced.

7.3.13 Approximately 225 m east of the Application Site is a Grade II listed 17th century barn at Lodge Farm (Site **20**). Approximately 250 m south of the proposal site, and immediately south west of the grounds of Burderop Park, is a Grade II listed former toll house of probable mid-19th century date (Site **21**), whilst approximately 350 m west of the Application Ste is a Grade II listed milestone of probable early 19th century date (Site **22**).

7.3.14 To the south west of the Application Site and close to the Scheduled Monument described above (Site **1**) is a small group of listed buildings. These include the Grade II* listed Overtown House which was built around 1700 (Site **23**), with the Grade II listed garden walls to the south (Site **24**) and a Grade listed cottage now incorporated into the stables to the east (Site **25**). Both the garden walls and the cottage are of 18th or early 19th century date. Just to the west of this group is the Grade II listed Overtown Manor (Site **26**), which was built in approximately 1693 and has a large extension of mid-19th century date on its southern side. Further south is a Grade II listed former farmhouse (Site **27**) and a K8 type telephone kiosk which is also listed at Grade II (Site **28**).

7.3.15 There are numerous other listed buildings within the 5 km study area. Most of these are located outside of the ZTV for the proposed development, or are located at a distance from the Application Site such that the proposed development could not have a significant effect on them even if views from, towards or across the listed buildings included some or all of the new data centre building (Figure 7.1).

7.3.16 Many of the listed buildings are concentrated within Conservation Areas which represent the historic cores of the settlements within the area. Examples of Conservation Areas can be found at Hodson, Chiseldon, Wroughton, Badbury, Liddington, Wanborough and within Swindon. The ZTV for the proposed development shows that the proposed development would not be visible in any views from some of the Conservation Areas and from only limited areas within others (Figure 7.1). Where visibility is possible, these Conservation Areas are located at a distance from the Application Site such that the proposed development could not have a significant effect on them.

Non-designated heritage assets

7.3.17 Evidence of prehistoric activity has been identified at several locations within the defined study area. A fragment of a flint Acheulian-type hand-axe of Palaeolithic date was recovered from a location close to Burderop Farm (Site **29**). Another fragment of a flint artefact, this time a knife of probably Neolithic date, was found to the north of Hodson (Site **30**).

7.3.18 The HER includes a record of a stone circle located to the south of Swindon, which was destroyed during the construction of the M4 motorway (Site **31**). It was reported to comprise two concentric

rings, and a single row of stones was present 125 m west of the circle. Although information on this monument is very limited, there is no reason to doubt its existence and another stone circle remains present at Day House (Coate), just 2 km to the north east of this one.

7.3.19 Some pieces of worked flint of probable Bronze Age date were found in the 1980s to the east of Overtown (Site **32**), whilst flint cores and tools of the same period have been found close to Wroughton (Site **33**). Ditches of Late Bronze Age date were found during archaeological observations along the route of a water pipeline reinforcement scheme (Site **34**), and nearby on the same scheme pits of Early Bronze Age to Late Iron Age date were identified (Site **35**).

7.3.20 Iron Age material has also been identified at other locations within the defined study area, including within the Application Site where sherds of Iron Age pottery were found in the mid-20th century (Site **36**). A burial was also found at the same location (Site **37**), but this is recorded as undated and therefore was not clearly associated with the Iron Age pottery. More Iron Age pottery was found just to the south and still within the Application Site; associated finds included animal bones and teeth (Site **38**). This findspot was within a rectangular earthwork enclosure which was not dated, although a number of internal pits were uncovered during earthmoving in this area (Site **39**). A large ditch containing a single sherd of Iron Age pottery along with animal bone and fragments of charcoal was identified during work in the vicinity of the principal house at Burderop Park (Site **40**).

7.3.21 At various locations within the defined study area, additional features have been recorded as cropmarks visible on aerial photographs. These are mostly undated but may well be of prehistoric date. One enclosure recorded in this way at a location to the south west of the Application Site was associated with fragments of Iron Age pottery (Site **41**). Other (undated) examples include a long linear feature to the south of the Application Site (Site **42**) and a group of features to the west of Burderop Farm (Site **43**). Two connected linear features have been recorded within the Application Site (Site **44**), with two parallel curvilinear examples also noted within Burderop Park (Site **45**).

7.3.22 A line of three pits or large postholes containing pottery of Roman date (mostly 2nd century AD) along with a fragment of tile and a cake of (metal-working) slag was found at a location now within the route of the M4 motorway (Site **46**. Roman pottery was found just to the east of Wroughton in the 1980s (Site **47**), whilst a single sherd of this period was found in a ditch during work in the vicinity of the principal house at Burderop Park (Site **48**).

7.3.23 Saxon pottery was found within a ditch found during archaeological observations along the route of a water pipeline reinforcement scheme (Site **49**), whilst pottery of the same date was found to the east of Wroughton in the 1980s and in 1991 (Site **50**). Close by, two burials of late 6th century AD date were excavated following a discovery in 2000 by a metal detectorist (Site **51**). One grave contained the remains of a child, the other one was the grave of an elderly adult male.

7.3.24 In addition to the earthwork remains of medieval settlement to the south of Overtown House and Overtown Manor noted above (Site **1**), material of this date has been recorded at a couple of additional locations within the defined study area. Pits containing medieval artefacts were found in two trenches during an archaeological evaluation at the former Princess Alexandra Hospital site just to the east of Overtown (Sites **52** and **53**. The settlement at Hodson has its origins in the medieval period (if not earlier) and features possibly connected with medieval settlement activity just to the west of the village have been recorded on aerial photographs (Site **54**).

7.3.25 The lane which runs adjacent to the western boundary of the Application Site (north of the B4005 and the site entrance) is a historic route which descends Ladder Hill before crossing over the M4 motorway and continuing on towards the Old Town part of Swindon (Site **55**). It is known as Ladder Lane or Jacob's Ladder and is associated with the author Richard Jefferies (1848-1887). Jefferies lived for much of his life in the Coate area of Swindon and was born in the house which is

now the Richard Jefferies Museum .at Coate. He is noted for his depiction of English rural life in a number of essays, non-fiction works and novels. Jefferies walked great distances in the area around Coate and there are frequent mentions of Burderop Wood / Park and Liddington Hill in his works. A memorial stone commemorating his life and works has been erected on Burderop Down, near to Barbury Castle.

Site History

7.3.26 A deer park is recoded at Burderop Park in 1583, but is likely to have been established at an earlier date (Site **56**). During the medieval period Burderop formed part of the manor of Chiseldon and it is possible that the emparkment was carried out by the Abbot of Hyde who is known to have held land here in the mid-14th century. Certainly by the middle of the 16th century a park had been established and 'Burdrop' is shown on Christopher Saxton's map of Wiltshire which was published in 1576.

7.3.27 The Calley family purchased the manors of Chiseldon and Burderop in 1619, and the Andrews and Drury map of Wiltshire published in 1773 shows the house at 'Burdrope' as the property of Wm. Calley Esq. On this map, the Application Site appears to be part of an area of parkland to the north of the house and its formal gardens (Figure 7.3). Overtown House and its surrounding estate was shown as being the property of Oliver Calley Esq.

7.3.28 The next map to show the area with any level of detail was the Ordnance Survey drawing (OSD) produced by William Stanley in 1818. This shows clearly that the Application Site formed part of Burderop Park, crossed by a track leading east to the Hodson Road with a branch heading off north towards 'Knightingal' (Figure 7.4). A similar layout is shown on the tithe map of 1844.

7.3.29 The 1st edition of the Ordnance Survey (OS) 25'' (to the mile) map was surveyed in 1883 and published in 1886. It shows the Application Site clearly as part of the wider park, with some planting of individual trees and clumps of trees which may well have been part of the designed landscape here (Figure 7.5). A track extends through the Application Site, connecting Lodge Farm with the road at the top of Brimble Hill. The principal house is to the south, separated from the Application Site to a large extent by the tree belts within 'Kennel Firs'.

7.3.30 The situation remains largely unchanged through subsequent editions of this map, although the 3rd edition (published in 1924, Figure 7.6) shows the earthwork enclosure within the south west part of the Application Site which is referred to above as being of probable Iron Age date (Site **39**). This is also shown on the 4th edition, published in 1947.

7.3.31 However, the survey revisions for the 4th edition were carried out in 1943, and subsequently the land within the Application Site was used during the Second World War as the location for an American Base Hospital. This was vacated by the Americans in around 1965 and taken over by the South-West Regional Hospital Board. The OS 1:10,560 map of 1956 shows the layout of the American hospital within the Application Site (Figure 7.7). There are numerous buildings and connecting accesses, with a 'School' marked at the eastern end of the complex, just outside the Application Site. The hospital site included land to the west of the Application Site, on the other side of the road. This map also suggests that part of the earthwork enclosure (Site **23**) remained intact, adjacent to, and parallel with, the road along the western edge of the Application Site.

7.3.32 The OS 1:2,500 map of 1969 shows the complex of hospital buildings in greater detail, along with the changes made following the transfer of the facility to the South-West Regional Hospital Board (Figure 7.8). The school which was just outside the Application Site had already been demolished. A later edition of the OS 1:10,000 map published in 1985 shows further changes to the buildings within the Application Site (Figure 7.9), along with the renewed establishment of a school at the eastern side of the hospital site. Aerial photographs presented as Figure 7.10 show the American Base Hospital as it was in 1951, along with a later image showing the subsequent redevelopment

of the hospital for civilian use. These photographs indicate the extensive nature of the built development within the Application Site in the second half of the 20th century.

7.3.33 In the final decade of the 20th century, the hospital buildings were cleared from within the Application Site and the current data centre buildings were constructed. Planning consent was also granted for an office development within the north western part of the Application Site, but this has never been implemented.

7.3.34 There are numerous buried services and utilities across the Application Site relating to the current data centre buildings (Figure 7.11), and there would also have been an extensive network of similar services associated with the former hospital here.

7.3.35 An archaeological evaluation by way of trial trenching was undertaken within the Application Site in the mid-1990s, possibly in connection with the proposed office development. The work identified a line of postholes and a pit beneath the remains of modern levelling and 'made ground'. The features and deposits recorded were all considered to relate to the construction of the American Base Hospital.

7.3.36 The current topography within the Application Site reflects the use of the materials resulting from the demolition to landscape the area as part of its redevelopment for the current data centres. These were constructed on level ground which had been established by cutting into the chalk which represents the basal geology within the Application Site, and the line of the internal roadway linking the data centres also appears to have been cut into the chalk. Outside of these areas of cut, the land within the Application Site has been raised through the placement of the material resulting from the demolition of the former hospital along with surplus material generated from the areas of cut.

7.3.37 A programme of Ground Investigation has been undertaken within the Application Site in connection with the proposed development (see Volume 3 Appendix 8.5). This has confirmed the presence of 'made ground' across much of the Application Site, varying in depth from 3.2 m to 0.3 m. The only areas where no 'made ground' was recorded were directly adjacent to the current data centres, where hardstanding was formed directly over chalk indicating the ground reduction (cut) that had occurred as part of the construction work for the data centres.

7.3.38 A programme of Historic Landscape Characterisation (HLC) has been undertaken for this area. HLC is an aspect of more general landscape characterisation that seeks to provide an additional element of 'time-depth', allowing the historic evolution of the landscape to be perceived and understood.

7.3.39 The broad HLC Type for the whole of the Application Site has been recorded as 'Medical facility' (Figure 7.12). This indicates that the HLC was undertaken prior to the establishment of the data centre buildings currently present within the Application Site, reflecting the previous use of the land here as a hospital.

Future Baseline Conditions

7.3.40 Changes to the baseline conditions in the future could include amendments to the list of designated heritage assets, e.g. additional designations of Scheduled Monuments, Listed Buildings (including locally listed buildings), Registered Parks and Gardens, Conservation Areas, or amendments to the extent and description of any of these asset types.

7.3.41 Additional changes could occur as a result of archaeological investigations undertaken with regard to other developments within the defined study areas or as part of more extensive programmes of research in the area.

7.3.42 Climate change could affect the historic environment baseline through changes to the historic landscape (vegetation loss, changes in vegetation types, changes in farming practices etc.).

There could also be degradation of buried archaeological remains as a result of changes in the burial environment (desiccation, waterlogging, etc.).

7.4 Mitigation Measures Adopted as Part of the Project

7.4.1 A targeted programme of archaeological monitoring during construction would be agreed with the archaeological advisers to the planning authority. This would enable a better understanding of the presence, nature and date of any archaeological remains within the Application Site and allow for the development of an appropriate strategy to avoid, reduce or offset any impacts that could occur as a result of construction.

7.4.2 This programme of archaeological monitoring will be undertaken during the removal of made ground during the construction process in areas where this activity will result in the exposure of underlying bedrock,

7.5 Assessment of Construction Effects

7.5.1 The construction of the project could lead to physical impacts on any buried archaeological remains that may be present within the Application Site. Archaeological remains have previously been recorded within the Application Site, although the construction and subsequent phases of development of the hospital in the mid-late 20th century, and the comprehensive redevelopment of the Application Site at the end of that century (the data centres and associated infrastructure and landscaping), are likely to have had a considerable impact on any archaeological remains.

7.5.2 Detailed information regarding the nature of the proposed development and the extent of construction activities for is presented in Chapter 2 Project Description and the master plan (document reference 20305S-RPS-00-XX-DR-A-9501). Following demolition of the current data centre buildings in the eastern part of the Application Site, a retention pond would be established in this location, with a new data centre building constructed to the west of here and within the northern part of the Application Site. This new building would be 12.3 m high (including roof plant) with flues extending for a further 2.7 m. A Pumphouse and Sprinkler Tank would be constructed adjacent to the south west corner of the new data centre building. In the western part of the Application Site a new gatehouse would be constructed to replace the existing one and a new internal access road layout would be established. The data centre buildings in the southern part of the Application site would be demolished and this area restored to grassland with some trees.

7.5.3 The new retention pond would require excavation below existing ground level, but this area has already been reduced down for the establishment of the current data centre and adjacent hardstanding, and the current data centre also has a basement, therefore survival of archaeological features and deposits in this area is very unlikely.

7.5.4 The new data centre would be constructed on pad foundations and requires a mixture of cut and fill in order to establish the floor levels. Most of the land within the footprint of the new building would require fill rather than cut, although land just within the south western part of the footprint would need to be reduced by as much as 3.95 m. The Ground Investigation found that ‘made ground’ in this area was up to 3.2 m thick so the cut for the proposed development may well extend into ground which was not disturbed subsequent to the demolition of the former hospital buildings.

7.5.5 Impacts on buried archaeological remains could be of high magnitude, but such remains are considered likely to be of up to low importance or value. The consequent significance of effect has been assessed as being up to permanent minor adverse. This is not a significant effect in EIA terms. As set out above, a targeted programme of archaeological monitoring during construction would be agreed with the archaeological advisers to the planning authority. This would enable a

better understanding of the presence, nature and date of any archaeological remains within the Application Site and allow for the development of an appropriate strategy to offset any impacts that could occur as a result of construction.

7.5.6 Construction impacts resulting from visual change and also noise within the settings of heritage assets are considered to be the same as those occurring during operation and are therefore set out in the following section of this chapter. It is acknowledged that construction noise could potentially exceed operational noise for limited key activities within the construction programme, but this would be temporary and for very short periods. Standard best practice measures would be implemented to ensure that construction noise impacts would be controlled and managed so as to avoid significant adverse effects. There may also be some limited visibility of taller construction equipment (such as cranes) on the Application Site in views towards or across the designated heritage assets at Burderop Park, but this would only occur over short periods of time and is very unlikely to impact on the ability to understand and appreciate the significance of these designated heritage assets.

Further Mitigation

7.5.7 No further mitigation is proposed other than the targeted programme of archaeological monitoring during construction described in paragraph 7.4.1 above.

Future Monitoring

7.5.8 No future monitoring is proposed.

Accidents and/or Disasters

7.5.9 There are no potential construction accidents and/or disasters that would result in impacts on any aspect of the historic environment.

7.6 Assessment of Operational Effects

7.6.1 The Application Site is within the setting of the group of listed buildings at Burderop Park, which includes the Grade II* listed principal house (Site **13**) as well as several other buildings listed at Grade II (Sites **14** - **19**). The significance of the group of listed buildings at Burderop Park derives greatly from their collective group value. As a corpus of 17th and 18th century buildings linked through shared ownership and with combined design elements, they have considerable aesthetic values as well as evidential and historical values associated with the fabric of the structures and the associated information which can be obtained through graphic, photographic, cartographic and documentary sources.

7.6.2 The immediate setting of the listed buildings at Burderop Park comprises the landscaped grounds within which they are located. These include areas of parkland with mown grass and designed woodland planting, as well as more formal elements including a tree-lined vista to the east of the principal house.

7.6.3 There is also a wider setting, particularly to the south of the house where a longer view out of the grounds is framed by two broadly symmetrical ranges of historic buildings. The Application Site forms part of this wider setting as it represents land which was formerly part of the historic park associated with the principal house. As evidenced from the historic maps of the area (e.g. Figures 7.4 – 7.6), the historic park extended north of the principal house as far as the edge of Burderop Woods, taking in the whole of the Application site which was planted with individual trees and tree clumps in order to create a typical parkland environment. The Application Site ceased to be part of the historic park as a result of the establishment of the American Base Hospital towards the end

of the Second World War, but remains part of the setting of the listed buildings through this historical association.

7.6.4 The current setting of the group of listed buildings at Burderop Park includes elements which detract from the significance of the listed buildings, particularly the three 'pavilions' which were built in the 1970s just to the west of the principal house. The large car parks are less detracting as there is very limited intervisibility between these and any of the listed structures due to the mature planting within the grounds.

7.6.5 Overall it is considered that the setting of the listed buildings at Burderop Park makes a Medium to High contribution to their significance, particularly as a result of the physical and visual relationships between the structures. There are some major detracting elements within the setting, but this will change as the consented redevelopment is implemented and thus the setting is likely to be improved in the near future.

7.6.6 There is no intervisibility between any part of the Application Site and any of the listed buildings at Burderop Park. This is due mainly to the extensive belt of mature vegetation to the north of the house (known as Kennel Firs) and the more recent planted woodland around the southern part of the Application Site.

7.6.7 Examination of the appearance of the proposed development (undertaken in conjunction with the assessment of the likely effects on landscape and visual resources presented in Chapter 5 of this ES) has demonstrated that no part of the proposed development would be visible in any views from, towards or across any of the listed buildings at Burderop Park. A visualisation has been prepared regarding a viewpoint to the south-east of Burderop Park from which the upper part of the principal house is visible. The visualisation is presented as Figure 5.44 of this ES and it confirms what is indicated in the ZVI, i.e. no part of the proposed development would be visible in the view towards the listed buildings from this location.

7.6.8 The proposed development would therefore represent a change within the setting of the group of listed buildings at Burderop Park, but this change would not result in any impact on the significance of the designated heritage assets here. The Application Site would continue to be the location of data storage buildings with associated infrastructure and landscaping. The number of buildings would be reduced but the new data centre building would be slightly larger than any of the existing ones. The southernmost data centre building currently within the Application Site would be removed and this area would be replanted to establish a parkland-type appearance. The magnitude of impact on the listed buildings at Burderop Park has been assessed as no change and the subsequent significance of effect would be no change.

7.6.9 The significance of the Scheduled medieval settlement remains at Overtown (Site **1**) is principally derived from its evidential value, i.e. the likelihood of information being gained through archaeological survey and excavation. The setting of the settlement remains includes the adjacent historic buildings at Overtown House and Overtown Manor, as well as surrounding farmland and other areas of built development to the south, south-west (Langton Park) and south-east. Overall the setting of the Scheduled medieval settlement at Overtown makes a low contribution to its significance.

7.6.10 The ZTV for the proposed development (Figures 7.1 and 7.2) indicate that some or all of the new data centre would be visible in views from within and across much of the Scheduled Monument. Viewpoints established for the Landscape and Visual Resources assessment (Chapter 5 of this ES) include locations close to the Scheduled Monument. Figure 5.31 of this ES shows these views looking towards the Application Site. These indicate that if any elements of the proposed development are visible in views from and across the Scheduled Monument, these would be limited to just the upper parts of the new data centre building and would be seen just above the trees which mark the horizon in that direction.

7.6.11 The change within the setting of the Scheduled medieval settlement remains at Overtown as a result of the construction and operation of the proposed development would represent an impact of low magnitude. This is a heritage asset of high importance and the consequent significance of effect has been assessed as minor adverse, which is not significant in EIA terms.

7.6.12 The ZTV also indicates that some or all of the new data centre may be visible in views from and across the Grade II* listed Overtown House (Site **23**) and the adjacent Grade II listed garden walls (Site **24**) and Grade II listed cottage now within the stable range here (Site **25**). These buildings have good evidential and historical values associated with the fabric of the structures and the associated information which can be obtained through graphic, photographic, cartographic and documentary sources. There are also aesthetic values deriving from the physical appearance of the buildings.

7.6.13 The settings of these listed buildings includes the other buildings within the complex at Overtown House along with the surrounding land which is mostly farmland and woodland. There are very few elements within the setting which detract from the significance of the listed buildings at Overtown House, and overall their setting makes a medium contribution to that significance.

7.6.14 Viewpoints established for the Landscape and Visual Resources assessment (Chapter 5 of this ES) include locations close to the listed buildings at Overtown House. Figure 5.31 of this ES shows these views looking towards the Application Site. These indicate that if any elements of the proposed development are visible in views from and across the listed buildings, these would be limited to just the upper parts of the new data centre building and would be seen just above the trees which mark the horizon in that direction.

7.6.15 The change within the setting of the listed buildings at Overtown House as a result of the construction and operation of the proposed development would represent an impact of low magnitude. Overtown House itself is a heritage asset of high importance and the consequent significance of effect has been assessed as minor adverse, which is not significant in EIA terms. The two Grade II listed buildings here are heritage assets of medium importance and the consequent significance of effect would be minor adverse, which is not significant in EIA terms.

7.6.16 The ZTV additionally indicates that some or all of the new data centre would be visible in views from and across the Grade II listed Nos. 5, 7 and 8 Overtown (Site **27**). However, examination of this location has found that intervisibility is very unlikely as a result of the extensive vegetation around the edge of the grounds of this property which provides comprehensive screening of views in the direction of the proposed development. Consequently the magnitude of impact on this designated heritage asset has been assessed as no change, with the consequent significance of effect also being no change. The same assessment applies to the Grade II listed Overtown Manor (Site **26**) and the Grade II listed K8 telephone kiosk at Langton Park (Site **28**), for both of which the ZTV indicates no intervisibility between the listed buildings and the proposed development (Figure 7.1).

7.6.17 The ZTV (Figure 7.1) indicates that some or all the proposed development would be visible in views from and across a group of Scheduled Monuments including Barbury Castle (Site **2**), a saucer barrow (Site **3**) and a group of three bowl barrows (Site **4**) to the west of Barbury Castle, a field system and earthwork enclosure on Burderop Down (Site **8**) and a disc barrow also on Burderop Down (Site **10**).

7.6.18 Barbury Castle (Site **2**) is located in an elevated position with wide-ranging views in all directions. As with many hillforts, it is very likely that it was designed to be visible from a great area as a symbolic site and not just as a defended settlement. There is also a high likelihood of designed intervisibility with other hillforts in the area including Liddington Castle (Site **11**). Although the significance of Barbury Castle is principally derived from its evidential value, i.e. the likelihood of

information being gained through archaeological survey and excavation, its setting makes a medium contribution to its significance.

7.6.19 The saucer barrow (Site **3**) and bowl barrows (Site **4**) to the west of Barbury Castle and the disc barrow on Burderop Down (Site **10**) are all located in elevated positions and have wide-ranging views. Barrow cemeteries are often placed where they could be seen from areas of contemporary settlement and there is often a great degree of designed intervisibility with other barrow cemeteries in the area. Although the significance of these barrows are principally derived from their evidential value, i.e. the likelihood of information being gained through archaeological survey and excavation, their setting makes a medium contribution to their significance.

7.6.20 The field system and earthwork enclosure on Burderop Down (Site **8**) are located on the north-facing slope of the downs, with views across the lower ground extending to the proposal site and beyond. The views from and towards both the field system and the earthwork enclosure are unlikely to have influenced their location, which is probably linked to their function as part of the agricultural use of available land. The significance of the field system and the earthwork enclosure is principally derived from their evidential value, i.e. the likelihood of information being gained through archaeological survey and excavation, and their setting makes a low contribution to their significance.

7.6.21 Viewpoints established for the Landscape and Visual Resources assessment (Chapter 5 of this ES) include locations within and near to Barbury Castle. Figure 5.41 of this ES represents a visualisation of how the proposed development would appear in the view from Barbury Castle, with the current view presented in Figures 5.39 and 5.40. The visualisation shows that the upper part of the new data centre building would be visible from this location within the Scheduled Monument, but that it would appear in the same part of the view (the mid-horizon) as a number of other large buildings located within the developed area of Swindon.

7.6.22 The proposed development would not affect the intervisibility between Barbury Castle (Site **2**) and any other hillfort in the area. The change within the setting of the Scheduled Monument at Barbury Castle as a result of the construction and operation of the proposed development would represent an impact of negligible magnitude. Barbury Castle is a heritage asset of high importance and the consequent significance of effect would be minor adverse, which is not significant in EIA terms.

7.6.23 The construction and operation of the proposed development would not affect the intervisibility between the saucer barrow (Site **3**) and bowl barrows (Site **4**) to the west of Barbury Castle and the disc barrow on Burderop Down (Site **10**), and any other barrow cemetery in the area. The change within the setting of these Scheduled Monuments as a result of the construction and operation of the proposed development would represent an impact of negligible magnitude. These barrows are heritage assets of high importance and the consequent significance of effect in each case would be minor adverse, which is not significant in EIA terms.

7.6.24 The change within the setting of the field system and earthwork enclosure on Burderop Down (Site **8**) as a result of the construction and operation of the proposed development would represent an impact of negligible magnitude. This Scheduled Monument is a heritage asset of high importance and the consequent significance of effect would be minor adverse, which is not significant in EIA terms.

7.6.25 Liddington Castle (Site **11**) is located in an elevated position with wide-ranging views in all directions. As with many hillforts, it is very likely that it was designed to be visible from a great area as a symbolic site and not just as a defended settlement. There is also a high likelihood of designed intervisibility with other hillforts in the area including Barbury Castle (Site **2**). Although the significance of Barbury Castle is principally derived from its evidential value, i.e. the likelihood of information being gained through archaeological survey and excavation, its setting makes a medium contribution to its significance.

7.6.26 The linear boundary earthwork to the west of Liddington Castle (Site **12**) is located on the west-facing slope with views across the lower ground extending to the proposal site and beyond. The views from and towards the linear earthwork are unlikely to have influenced its location, which is probably linked to its function as part of the division of land (territorial boundary). The significance of the linear boundary earthwork is principally derived from its evidential value, i.e. the likelihood of information being gained through archaeological survey and excavation, and its setting makes a low contribution to their significance.

7.6.27 Viewpoints established for the Landscape and Visual Resources assessment (Chapter 5 of this ES) include locations within and near to Liddington Castle. Figure 5.38 of this ES represents a visualisation of how the proposed development would appear in the view from Liddington Castle, with the current view presented in Figures 5.36 and 5.37. The visualisation shows that the upper part of the new data centre building would be just about visible from this location within the Scheduled Monument, but that it would appear with woodland in front of and also behind it. The proposed development would be much less visible than other existing development within this view.

7.6.28 The construction and operation of the proposed development would not affect the intervisibility between Liddington Castle (Site **11**) and any other hillfort in the area. The change within the setting of the Scheduled Monument at Liddington Castle as a result of the construction and operation of the proposed development would represent an impact magnitude of no change and the consequent significance of effect would also be no change, which is not significant in EIA terms.

7.6.29 The change within the setting of the linear boundary earthwork to the west of Liddington Castle (Site **12**) as a result of the construction and operation of the proposed development would represent an impact magnitude of no change and the consequent significance of effect would also be no change, which is not significant in EIA terms.

7.6.30 The Grade II listed milestone on Brimble Hill (Site **22**) is located on the northern side of the B4005 road. As a milestone, the core element within its setting which contributes positively towards its significance is the road itself. The ZTV for the proposed development indicates that no part of the new data centre or any other development element would be visible in views from, towards or across the milestone. The relationship of the milestone and the adjacent road would remain unchanged.

7.6.31 The change within the setting of the Grade II listed milestone on Brimble Hill (Site **22**) as a result of the construction and operation of the proposed development would represent an impact magnitude of no change and the consequent significance of effect would also be no change, which is not significant in EIA terms.

7.6.32 The non-designated historic routeway known as Ladder Lane or Jacob's Ladder (Site **55**) is located immediately to the west of the Application Site. Viewpoints established for the Landscape and Visual Resources assessment (Chapter 5 of this ES) include a location on Ladder Lane adjacent to the Application Site. Viewpoint 11 on Figure 5.32 of this ES illustrates the current view from the historic routeway through to the Application Site. It shows how the vegetation along the western side of Ladder Lane screens much of the current built development and associated landscaping, even in the winter months, although there are glimpsed views through to the Application Site. The proposed development is not particularly different to the current built development within the Application Site, representing the replacement of current buildings with a new and slightly larger one. The small gatehouse building which is closest to the historic routeway would be removed.

7.6.33 The construction and operation of the proposed development would therefore represent a change within the setting of this non-designated heritage asset, but the magnitude of impact would be no

change and the consequent significance of effect would also be no change, which is not significant in EIA terms.

7.6.34 The construction and operation of the proposed development would not affect any of the other designated and non-designated heritage assets described within section 7.3 of this chapter, and therefore no detailed assessment of the likely impacts and effects has been undertaken with regard to those assets.

7.6.35 The project would not have any effect on the character of the historic landscape of the area, which would remain as one dominated by large data centres set within a landscaped environment. The HLC for this area is already out of date and reflects the former use of the Application Site as a hospital.

Further Mitigation

7.6.36 No further mitigation during operation is proposed.

Future Monitoring

7.6.37 No future monitoring is proposed.

Accidents/Disasters

7.6.38 There are no potential operational accidents and/or disasters that would result in impacts on any aspect of the historic environment.

Potential Changes to the Assessment as a Result of Climate Change

7.6.39 Future changes to baseline conditions resulting from climate change would not lead to any changes to the significance of any operational effects described above.

7.7 Assessment of Cumulative Effects

7.7.1 A list of developments included in the assessment of cumulative effects, along with a figure indicating the location of these developments, is presented in Volume 3 Appendix 4.3 of this ES.

7.7.2 None of the identified developments have the potential to lead to cumulative effects on any heritage asset when considered in conjunction with the proposed development.

7.7.3 The main potential impacts on the Historic Environment associated with the infrastructure upgrade works would be related to the construction period for such works; no heritage impacts are predicted once the upgraded infrastructure is operational.

7.7.4 Works to install the upgrades would be undertaken by the utility providers and would follow standard construction methodologies. Given that the standard depth of these utility trenches would be relatively shallow and that any such works may be installed within part of the public highway or adjacent to part of the public highway, the proposed upgrades would not lead to any cumulative impact on buried archaeology.

7.7.5 These construction works for likelythe future upgrade toof the electrical power network would be underground and would not lead to any cumulative effects on the settings of any designated heritage assets when considered in conjunction with the proposed development.

7.8 Inter-relationships

7.8.1 The topic of Historic Environment has inter-relationships with other topics considered within this ES, most specifically with Chapter 5: Landscape and Visual Resources. However, the focus in Chapter 5 is on the likely effects of the project on the character of the current landscape whereas this chapter assess the likely effects on the character of the historic landscape.

7.9 Summary of Effects

7.9.1 **Table 7.6** below presents a summary of the assessed effects of the proposed development on the historic environment.

7.9.2 Some archaeological remains have previously been identified within the Application Site, but subsequent developments comprising the construction and operation of a military (later civilian) hospital and the construction of a data centre site with considerable topographic remodelling are likely to have caused extensive loss of or damage to such remains.

7.9.3 The construction of the proposed development could result in direct impacts on any buried archaeological remains that may still be present within the Application Site . Impacts on buried archaeological remains could be of high magnitude but such remains are considered likely to be of up to low importance or value. The consequent significance of effect has been assessed as being up to permanent minor adverse. A programme of targeted archaeological monitoring during construction would be agreed with the archaeological advisers to the planning authority. This would enable a better understanding of the presence, nature and date of any archaeological remains within the Application Site and allow for the development of an appropriate strategy to offset any impacts that could occur as a result of construction.

7.9.4 The Application Site falls within the settings of a number of designated and undesignated heritage assets. The assessment has identified a likelihood of minor adverse effects with regard to a small number of these assets as a result of changes within their settings. Such assets include six Scheduled Monuments, one Grade II* listed building and two Grade II listed buildings.

7.9.5 There would be no effect on the character of the overall historic landscape.

7.10 References

Chartered Institute for Archaeologists (CIfA) (2020) Standard and guidance for historic environment desk-based assessment, October 2020.

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Landscape Institute and Institute for Environmental Management and Assessment (2013) Guidelines of Landscape and Visual Assessment, 3rd edition.

Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework.

Swindon Borough Council (2015) Swindon Borough Local Plan 2026.

Swindon Borough Council (2019) Swindon Borough Local Plan 2036 Regulation 19 Proposed Submission Draft Version

Table 7.3: Summary of Likely Environmental Effects on Historic Environment

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant
Buried Archaeological Remains	Up to low (assumed)	Loss of or damage to archaeological features or deposits	Permanent	High	Up to minor adverse	Not significant
Burderop Park (house) (Grade II* listed Building)	High	Change within setting	Long term	No change	No change	Not significant
West wing to Burderop Park (Grade II listed building)	Medium	Change within setting	Long term	No change	No change	Not significant
Granary at Burderop Park (Grade II listed building)	Medium	Change within setting	Long term	No change	No change	Not significant
Walls to kitchen court at Burderop Park (Grade II listed building)	Medium	Change within setting	Long term	No change	No change	Not significant
Kitchen garden wall etc at Burderop Park (Grade II listed building)	Medium	Change within setting	Long term	No change	No change	Not significant
Burderop Cottage and stables (Grade II listed building)	Medium	Change within setting	Long term	No change	No change	Not significant
Coach house and stable block east of Burderop Cottage (Grade II listed building)	Medium	Change within setting	Long term	No change	No change	Not significant

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant
Medieval settlement remains at Overtown (Scheduled Monument)	High	Change within setting	Long term	Low	Minor	Not significant
Overtown House (Grade II* listed building)	High	Change within setting	Long term	Low	Minor	Not significant
Walls enclosing garden to south of Overtown House (Grade II listed building)	Medium	Change within setting	Long term	Low	Minor	Not significant
Cottage now among stable range at Overtown House (Grade II listed building)	Medium	Change within setting	Long term	Low	Minor	Not significant
Nos. 5,7, and 8 Overtown (Grade II listed building)	Medium	Change within setting	Long term	No change	No change	Not significant
Overtown Manor (Grade II listed building)	Medium	Change within setting	Long term	No change	No change	Not significant
K8 telephone kiosk, Langton Park (Grade II listed building)	Medium	Change within setting	Long term	No change	No change	Not significant
Barbury Castle hillfort and bowl barrow (Scheduled Monument)	High	Change within setting	Long term	Negligible	Minor	Not significant
Saucer barrow west of Barbury Castle (Scheduled Monument)	High	Change within setting	Long term	Negligible	Minor	Not significant
Three bowl barrows west of Barbury Castle (Scheduled Monument)	High	Change within setting	Long term	Negligible	Minor	Not significant
Disc barrow on Burderop Down)	High	Change within setting	Long term	Negligible	Minor	Not significant
Field system and earthwork enclosure on Burderop Down (Scheduled Monument)	High	Change within setting	Long term	Negligible	Minor	Not significant

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant
Liddington Castle hillfort (Scheduled Monument)	High	Change within setting	Long term	No change	No change	Not significant
Linear boundary earthwork west of Liddington Castle (Scheduled Monument)	High	Change within setting	Long term	No change	No change	Not significant
Brimble Hill milestone (Grade II listed building)	Medium	Change within setting	Long term	No change	No change	Not significant
Ladder Lane (aka Jacob's Ladder)	Low	Change within setting	Long term	No change	No change	Not significant

8 OTHER ENVIRONMENTAL EFFECTS

8.1 Introduction

8.1.1 The Environmental Impact Assessment (EIA) Scoping Opinion provided by Swindon Borough Council (SBC) (Volume 3 Appendix 4.1) agreed that a number of environmental topics could be scoped from the EIA process as significant adverse effects were unlikely to occur. The topics that were scoped out of the EIA were:

- land use, agriculture and recreation;
- socio-economics and community;
- human health;
- noise and vibration;
- air quality;
- traffic and transport;
- hydrology and flood risk;
- geology and ground conditions;
- climate change;
- daylight, sunlight and microclimate;
- material assets;
- major accidents and disasters;
- residues and emissions;
- waste; and
- radiation and heat.

8.1.2 A number of technical reports have been prepared to support the planning application:

- noise and vibration;
- air quality;
- traffic and transport;
- hydrology and flood risk; and
- geology and ground conditions.

8.2 Noise and Vibration

8.2.1 A Noise Impact Assessment for the proposed development was prepared in accordance with BS 4142:2014+A1:2019 which is the nationally recognised standard and the methodology was agreed with SBC.

8.2.2 The Application Site is a currently disused Data Centre campus in a rural location on the Burderop Estate to the south of Swindon with neighbouring land uses primarily comprising woodland and agriculture. There are a few individual houses and small clusters of houses in the vicinity; there is also planning permission for a residential development located directly to the south occupying part of Burderop Park. Locations of the Noise Sensitive Receptors (NSRs) are listed below:

- Lodge Farm, approximately 240 m east;
- Burderop Barns, approximately 280 m south;
- Burderop Farm House, approximately 450 m south east; and
- the consented residential development on Land at Burderop Park located approximately 40 m south.

8.2.3 Representative baseline sound levels were determined through a combination of long-term monitoring on the Application Site and short-term monitoring at locations close to the nearest residential properties.

8.2.4 One long term monitor (LT1) was installed on the southern boundary of the Application Site at a similar distance from the B4005 Brimble Hill to the consented residential development on Land at Burderop Park. A second long-term monitor (LT2) was installed on the eastern boundary of the Application Site, at the closest part of the site to Lodge Farm.

8.2.5 The long-term monitoring was undertaken from 14 October to 21 October 2020. Sound level measurements were carried out using a 'Class 1' Rion NL-52 sound level meter (SLM) in accordance with BS 7445-2:1991(BS, 1991), with the microphone mounted on a pole at around 1.5 m above local ground level.

8.2.6 The short-term monitoring was undertaken at two locations: ST1 was located to the north of Burderop Barns adjacent to the B4005; and ST2 was located on the B4005 at the entrance to Burderop Farm. For both surveys, 15-minute data samples were recorded over four periods during the daytime and evening on 14 and 15 October 2020.

8.2.7 Noise from construction activities is likely to be noticeable at some existing NSRs for some periods of the construction programme, including Lodge Farm and Burderop Farmhouse. It is less likely that construction noise would be noticeable at Burderop Barns as there are high levels of road traffic noise during the daytime at this location, although it may be temporarily noticeable when there are lulls in road traffic.

8.2.8 Initial estimates of construction vehicle movements have been made using data derived from a similar data centre construction, from which it is expected that an average of approximately 75 HGVs would be on site per day, equating to a total of 150 HGV movements per day. During the peak (during the first three months of construction) this would increase to 110 HGVs on site each (a total of 220) HGV movements All construction HGVs would route via Junction 15 of the M4 via the A346 and the B4005. Due to the relatively low levels of baseline HGV traffic on B4005, there is likely to be a low, and potentially moderate impact at NSRs along this link. However, this would be very short-term. Along the other road links the traffic noise impact is likely to be negligible

8.2.9 During normal operation and generator testing, predicted operational noise levels at NSRs would be below or just exceed the prevailing background sound levels; would be well below the thresholds at which critical health effects would occur according to guidance published by the World Health Organisation; and would only result in a small increase to existing baseline ambient sound levels. Furthermore, noise from the proposed development would be similar in character to other operational facilities in the vicinity. On this basis, the noise impacts for general operation of the proposed development are anticipated to be negligible.

8.2.10 Noise from the generators has been mitigated and reduced to a minimum by locating the generators in enhanced acoustic enclosures. These enclosures are a higher-performance specification than the Applicant typically uses (reducing the sound emissions by over 33%). Notwithstanding this, in the event of a major grid failure, if all emergency generators are required, the noise impact would be considered as significant during the night-time. However, due to the rare likely occurrence of the emergency scenario, National Grid reliability and the in-built redundancy and infrastructure maintenance systems, this is unlikely to occur in practice and/or for

any length of time and should therefore be considered acceptable. The Applicant also has a rigorous internal process for equipment inspection and preventative maintenance with the objective of avoiding the use of the emergency generators.

8.2.11 Furthermore, it is noted that the proposed development is replacing two existing data centre buildings that were constructed in the early 1990s and ceased operation last year (2020). These two existing facilities utilized four 1,500 kVA and two 750kVA emergency generators that were tested on a monthly basis between two and four hours. The data centre in the south of the Application Site has three 3,000 kVA and one 1,000 kVA emergency generators that were tested on a similar schedule. In total, the Data Centre campus that is being redeveloped had a total of 10 emergency generator units. The replacement facility will have 11 total emergency generator units. Therefore, the data centre is not providing a new source, but replacing an existing facility.

8.2.12 On the basis of the above, it is considered that the development complies with national planning policy in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE) and Planning Practice Guidance for Noise (PPG-N); and policy ENV7 of the Swindon Borough Local Plan 2026. Therefore, there is no reason with respect to noise why planning permission should not be granted for the proposed development.

8.3 Air Quality

8.3.1 The Application Site is located within the administrative area of Swindon Borough Council. The council has designated an Air Quality Management Area (AQMA) for Kingshill Road, approximately 3.7 km to the north west of the Application Site. The AQMA is highly unlikely to be affected by emissions to air from the proposed development.

8.3.2 Potentially sensitive receptors in the vicinity of the proposed development include residential dwelling(s) (existing and proposed) at Burderop Park to the south and the adjacent Burderop Wood Ancient Woodland and SSSI.

8.3.3 The nearest monitoring stations are more than 2 km from the Application Site. Measured concentrations are therefore unlikely to be representative of baseline air quality at the Application Site.

8.3.4 In the absence of local monitoring, ambient annual-mean concentrations have been derived from the latest available Defra mapped background concentration estimates for the 1 km grid square of the Application Site. To ensure that the assessment presents conservative results, no reduction in the background traffic related NO_2 concentrations has been applied for future years.

8.3.5 The air quality assessment (Volume 3, Appendix 8.2) provides further detail and should be read alongside this section. It covers the:

- construction phase - an evaluation of the temporary effects from fugitive construction dust; and
- operational phase – an evaluation of the impacts of the key emission sources to air (i.e. the 11 diesel-powered generators) during testing and emergency use on the local area.

8.3.6 Whilst no detailed construction phase information is currently available, the type of activities that could cause fugitive dust emissions are: demolition; earthworks; handling and disposal of spoil; wind-blown particulate material from stockpiles; handling of loose construction materials; and movement of vehicles, both on and off site.

8.3.7 Impacts during construction are predicted to be of short duration and only relevant during the construction phase. The results of the risk assessment of construction dust impacts undertaken using the Institute of Air Quality Management (IAQM) dust guidance, indicates that before the implementation of mitigation and controls, the risk of dust impacts will be medium. Implementation

of the highly recommended mitigation measures described in the IAQM construction dust guidance should reduce the residual dust effects to a level categorised as "not significant".

8.3.8 Regarding exhaust emissions from construction-related vehicles (contractors' vehicles and Heavy Duty Vehicles (HDVs), diggers, and other diesel-powered vehicles), these are unlikely to have a significant impact on local air quality except for large, long-term construction sites: Highways England's Design Manual for Roads and Bridges (HE, 2019) states that an air quality assessment of construction-related vehicle traffic need only be assessed where construction activities are programmed to last more than two years. The construction phase is estimated to take 10 – 12 months to complete and will comprise external construction and civils activities. This is forecast to commence in early Q3 2021 (subject to the progress of the planning process).

8.3.9 Once operational, the key sources of emissions to air are the 11 diesel-powered emergency generators. The key pollutant emissions associated with the generators are oxides of nitrogen (NO_x), PM_{10}, $PM_{2.5}$ (particles up to 2.5 µm in diameter, a subset of PM_{10}), SO_2, CO and hydrocarbons. Concentrations of NO_2, PM_{10}, SO_2, CO and benzene have been predicted at selected sensitive receptors using a detailed atmospheric dispersion model and compared with the relevant long and short-term Air Quality Strategy (AQS) objectives. The long-term operational impacts for all pollutants are predicted to be 'negligible', considering the changes in pollutant concentrations and absolute levels.

8.3.10 Traffic generation associated with the development, once operational is low in the context of other traffic in the area; typically, six HDVs arriving and departing each day (i.e. 12 in total) and 74 total car movements per day. On this basis, the EPUK/IAQM thresholds are highly unlikely to be exceeded; therefore, operational-vehicle exhaust emissions have not been assessed and can be considered negligible.

8.3.11 Using professional judgement, the resulting air quality effect is considered 'not significant'.

8.4 Traffic and Transport

8.4.1 The Application Site is located to the south of Swindon, to the east of Wroughton and to the north-west of the hamlet of Burderop. The site is surrounded predominantly by countryside/recreational land, with some residential and industrial businesses located to the south and west.

8.4.2 The Application Site lies within the administrative area of Swindon Borough Council (SBC). Swindon is located approximately 1.2km to the north of the site. The site is currently accessed via the existing access on the western boundary of the site leading onto the B4005 Brimble Hill.

8.4.3 The Application Site access junction is a simple priority junction onto the B4005 Brimble Hill with a wide bellmouth within which is a pedestrian refuge. The access junctions geometries are suitable for accommodating cars and HGVs. The access is on the outside of a bend and visibility for vehicles arriving and departing is good.

8.4.4 The road network immediately surrounding the Application Site comprises local roads, with the principal access to the site extending from the B4005. The Application Site can also be accessed by pedestrians and cyclists from the same entrance via the unnamed access road off B4005 Brimble Hill. A footway exists along the eastbound carriageway leading into the site.

8.4.5 The B4005 is a single carriageway road subject to the national speed limit within the vicinity of the Application Site. The B4005 is rural in nature and the conditions are reflective of this; there is no street lighting within the vicinity of the access and there are narrow footways on both sides of the carriageway.

8.4.6 The B4005 routes broadly west to east between Wroughton and Chiseldon respectively. At its western end it forms a three arm roundabout with the A4361 Devizes Road / High Street and the

A4361 Moormead Road / Swindon Road whilst at its eastern end it forms the minor arm of a ghost island right turn lane priority junction with the A346 Marlborough Road. To the north west of Wroughton, the B4005 continues west to join junction 16 of the M4, via a grade separate roundabout where it meets with the A3102 Swindon Road. A more detailed description of the road network is provided in Volume 3, Appendix 8.3.

8.4.7 There are no national cycle routes within the immediate vicinity of the Application Site, however, National Cycle Route 45 routes through the village of Chiseldon and is accessible approximately 3km cycle from the site. Route 45 routes along the southern suburban boundary of Swindon, through west Swindon and continues north towards Cirencester. Route 45 also continues broadly south to join national cycle routes 482 and 403.

8.4.8 The nearest bus stops to the site are located approximately 100m west of the Application Site access on the B4005 Brimble Hill.

8.4.9 The construction period (including demolition) is anticipated to last for up to 12 months. Construction will consist of a mixture of construction staff vehicle movements, LGVs and HGVs. Using data derived from a similar data centre construction as received from the prospective operator, the following numbers have been derived:

- an average of 275 construction staff on site per day;
- a peak (first three months of construction) of 400 construction staff per day;
- an average of 50% of staff as car drivers with the remaining 50% car sharing and arriving by sustainable means of transport;
- taking into account 50% of construction staff will car share of arrive by sustainable means of transport, an average of 138 construction staff vehicles on site, equating to 275 vehicle movements per day (accounting for one arrival and one departure);
- taking into account 50% of construction staff will car share of arrive by sustainable means of transport, a peak (during first three months of construction) of 200 construction staff vehicles on site, equating to 400 vehicle movements per day (accounting for one arrival and one departure);
- an average of 75 HGVs on site per day, equating to 150 HGV movements per day;
- a peak (during first three months of construction) of 110 HGVs on site per day, equating to 220 HGV movements per day; and
- a peak (during first three months of construction) of 30 LGVs on site per day, equating to 60 LGV movements per day.

8.4.10 The construction period is estimated to last up to 12 months (with a peak in the first three months), with deliveries fluctuating within this period. It is envisaged that the majority of movements would be Monday to Friday with only a limited number of movements on a Saturday morning.

8.4.11 Provision will be made to ensure that all vehicles are able to park on site, or on land designated for construction staff, to avoid obstruction to the operation of the public highway. This shall be strictly enforced.

8.4.12 Construction access to the proposed development will be taken from the existing access from the B4005 Brimble Hill.

8.4.13 There is potential for the construction of the proposed development to overlap with the construction of the adjacent proposed residential development at Burderop Park. HGV movements will be spread across the day between 08:00 and 18:00, equating to a combined average of 19 HGV movements per hour if there were to be any overlap of the two construction processes.

8.4.14 Burderop Wood SSSI is located to the north and west of the Application Site. From an analysis of the surrounding highway network, all construction HGVs and the majority of construction staff would route via Junction 15 of the M4 via the A346 and the B4005; therefore, the vast majority of construction vehicles associated with the proposed development would not route along the B4005 adjacent to the SSSI.

8.4.15 The majority of construction traffic generated by the proposed development would travel via the M4 east and west of Junction 15; however, based on the construction vehicle movements set out above, it is clear that the impact of construction HGVs in the context of the existing HGV traffic within the vicinity of the Application Site is considered to be negligible.

8.4.16 The management measures will be implemented for the duration of the construction period and a CTMP has been prepared in support of the application and is included in Volume 3, Appendix 8.3will be submitted in support of the planning application.

8.4.17 During operation, up to 50 staff will be employed across a 24-hour period and will be separated by day and night shifts. Up to 30 full time staff will be on site during a typical weekday with up to seven full time staff on site during the night, including security staff. Up to 13 external staff / maintenance staff / visitors are also included as part of standard operation of the data centre. There will typically be six HGVs arriving and departing per day.

8.4.18 The resultant vehicle movements generated when the Application Site is operational will be far lower than the construction vehicle movements, therefore, on the same basis, are not expected to result in any significant adverse environmental effects. On this basis, no significant adverse effects will occur.

8.5 Hydrology and Flood Risk

8.5.1 There are no surface watercourses on the Application Site, however there is a surface water drain to the south of the site that connects to a stream approximately 90m from the south east boundary and then into a series of ponds.

8.5.2 A topographic survey completed by Clifton Surveys in June 2020 (drawing reference 989/4414/1) indicates that the level at the main access road is recorded to be 175 metres (m) above Ordnance Datum (AOD) at the site main entrance. The level drops to 172m AOD at the entrance to the southern data building and remains at that level following a path across the southern area of the site. Further east along the path, the level rises to 175m AOD before falling to 171m AOD at the entrance of the northern data building.

8.5.3 The entire Application Site is located in Flood Zone 1, land designated by the Environment Agency as having a less than 1 in 1,000 (0.1%) annual probability of flooding from rivers or the sea (i.e. very low risk).

8.5.4 The majority of the Application Site has a very low risk of surface water flooding, equivalent to an annual chance less than 1 in 1,000 (0.1%). Small, isolated areas of the site are shown to experience minor flooding in a low likelihood surface water flood event, with an annual chance of 1 in 1,000 (0.1%). Flooding is restricted to a few small isolated areas and is generally shown to be shallow (<0.3m). It is not indicative of a wider drainage issue.

8.5.5 The British Geological Survey Susceptibility to Groundwater Flooding map identifies the Application Site with a limited potential for groundwater flooding.

8.5.6 The Application Site is outside of the maximum extent of reservoir flood risk and is located remote from canals or other artificial water sources.

8.5.7 Soakaway testing has been undertaken in the location of the infiltration pond as part of the October 2020 ground investigation (see below). The results indicated that infiltration rates would

not be adequate for a shallow-based infiltration drainage solution. However, a deeper borehole infiltration test was undertaken which indicated higher infiltration rates could be achieved below 3m bgl.

8.5.8 A Drainage Design Philosophy is presented in 20305S-RPS-00-XX-RP-D-9605 that aims to ensure that the flood risk remains very low on site and is not increased elsewhere, taking into account climate change. The Philosophy proposes that surface water runoff generated from the proposed data centre is conveyed into an infiltration basin and discharged via soakaway into geocellular storage.

8.5.9 The drainage system will enable all off site discharges to be shut off in the event of a fire. This will enable the safe storage of fire-water runoff that may be contaminated. The storage required for this will be incorporated within the design. Any features that form part of the fire water storage system would be lined to prevent any infiltration to groundwater.

8.5.10 A site-specific flood risk assessment (FRA) (see Volume 3 Appendix 8.4) has been undertaken and demonstrates that the risk of flooding will not increase as a result of the proposed development. As such, it is not likely that a flooding event would significantly affect the proposed development.

8.5.11 Given the absence of surface watercourses or on adjacent to the Application Site, and the predominantly very low risk of flooding, significant adverse effects are considered unlikely to occur.

8.6 Geology and Ground Conditions

8.6.1 A site due diligence report was carried out by Arcadis in July 2020 (report ref. 10040272-SDD-SN4-001). The British Geological Survey (BGS) maps used in the report indicate that the ground conditions underlying the Application Site comprise Made Ground deposits of variable thickness and composition. There is no evidence of superficial deposits; the Made Ground is directly underlain by bedrock of the West Melbury Marly Chalk Formation, which is described as grey/off-white, soft, marly chalk and hard grey limestone. This is underlain at depth by the Upper Greensand Formation, described as sand and sandstone, fine-grained silt, glauconitic and shelly. Both the Chalk and the Greensand comprise important groundwater resources and are classified as Principal Aquifers. There are no Source Protection Zones within 2km of the site.

8.6.2 The groundwater depth beneath the Application Site is unknown. Based on historical borehole logs, groundwater is present in the Upper Greensand Formation and was historically abstracted locally from this aquifer for farming/dairy use 380m west and 730m south east of the Application Site.

8.6.3 Groundwater flow has historically been recorded in a north east direction however may be influenced locally by the aforementioned abstractions. There is no recorded evidence available that indicates groundwater rests in the West Melbury Marly Chalk Formation (i.e. <15 depth) however this cannot be ruled out as this stage.

8.6.4 A Phase 2 investigation was also undertaken in July 2020 comprising six percussive/rotary boreholes drilled to between 10 and 15m below ground level (bgl). The ground conditions were confirmed as grass over topsoil or Made Ground, overlying the West Melbury Marly Chalk (generally structureless at the Made Ground / chalk interface becoming more competent with depth) overlying strata of the Upper Greensand Formation. The Greensand Formation was encountered in only two of the boreholes at depths of between 4.90m and 7.90m bgl. Three of the boreholes were installed for groundwater monitoring, however no groundwater was detected in any of the boreholes.

8.6.5 None of the contaminant concentrations in the soil samples analysed exceeded the Generic Assessment Criteria derived for the protection of human health receptors.

8.6.6 Widespread, gross or potential mobile contamination impacts were not identified at the Application Site. Based on the measured contaminant concentrations, the site soils do not present a significant risk to human health under a commercial development scenario. The risk to controlled waters is also not indicated to be significant. Elevated Polycyclic Aromatic Hydrocarbons (PAH) were recorded within four shallow soil samples (i.e. exceeding the GACs protective of controlled waters (groundwater and surface water)), however these are not anticipated to leach into the underlying aquifer. Therefore, no contaminants were identified that would require remediation.

8.6.7 Further ground investigation was undertaken at the Application Site in October 2020 comprising 15 trial pits, two hand dug pits and three soakaway tests. Gas and groundwater level monitoring was undertaken on three occasions. Groundwater was not encountered and is deemed to the present at a depth greater than 10m bgl, and therefore, samples could not be collected and analysed. Installations were monitored for concentrations of methane, carbon dioxide and oxygen. The flow rate and barometric pressure were also recorded.

8.6.8 Methane was recorded at levels below the machine detection limit in all boreholes. Carbon dioxide was recorded at a maximum concentration of 3.9% v/v within monitoring well BH05, screened within the West Melbury Marly Chalk Formation and Upper Greensand Formation on 21st October 2020.

8.6.9 The CIRIA Report C665 ‘Assessing risks posed by hazardous ground gases to buildings’ outlines indicative guideline concentrations for carbon dioxide and methane in association with gas flow rates for which gas protection measures may be required in new residential or commercial developments. The methodology is based on the Modified Wilson and Card approach that characterises the gas regime into a series of Characteristic Situations (1 to 5), with corresponding indicative gas protection measures. Using this methodology, the ground gas regime at the Application Site corresponds to Characteristic Situation 1, whereby no specific gas protection measures are required.

8.6.10 Asbestos samples were found in eight samples of the Made Ground collected across the Application Site.

8.6.11 In areas of the Application Site proposed to be covered by buildings and hardstanding, the risks to future site users from these contaminants of concern via the pathways of dermal contact and ingestion will be mitigated. In areas of the Application Site that are not covered by buildings or concrete/asphalt hardstanding, these pathways could still be active. Further targeted surveys are proposed post-submission based on the summary approach in Volume 3 Appendix 8.5. The results of the surveys will be used to inform mitigation measures (where required) and will be agreed with SBC.. These measures will mitigate potential risks to human health.

8.6.12 A CoCP has been prepared as part of the application (Volume 3, Appendix 2.1) and includes measures relating to the storage and use of oils and chemicals; spillage control measures and require a procedure to be in place should unexpected contamination be encountered.

8.6.13 During operation, the Application Site includes hardstanding limiting infiltration and reducing the likelihood of contaminants leaching into the aquifer. The proposed infiltration pond is located below the level of the Made Ground to mitigate the risks of the contaminants of concern leaching into the groundwater. The mitigation implemented during the construction phase will also remove potential pathways with future site users.

8.6.14 Based on the above, the risk to controlled waters from the site soils is considered low.

1 INTRODUCTION

1.1.1 This Environmental Statement (ES) reports on the findings of the Environmental Impact Assessment (EIA) process and supports the planning application for the redevelopment of land at the National Data Centre. The proposed development comprises a replacement data centre and associated infrastructure.

1.1.2 The Application Site is located at the Old Burderop Hospital Site on Brimble Hill as shown on Figure 1.1. The site is approximately 980 m from Wroughton, 1.2 km south of the outer edge of Swindon and 670 m from the M4 motorway.

1.1.3 The proposed development will include a:

- data hall;
- associated electrical and Air Handling Unit (AHU) Plant Room;
- loading bay;
- maintenance and storage space;
- office administration area; and
- plant at roof level.

1.1.4 The proposed development will also include emergency generators, emission stacks and associated infrastructure.

1.2 Statutory Framework and Purpose of the Environmental Statement

Purpose of EIA

1.2.1 EIA is a means of identifying and collating information to inform an assessment of the likely significant environmental effects of a project. The findings of the EIA process are reported in an ES in order to inform the relevant planning authority and interested parties as part of the decision-making process.

The EIA Regulations

1.2.2 The legislative framework for EIA in the UK is set by the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 as amended. These regulations are referred to in this ES as 'the EIA Regulations'.

1.3 Need for EIA

1.3.1 Schedule 1 of the EIA Regulations identifies development types that always require EIA. Schedule 2 identifies development types that require EIA if they are likely to lead to significant effects on the environment by virtue of factors such as their nature, size or location. Schedule 2 development is defined within the EIA Regulations as development of a description mentioned in Column 1 of the table in Schedule 2 where:

'a) any part of that development is to be carried out in a sensitive area; or

b) any applicable threshold or criterion in the corresponding part of Column 2 of that table is respectively exceeded or met in relation to that development.'

1.3.2 The proposed development falls within Part 10(a) of Column 1 of the table in Schedule 2 – industrial estate development projects. The threshold for Part 10(a) development is:

- The area of the development exceeds 0.5

1.3.3 The proposed development area extends to 5.53 hectares and therefore, exceeds the 0.5-hectare threshold. On this basis, the proposed development would be a Schedule 2 development.

1.3.4 Schedule 2 developments require consideration against the criteria set out in Schedule 3 of the EIA Regulations to determine whether EIA is required. The criteria include the characteristics of the development, location of development and characteristics of the potential impact.

1.3.5 A formal request for a Screening Opinion was submitted to Swindon Borough Council on 2 October 2020 and a Screening Opinion was returned on 30 November 2020. The Screening Report and Screening Opinion are provided at Appendix 1.1 of the ES. The Screening Opinion concluded that an ES is required for the proposed development as '*the information submitted* [with the Screening request] *does not demonstrate that a significant environmental effect would not result with regard to above ground heritage, ecology and biodiversity with particular regard to the SSSI; and the character and appearance of the landscape with particular regard to the AONB'.*

1.4 Content of the ES

1.4.1 This ES has been prepared in accordance with the EIA Regulations. Although there is no statutory provision as to the form of an ES, it must contain the information specified in Regulation 18 and Schedule 4 of the EIA Regulations. For the avoidance of doubt, the specified information within Regulation 18 and Schedule 4 is provided in Appendix 1.2 of this ES.

1.4.2 This ES provides all information required under Regulation 18 and Schedule 4. The information supplied within this ES is considered to provide a clear understanding of the main and likely significant effects of the project upon the environment.

1.5 Structure of the ES

1.5.1 The ES has been structured in order to allow relevant environmental information to be easily accessible. This volume of the ES (Volume 1) includes the main text of the ES. The description of the proposed development is provided in Chapter 2. Information relating to the main alternatives considered during the evolution of the proposed development and the reasons for the choices made is found within Chapter 3. Chapter 4 outlines the approach and methodology adopted for the EIA. The remainder of Volume 1 contains topic by topic environmental information as shown in Table 1.1.

1.5.2 Figures and appendices to accompany the text of the ES are provided separately in Volumes 2 and 3. Volume 3 includes specialist reports providing relevant background and technical information. A Non-Technical Summary (NTS) of the ES is available as a separate summary document.

Table 1.1: Structure of ES

Structure of ES	
Non-Technical Summary	Summary of the ES using non-technical terminology
Volume 1: Text	
	Glossary

Structure of ES	
Chapter 1	Introduction
Chapter 2	Project Description
Chapter 3	Need and Alternatives Considered
Chapter 4	Environmental Assessment Methodology
Chapter 5	Landscape and Visual Resources
Chapter 6	Ecology and Biodiversity
Chapter 7	Historic Environment
Chapter 8	Other Environmental Effects
Volume 2: Figures	
Including all figures and drawings to accompany the text.	
Volume 3: Appendices	
Including specialist reports forming technical appendices to the main text.	

1.6 The Assessment Team

1.6.1 The EIA has been managed by RPS, taking into account information provided by the Applicant and design team. RPS is a registrant of the Institute of Environmental Management and Assessment (IEMA) Quality Mark. All authors of this ES are senior members of RPS, and a statement setting out how the authors have sufficient expertise to ensure the completeness and quality of the ES is provided in Appendix 1.3.

1.7 Further Information

1.7.1 This ES has been submitted as part of a planning application for the proposed data centre at Burderop. The application has been submitted to Swindon Borough Council (Wat Tyler House, Princes Street, Swindon SN1 2JG). The planning application, ES and Non-Technical Summary can be viewed at: https://pa1.swindon.gov.uk/publicaccess/.

1.7.2 Further copies of the ES can be obtained from the following address:

RPS

20 Western Avenue

Milton Park

Abingdon

Oxfordshire

OX14 4SH

1.7.3 A paper copy of the full ES can be obtained for a cost of £250 plus VAT or an electronic copy (CD) for a cost of £10.

1.7.4 All comments on the ES (and planning application) should be issued to Swindon Borough Council (planning department) at the address stated in paragraph 1.7.1.

PROPOSED REPLACEMENT DATA CENTRE

ENVIRONMENTAL STATEMENT VOLUME 1: MAIN TEXT

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton, Swindon

20305S-RPS-XX-XX-RP-P-9710

rpsgroup.com

PROPOSED REPLACEMENT DATA CENTRE, OLD BURDEROP HOSPITAL SITE, SWINDON

Environmental Statement: Volume 1 Main Text

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton Swindon

March 2021

Final

VOLUME 1: MAIN TEXT

6 ECOLOGY AND BIODIVERSITY

6.1 Introduction

6.1.1 The purpose of this chapter is to identify and assess the effects on ecology and biodiversity which would result from the redevelopment of land at the National Data Centre, located at the Old Burderop Hospital site, Brimble Hill (hereafter referred to as the 'Application Site') and to provide a replacement data centre and associated infrastructure (the 'proposed development').

6.2 Assessment Methodology

Planning Policy Context

6.2.1 The following national and local planning policy documents and guidance are relevant to the proposed development:

- National Planning Policy Framework – NPPF (DCLG, 2018);
- Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Effect within the Planning System (ODMP and DEFRA, 2005);
- Planning for Biodiversity and Geological Conservation: A Guide to Good Practice (ODMP, 2005);
- National Planning Practice Guidance – NPPG (DCLG, 2018);
- Swindon Borough Local Plan 2026 (Swindon Borough Council, 2015);
- Swindon Borough Green Infrastructure Strategy 2010-2026 Revised Consultation Document (Swindon Borough Council, 2011); and
- Wiltshire Biodiversity Action Plan 2008 (Wiltshire Wildlife Trust, 2008).

6.2.2 Relevant extracts of the above policies and documents are provided in Volume 3 Appendix 6.1.

Relevant Guidance and Legislation

Wildlife and Countryside Act 1981 (as amended)

6.2.3 The Wildlife and Countryside Act (WCA) 1981 (as amended) is the principal legislative protection for wildlife within England. It establishes protection for certain species of plant and animals and allowed for the protection in law of various designated sites. It also consolidated and amended earlier national legislation to implement the European Directive 2009/147/EC on the conservation of wild birds – (The Birds Directive) in the UK. Individual species receive different levels of protection under the act. Special Protection Areas (SPAs) were designated under the WCA 1981 where sites and their habitats support significant numbers of wild birds.

Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

6.2.4 The WCA 1981 is complemented by the Conservation of Habitats and Species Regulations 2017 (hereafter referred to as The Habitat Regulations) which was amended in 2019 to address the Brexit transition. This is the most recent legislation to implement in law the European Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora - (Habitats Directive) adopted in 1992.

6.2.5 Individual species (such as otter *Lutra lutra* and dormouse *Muscardinus avellanarius*) and species groups (e.g. all native UK bat Chiroptera species) receive a high level of protection under the Habitat Regulations.

6.2.6 The regulations require the potential effects on European Protected Habitats to be a key consideration in planning decisions. If it is likely that the designated features have the potential to be impacted, then an appropriate assessment is required under Article 6(3) of the Habitats Directive with consideration of mitigation options to avoid adverse effects. If uncertainty remains over a potentially significant effect, then alternative solutions need to be considered.

Countryside and Rights of Way Act 2000

6.2.7 The WCA 1981 has been amended and reinforced in England and Wales by the Countryside and Rights of Way Act (CRoW) Act 2000 (as amended). The CRoW Act increases protection for Sites of Special Scientific Interest (SSSI) as well as strengthening wildlife enforcement legislation.

6.2.8 The CRoW Act places a duty on the Government to have regard for the conservation of biodiversity and to maintain lists of species and habitats for which conservation action should be taken or promoted, in accordance with the Convention on Biological Diversity. Schedule 9 of the CRoW Act amends the WCA 1981 by altering the notification procedures for SSSIs and providing increased powers for their protection and management.

Natural Environment and Rural Communities Act 2006

6.2.9 The Natural Environment and Rural Communities (NERC) Act 2006 places a duty on all public authorities to have regard to the purpose of conserving biodiversity.

6.2.10 Section 40 of the NERC Act 2006 imposes a duty on all public bodies including local and national government to have regard to biodiversity in the exercise of all of their functions, with particular regard to the species of conservation priority and is often referred to as 'the biodiversity duty'.

6.2.11 In England, Section 41 (S41) of the Act lists the species and habitats of highest importance for conserving biodiversity (derived from the original UK Biodiversity Action Plan (BAP) priorities). These are referred to in this report as ‘Species of Principal Importance’. The S41 list is a definitive reference for all public bodies in England (statutory and non-statutory) and is a guide for decision-makers when implementing their statutory duties to have regard to the conservation of biodiversity. This ‘biodiversity duty’ includes taking steps to promote the restoration and enhancement of the populations of S41 species.

6.2.12 Section 41 species include a number of native bat species (including greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *Rhinolophus hipposideros*, noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, and brown long-eared bat *Plecotus auritus*, dormouse *Muscardinus avellanarius*, hedgehog *Erinaceus europaeus*, brown hare *Lepus europaeus*, a number of bird species associated with grassland and woodland habitats, and slow-worm *Anguis fragilis*, and great crested newt *Triturus cristatus* amongst others. All these species are of conservation concern and have suffered long-term population declines.

Protection of Badgers Act 1992

6.2.13 Badger *Meles meles* is protected (with very few exceptions) from being taken, killed or injured under the Badger Protection Act 1992. Most relevant to development, the Protection of Badgers Act 1992 also prohibits damaging, destroying or obstructing access to a badger sett or to disturbing a badger while occupying a sett.

Guidance

6.2.14 The assessment follows the methods set out in guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

Study Area

6.2.15 The study area for terrestrial ecology extends to 2 km from the Application Site redline boundary for non-statutory designated sites and species records, 5 km for statutory designated sites and 10km for air quality impacts on European designated sites.

6.2.16 The study area for the baseline surveys, and the extent of the site to which this assessment applies (the 'Application Site') is defined in the Ecological Appraisal (see Volume 3 Appendix 6.2).

Baseline Methodology

6.2.17 The following ecological baseline studies were undertaken to inform this assessment:

- Preliminary Ecological Appraisal;
- NVC Grassland Survey;
- Invertebrate Survey;
- Reptile Survey;
- Preliminary Bat Roost Assessment;
- Tree Climbing Inspections (to assess bat roost potential of trees);
- Bat Activity Surveys;
- Badger Survey; and
- Dormouse Survey.

6.2.18 Detailed methodologies of the baseline surveys are given the Ecological Appraisal Report (RPS, 2020) in Volume 3 Appendix 6.2 of the ES.

Consultation

6.2.19 A summary of all consultation with stakeholders and consultees is given in the Table 6-1.

Table 6-1: Consultation Responses Relevant to Ecology and Biodiversity

Date	Consultee and Issues Raised	How/ Where Addressed
30/11/2020 Screening Opinion	Swindon Borough Council There is clearly potential for significant effects with regard to the proximity to the SSSI, particularly Burderop Wood. Mitigation measures during construction to limit dust, noise and lighting and their impact on the neighbouring SSSI may limit the potential for any significant effect. However, the information submitted does not comprehensively demonstrate that there would not be significant effects on the Burderop Woods SSSI. Further studies are being carried out and the outcome of these are likely to be informative with regard this assessment.	This chapter details the surveys and assessment that have been undertaken to demonstrate that there proposed development would have significant adverse effects on ecology and biodiversity.
09/12/2020	County Ecologist	

Date	Consultee and Issues Raised	How/ Where Addressed
Swindon Borough Council Pre-application Advice	Potential impacts of construction and operation on Burderop Wood SSSI which adjoins the northern Application Site Boundary, including air emission, heat and humidity effects.	Recognised in baseline survey report (Volume 3 Appendix 6.2) and impact assessment in this chapter.
	Proposed biodiversity enhancements should be included in the proposal. Sustainable drainage measures should also contribute to the biodiversity enhancements at the Application Site.	BNG Assessment (Volume 3 Appendix 6.3), Landscape Strategy (Figure 5.45).
	Potential loss of vegetation and impact on the North Wessex Downs AONB. The development should comply with North Wessex Downs AONB Management Plan and Paragraphs 127 and 173 of the NPPF.	Landscape and Visual Impact Assessment LVIA (Chapter 5) BNG assessment (Volume 3 Appendix 6.3), impact assessment and mitigation in this chapter.
	Where compliance with the NPPF or other policies isn't possible, the development should provide mitigation, and also enhancements where possible.	
	Impacts on biodiversity generally should be found to be neutral, positive or able to be adequately mitigated.	Addressed in the BNG Assessment (Volume 3 Appendix 6.3), impact assessment and mitigation in this chapter.
	The requirement for a Biodiversity Net Gain (BNG) Assessment using the DEFRA metric.	Addressed in the BNG Assessment (Volume 3 Appendix 6.3).
09/12/2020 Swindon Borough Council Pre-application Advice	Natural England	
	Potential significant effects on Burderop Wood and Coates Water SSSIs and the North Wessex Downs AONB requiring sufficient information on potential impacts on these sites to be submitted.	LVIA (Chapter 5) Air Quality Assessment (Volume 3 Appendix 6.5), impact assessment and mitigation in this chapter.
	The need to seek information from the local records centre and other relevant organisations on local biodiversity receptors.	Addressed in the desk study of the Ecological Appraisal (Volume 3 Appendix 6.2).
	Potential Impacts on protected species, priority habitats / species, local wildlife sites, application of appropriate avoidance mitigation or compensation.	Impact assessment and mitigation in this chapter.
10/01/21 Swindon Borough Council Scoping Opinion	Swindon Borough Council ecologist	
	Both bat roost and invertebrate surveys are outstanding and will not be available prior to the submission of an application – This is a matter that needs to be fully addressed	The required surveys will be completed in spring prior to planning determination
	A Discretionary Advice Service request to Natural England prior to application should be submitted to determine whether Natural England would consider this site suitable for the proposed development; and this should be included with any planning application	There is direct engagement with NE and the outcomes of the discussions are being addressed within the planning application.
	The Defra Biodiversity Metric should be submitted with a planning application as a working Excel spreadsheet. Biodiversity net gain will be required, in accordance with the NPPF and Local Plan Policy EN4,	A summary of the BNG and the Biodiversity Metric are to be submitted with the final ES chapter

Date	Consultee and Issues Raised	How/ Where Addressed
	It is welcomed that the assessment will address the impacts from changes in habitat quality or disturbance, through changes in lighting or noise. This should also include changes resulting from heat loss/changes in humidity and the use of the generators.	TBC
	The scoping out of ecological receptors, namely Otters; Water Voles; and Amphibians, is based on existing survey data which is not available as part of this scoping report.	These species have been scoped out as ecological receptors due to nature and context of the site
03/02/21 – Natural England Discretionary Advice Service Meeting	Natural England	
	Proximity of the proposed development to Burderop Wood SSSI and Ancient Woodland and explained that all aspects of the development (including the fence line) would have to be a minimum of 15m from the Ancient Woodland.	The masterplan provides a minimum 15m standoff from the fence line to the ancient woodland to the north. The building is located at a further distance from the woodland, and the generators have been located to the south of the building to minimise noise and air quality impacts.
	The Application Site includes a relatively large area of neutral unimproved grassland, which is a priority habitat in the UK and is in decline. The ecological value of the grassland is given greater importance because it is contiguous with the SSSI to the north, provides a mosaic of habitats and is located within the AONB. NE requires full review of alternatives including the adjoining off-site land and alternative layouts within the site to provide strong justification for why the Application Site and impacts on grassland have been minimised.	The neutral grassland has developed on ground that previously contained a military hospital with buildings present across the site. The status and value of the grassland is part of ongoing discussions with NE. Extensive consideration of alternatives has been undertaken of layouts on site and the adjoining land (outside the redline boundary) to reduce the loss of habitat. This process has been documented in Chapter 3- Need and Alternatives.
	Proposed grassland mitigation in the east and the retained grassland in the west would be fragmented and separated by the development and its ecological value would be lower than continuous habitat.	A revised masterplan has been adopted reducing the area enclosed by perimeter fencing and demolishing the Alpha building to increase the extent of connected grassland habitat in the final development – shown on the Landscape Strategy
	Where it is shown that the loss of high value grassland is unavoidable, then NE would require a minimum of 10% BNG. Where this cannot be provided in the Application Site then new high value grassland habitat would be required elsewhere. The priority should be to AVOID the loss of the grassland habitat and if this not possible seek to provide a replacement functional habitat elsewhere.	The NVC data has been provided and discussed with Natural England. Agreed that the grassland does not fall into lowland meadow habitat but has the potential to become this through management. The revised masterplan has been developed to increase the biodiversity value of the post development site – reducing hardstanding and mown wildflower turf and increasing the extent of retained, translocated and new neutral grassland
18/02/21 – Natural England Discretionary Advice Service Meeting	Natural England (Additional points beyond those raised in the meeting on 03/02/21)	

Date	Consultee and Issues Raised	How/ Where Addressed
	Request for NVC grassland data to review classification and status of the grassland habitats	The data has been provided and will inform the future discussions with NE
	Request for the information on shading from the data centre and the potential for adverse effects of the woodland trees	To be addressed in the final ES chapter
	Where it can be shown that there are no alternatives to the siting of development with the loss of grassland being unavoidable then NE would support translocation within the site – as a last resort – minimising the period of turf storage.	A Grassland Translocation Method Statement and Biodiversity Management and Monitoring Plan will be prepared to detail preparation, methods, timing, aftercare, monitoring and remedial actions.
09/03/21 – Natural England Discretionary Advice Service Meeting	Natural England (Additional points beyond those raised in the meeting on 03/02/21)	
	Alternative layouts query – further information required on the assessment of the adjoining off-site field	The alternative layouts are discussed in Chapter 3 of the Environmental Statement.
	Grassland classifications and conditions. The site has areas of grassland of value in a local context but which do not qualify as 'lowland meadow' a habitat of principle importance	A detailed breakdown of grassland areas BNG condition will be prepared for grasslands showing the level of enhancement proposed – target condition
	Grassland / soils translocation Where there are no alternatives the safeguarding and translocation of vegetation and soils would be acceptable	A detailed grassland method statement will be prepared including details of soil structure and pH and with details of the operations with support from a specialist contractor.
	Off-site compensation for the loss of grassland will remain a requirement for the development	The scale of off-site compensation may need to be reviewed following agreeing the fine details in the BNG calculations

Assessment Criteria and Assignment of Significance

Receptor Value

6.2.20 The assessment of ecological effects from the proposed development focusses on 'important ecological features' (IEFs). These are species and habitats that are valued in some way and could be affected by the Project. Other IEFs may occur on or in the vicinity of a proposed development but do not need to be considered because there is no potential for them to be significantly affected.

6.2.21 Each IEF is ascribed a value based on several parameters as set out in Table 6-2

Table 6-2: Definitions of Ecological Receptor Value

Receptor Value	Typical Descriptors
Very High	Sites International (i.e. greater than UK or Welsh) significance e.g. Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar Sites.

Receptor Value	Typical Descriptors
	Sites which have features sufficiently unique or unusual as to be considered one of the highest quality examples in an international or national context and therefore are likely to qualify as a site of european or international importance. Resident, or regularly occurring, populations of species which may be considered at an International or European level where: • the loss of these populations would adversely affect the conservation status or distribution of the species **at this geographic scale**; or • the population forms a critical part of a wider population **at this scale**; or • the species is at a critical phase of its life cycle **at this scale**.
High	Sites of UK or National (English) Importance e.g. Sites of Special Scientific Interest (SSSI) & National Nature Reserves (NNR). Sites which have features sufficiently unique or unusual as to be considered one of the highest quality examples nationally and therefore are likely to qualify as a site of national importance. Priority habitats in UK BAP and NERC Act (2006) and Ancient woodland. Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where: • the loss of these populations would adversely affect the conservation status or distribution of the species **at this scale**; or • the population forms a critical part of a wider population **at this scale**; or • the species is at a critical phase of its life cycle **at this scale**.
Medium	Sites of Regional (Southern England) or County (Wiltshire) Importance e.g. Sites of Nature Conservation Importance (SINCs), Local Nature Reserves (LNRs) Local Wildlife Sites (LWSs) and Ancient Woodland. Sites which have features sufficiently unique or unusual as to be considered one of the highest quality examples in the regional / county context and therefore are likely to qualify as a site of regional / county importance. Presence of Local Biodiversity Action Plan (LBAP) habitats or species, where the action plan states that all areas of representative habitat or individuals of the species should be protected. Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level and key/priority species listed within Local BAPs where: • the loss of these populations would adversely affect the conservation status or distribution of the species **at this scale**; or • the population forms a critical part of a wider population **at this scale**; or • the species is at a critical phase of its life cycle **at this scale**.
Low	District / Local Importance but unlikely to be of sufficient value to merit a formal nature conservation designation. Areas of habitat; or populations / communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.
Negligible	Includes features of site level vale and of no more than Parish importance.

6.2.22 In assigning a value to a site, habitat or species population or assemblage, its distribution and status (including a consideration of trends based on available historical records) are considered. Rarity is considered because of its relationship with threat and vulnerability, and the need to conserve representative areas of habitats and genetic diversity of species populations, although rarity in itself is not necessarily an indicator of value. A species that is rare and declining is assigned a higher value than one that is rare but known to be stable.

6.2.23 The valuation of sites also takes full account of existing value systems such as SSSIs and Local designations. Judgement is required for the valuation of sites of less than county importance.

6.2.24 The valuation of habitats takes into account published selection criteria. These include size (extent), diversity, naturalness, rarity, fragility, typicalness, recorded history, position in an ecological or geographical unit, current condition and potential importance.

6.2.25 Criteria for the valuation of habitats and plant communities include Annex III of the Habitats Directive, guidelines for the selection of biological SSSIs and criteria used by local planning authorities and the Wildlife Trusts for the selection of local sites. Legal protection status is also a consideration for habitats where these are features of statutory designated sites.

6.2.26 Species populations are valued on the basis of their size, recognised status (such as through published lists of species of conservation concern and designation of BAP status) and legal protection status. For example, bird populations exceeding 1% of published information on biogeographic populations are considered to be of international importance, those exceeding 1% of published data for national populations are considered to be of national importance, etc.

6.2.27 In assigning importance to species populations, it is important to consider the status of the species in terms of any legal protection to which it is subject. However, it is also important to consider other factors such as its distribution, rarity, population trends, and the size of the population which would be affected. Thus, for example, whilst the great crested newt *Triturus cristatus* is protected under the Habitats Directive, and therefore conservation of the species is of significance at the international level, this does not mean that every population of great crested newt is internationally important and thus of very high value. It is important to consider the population in its context. Thus, in assigning values to species, the geographic scale at which they are important has been considered. The assessments of value rely on the professional opinion and judgement of experienced ecologists.

6.2.28 Due regard has been paid to the legal protection afforded to such species in the development of mitigation measures to be implemented during construction and operation of the proposed development. For European protected species there is a requirement that a scheme should not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range, i.e. to maintain favourable conservation status, a scheme should not affect the long term availability of sufficient habitat required by the population, the long term viability of the population, or the long term natural range of the species.

6.2.29 Assessing feature values requires consideration of both existing and future predicted baseline conditions, and therefore, the description and valuation of ecological features takes account of any likely changes, including for example, trends in the population size or distribution of species, likely changes to the extent of habitats and the effects of other proposed developments or land use changes.

Magnitude of Impact

6.2.30 The likely impacts of the Swindon Data Centre Project have been assessed in terms of the:

- type of impact (i.e. whether the Project would result in a beneficial or adverse impact on the identified IEFs);
- size or intensity of the impact measured in relevant terms (e.g. numbers of individuals lost or gained, area of habitat lost or created);
- extent or spatial scope of the impact;
- likely duration of the impact;
- reversibility of the impact – whether the effect is naturally reversible or reversible through mitigation action; and
- timing and frequency of the impact, in relation to ecological changes.

6.2.31 Table 6-3: Definitions of Magnitude of Effects Used in this Assessment indicates how the magnitude of impacts has been described within this assessment, taking into account guidance provided in CIEEM (2018).

Table 6-3: Definitions of Magnitude of Effects Used in this Assessment

Magnitude of Effect	Typical Descriptors
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Medium	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Low	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

6.2.32 Conservation status is described by the CIEEM (2018) guidance as follows:

'*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*.'

6.2.33 The assessment of whether the favourable conservation status of an IEF is likely to be compromised has been made using professional judgement based on an analysis of the predicted impact of the Swindon Data Centre Project with reference to specific parameters outlined in Table 6-2 and Table 6-3. For designated sites that are affected by the Swindon Data Centre Project, the focus has been on the impacts on the integrity of the site, i.e. the ability of the site to continue to maintain conditions which would allow the key species and habitats for which it was designated to flourish. In assessing impacts on these sites, the focus has been on impacts on the key species and those habitats and features of value to them.

6.2.34 In assessing the magnitude of impacts, consideration has been given to the fragility or stability of the habitats and the sensitivity of the species potentially affected by the Swindon Data Centre Project. Fragile habitats are those which are readily damaged by human activity. Fragility is to some degree the inverse of stability, which can be defined as the ability of an ecosystem to maintain some form of equilibrium in the presence of perturbations. Fragility and stability can be expressed in terms of the degree of change in species abundance and composition following disturbance. Sensitive species are those that are highly susceptible to disturbance. This may be direct disturbance as result of human activity, noise etc., or disturbance as a result of habitat

change where a species is particularly associated with a specific habitat and would be lost for the area if that habitat is removed.

6.2.35 Where likely adverse impacts have been identified, mitigation methods have been incorporated into the Swindon Data Centre Project, where practicable.

Significance of Effects

6.2.36 The interaction of IEF sensitivity and impact magnitude defines the overall significance of the impact. Levels of significance used in this assessment are defined in Table 6-4.

Table 6-4: Assessment Matrix to Determine Significance of Effects

Value of Receptor	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Negligible or Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

6.2.37 The nature of the effects has been classified as adverse, beneficial or neutral.

6.2.38 Where the matrix offers more than one significance option, professional judgement has been used based on all the available information to decide the most appropriate level of significance.

6.2.39 The broad definitions of the terms used should be in line with the following:

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
- Moderate: These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Timescale of Effects

6.2.40 For the purposes of the assessment the following timeframes are referred to in relation to the duration of effects and/or the time required for mitigation measures to become effective:

- Short term: A period of months, up to one year;
- Medium term: A period of more than one year, up to five years; and
- Long term: A period of greater than five years.

Limitations of the Assessment

6.2.41 Bat activity surveys were carried out monthly in August, September and October 2020 with remote recording for at least five days at two locations each month. Extrapolating from the August to October 2020 surveys, the very low levels of bat activity indicate the site has lower value for foraging bats than the habitats present might suggest. Therefore, additional surveys would be unlikely to yield further information that would significantly change the assessment in this chapter.

6.2.42 Eight buildings (See Volume 3 Appendix 6.2, Figure 3), B1 to B8, are present on site. Each On a precautionary basis Buildings B1, B3 and B8 were assessed as having low bat roost potential due to the presence of a small feature or lack of internal access. The three buildings B1, B3 and B8 will be subject to a single dusk emergence survey prior to planning determination. All of these buildings will be demolished as part of the proposed development.

6.2.43 Trees T10/T76), T11/T40, T14/T75, T21/T65 had a ground inspection and one climbing inspection with no signs of bat roosting recorded. Further tree climbing/emergence surveys are due to be carried out on each of these trees in spring and early summer 2021 to confirm if there are any roosts located within the development footprint or adjacent to the operational site.

6.2.44 Invertebrate surveys carried out in September and October concluded that the site was unlikely to have high invertebrate interest. Species that only fly in spring and early summer would not have been detected late in the season and further surveys in May and June would be needed to give a more complete an assessment of the site value for invertebrates (see paragraph **Error! Reference source not found.**).

Baseline Environment

Designated Sites

6.2.45 Information on statutory designated sites, (including SACs, SPAs, SSSIs and NNRs); and non-statutory designated sites (including LWSs and SINCs) was obtained through the desk study carried out as part of the Ecological Appraisal (Volume 3 Appendix 6.2).

6.2.46 Designated nature conservation sites identified in the desk study are listed in Table 6-5 and their locations shown on the Designated Sites Plans (Volume 3 Appendix 6.2, Figure 1 and 2).

6.2.47 More detailed descriptions (where information was available) are given in the text below.

Table 6-5. Designated Nature ConservationSites within 2km (non-statutory sites) and 5km (statutory sites) of the Application Site.

Site name	Type	Interest Features / Reasons for Designation	Distance from site (km)
Statutory Designations within 5km			

Site name	Type	Interest Features / Reasons for Designation	Distance from site (km)
North Wessex Downs	AONB	Encompassing one of the largest tracts of chalk downland in southern England the AONB also includes lowland farmland, and woodland. The AONB includes areas of great biodiversity and archaeological interest.	Site is within the designation
Burderop Wood	SSSI	Wet ash-maple and acid pedunculate oak-hazel-ash woodland, with a rich associated ground flora, large numbers of mature oaks and areas of permanently saturated ground.	0m (adjacent to northern boundary)
Coate Water	SSSI and LNR	Two lakes and adjacent semi-natural vegetation including semi-natural woodland of oak, ash and willow and associated woodland ground flora Willow scrub and fen communities adjoin the lake edge. Several wet meadows support semi-improved and unimproved grassland and there are areas of sedges and rushes. Field boundaries comprise thick old hedgerows with mature oak and ash trees. The site is important for breeding birds (woodland and wildfowl species). The lake margins support an outstanding dragonfly and damselfly assemblage.	1.6
Clouts Wood	SSSI	Good example of ash-maple-hazel and invasive English elm woodland with rich ground flora.	2.3
Old Town Railway Cutting	SSSI	Designated for geological importance.	2.6
Great Quarry	SSSI	Designated for geological importance.	2.9
Okus Quarry	SSSI	Designated for geological importance.	3.4
Bicknoll Dip Woods	SSSI	Designated due to presence of nationally and internationally rare mosses.	4.8
Quarry Wildlife Garden	LNR	Wildlife Garden in a former quarry surrounded by houses yet with diverse wildlife including dragonflies and frogs in a small pond, and badgers.	2.9
Barbury Castle	LNR	Iron age hillfort. Areas of chalk downland which support the typical assemblage of species found in such areas. It is particularly notable for its butterflies, flora and bird species	3.5
Radnor Street Cemetery	LNR	Ancient semi-natural woodland mostly of oak and hazel with some old coppice stools. Good range of woodland flowers. Open wayleaves under powerlines are important for invertebrates. Small adjacent species rich meadow. Bechstein's bat is breeds on site.	3.7
Rushley Platt Canalside Park	LNR	Grassland with stream and a pond. Water vole are present along with several bird species associated with wetland habitat. Dragonflies breed in the pond.	3.8
Non-statutory Designations within 2km			
Burderop Combe	LWS	Grassland	0.05
River Ray and Burderop Plantations	LWS	Woodland	0.51
Oaken Ground Copse	LWS	Ancient Woodland	0.69
Burderop Wood North	LWS	Woodland	0.76
Long Copse and Crook's Copse	LWS	Woodland	0.87
Hodson Scarp	LWS	Grassland	1.1

Site name	Type	Interest Features / Reasons for Designation	Distance from site (km)
Coombe Bottom	LWS	Ancient Woodland, Grassland	1.1
Pinkcombe Wood	LWS	Woodland	1.2
Wroughton Reservoir	LWS	Waterbody	1.2
King's Farm Wood	LWS/ WWT	Woodland	1.7
Great Copse	LWS	Woodland	1.9
Cow Hill Bank	LWS	Grassland	1.9
Diocese Land	LWS / WWT	Grassland	2.1
Church Hill Pastures	LWS / WWT	Grassland	2.1

Abbreviations used in Table 6-5: SSSI: Site of Special Scientific Interest; LNR: Local Nature Reserve; LWS: Local Wildlife Site; WWT Reserve; Wiltshire Wildlife Trust Reserve; NS: Not supplied; ha: hectare.

North Wessex Downs AONB

6.2.48 The North Wessex Downs AONB encompasses one of the largest tracts of chalk downland in southern England. The AONB chalk ridge extends from the wooded reaches of Goring Gap in the east where it meets the Chilterns AONB, looping around the Kennet Valley and falling away to the Test Valley. In contrast to the chalk uplands of Marlborough, Berkshire and the North Hampshire Downs, the AONB includes farmed valley landscapes such as the Vale of Pewsey and the beech avenues and oak-fringed glades of Savernake Forest.

6.2.49 Along with the important surviving chalk downland and ancient woodland, the AONB has great archaeological significance having been settled since 3000 BC. Archaeological features across the AONB include barrows The Wansdyke earthwork, Roman roads, ancient tracks such as the Ridgeway, and the famous chalk cutting of the White Horse of Uffington, the Neolithic stone circle at Avebury and surrounding monuments are within the AONB and are part of a World Heritage Site.

6.2.50 Agriculture (mostly cereals in the lowland areas) is the major land use in the AONB, and the valleys are some of Britain's most fertile farmland.

6.2.51 The North Wessex Downs AONB is not explicitly designated for biodiversity or ecological features. Those features within the AONB which have biodiversity interest are either sites designated specifically for their biodiversity interest (listed in Table 6-5) or they are habitats and species within the Application Site and wider local area. Potential impacts on these are addressed in the relevant sections of this chapter.

Burderop Wood SSSI

6.2.52 Burderop is an example of wet ash-maple and acid pedunculate oak-hazel-ash woodland, with a rich associated ground flora. There are many mature oaks and extensive areas of permanently saturated ground due to the presence of several springs.

6.2.53 The woodland has a varied structure due to steep slopes, the effects of Dutch elm disease, small areas of coppicing and the presence of mown rides. The most widespread tree is ash *Fraxinus excelsior*, but many mature oak *Quercus robur* standards are also present. Silver birch *Betula pendula*, field maple *Acer campestre* and holly *Ilex aquifolium* are of more restricted distribution.

Wych elm *Ulmus glabra*, and English elm *U. procera* are regenerating in places. There are also several areas of old sycamore *Acer pseudoplatanus* coppice.

6.2.54 Where the canopy is open a well-developed and diverse shrub layer occurs, including wayfaring tree *Viburnum lantana*, guelder rose *V. opulus*, spindle *Euonymus europaeus*, wild privet *Ligustrum vulgare* and hawthorn *Crataegus monogyna*. Red currant *Ribes rubrum* occurs widely while coppiced hazel *Corylus avellana* predominates in the north of the site. Due to variations in ground conditions several species are locally frequent, including bracken *Pteridium aquilinum*, dog's mercury *Mercurialis perennis* bramble *Rubus fruticosus* agg, bluebell *Hyacinthoides non-scripta,* Great horsetail *Equisetum telmateia* and opposite-leaved golden-saxifrage *Chrysosplenium oppositifolium*.

6.2.55 Species of interest in the ground flora include the nationally restricted Spiked star-of-Bethlehem *Ornithogalum pyrenaicum* as well as herb-Paris *Paris quadrifolia*, broad-leaved helleborine *Epipactis helleborine*, sweet woodruff *Galium odoratum*, wood anemone *Anemone nemorosa*, sanicle *Sanicula europaea* and moschatel *Adoxa moschatellina*.

6.2.56 The site supports a range of typical woodland birds and other animals.

6.2.57 Burderop Wood SSSI is of high (national) value.

Coate Water SSSI

6.2.58 The larger lake was constructed as a canal feeder reservoir and is now a recreation area. Adjacent meadows were shallowly flooded in 1975 to produce a second lake, now an actively managed local nature reserve. Semi-natural woodland around the older lake is largely dominated by ash *Fraxinus excelsior* and oak *Quercus robur* with abundant willow *Salix* spp. A variety of woodland herbs are present including enchanter's nightshade *Circaea lutetiana*, wood avens *Geum urbanum*, dog's mercury *Mercurialis perennis* and wood sedge *Carex sylvatica*. At the water's edge willow scrub gives way to a tall fen community dominated by common reed *Phragmites australis* with some reed sweet-grass *Glyceria maxima*.

6.2.59 The margin of the newer lake supports reed beds and sedges including brown sedge *Carex disticha*, slender tufted-sedge *C. acuta*, creeping forget-me-not *Myosotis secunda* and the notable golden dock *Rumex maritimus*.

6.2.60 Several wet meadows surround the newer lake comprising smaller areas of recently planted deciduous trees and shrubs. The meadows are dominated by grasses such as crested dog's-tail *Cynosurus cristatus*, creeping bent *Agrostis stolonifera* and meadow foxtail *Alopecurus pratensis*. There are also large areas of sedges *Carex* spp. and rushes *Juncus* spp. Field boundaries comprise thick old hedges with numerous mature oak and ash trees.

6.2.61 The site is one of the most important in Wiltshire for breeding reed warbler *Acrocephalus scirpaceus* and great-crested grebe *Podiceps cristatus*. Other breeding birds include sedge warbler *Acrocephalus schoenobaenus* Mallard *Anas platyrhynchos*, moorhen *Gallinula chloropus*, coot *Fulica atra*. Reed bunting *Emberiza schoeniclus* and Canada goose *Branta canadensis*. Tufted duck *Aythya fuligula* breeds here in some years. Water rail *Rallus aquaticus* has also recently bred.

6.2.62 Woodland birds include nightingale *Luscinia megarhynchos*, blackcap *Sylvia atricapilla* and garden warbler *Sylvia borin,* marsh tit *Poecile palustris*, willow tit *Poecile montanus*, and tawny owl *Strix aluco*. Great spotted woodpecker *Dendrocopos major* and lesser spotted woodpecker *Dryobates minor* both breed at the site irregularly.

6.2.63 Further species occur on passage in spring and autumn such as common sandpiper *Actitis hypoleucos*, common tern *Sterna hirundo* and black tern *Chlidonias niger*. Birds using the lakes as

a summer feeding ground, whilst breeding elsewhere, include swallow *Hirundo rustica*, house martin *Delichon urbicum* and occasionally hobby *Falco subbuteo*.

6.2.64 The site supports an outstanding assemblage of dragonflies and damselflies with fifteen species recorded including the emperor dragonfly *Anax imperator*, the four-spotted chaser *Libellula quadrimaculata*, four species of hawker *Aeshna* spp. And the national restricted red-eyed damselfly *Erythromma najas*.

6.2.65 Coate Water SSSI is of high (national) value.

Clouts Wood SSSI

6.2.66 Clouts Wood thought to be mostly ancient woodland and is a good example of a mainly ash-maple-hazel and invasive English elm woodland with a rich ground flora. Ash and field maple occur as coppice and standards, with scattered mature oaks. Woodland composition varies with topography and land use history and includes steep slopes which support Wych elm coppice stools with cherry *Prunus avium*, aspen *Populus tremula* and common lime *Tilia vulgaris*. Woodland on the valley floor includes vigorous suckering regrowth of English Elm, willow scrub and small areas of planted conifers.

6.2.67 The ground layer is dominated by dog's mercury, bluebell, tufted hair-grass *Deschampsia cespitosa*, and nettle *Urtica dioica*. There are several species of nationally restricted distribution, including herb Paris, meadow saffron *Colchicum autumnale*, Green hellebore *Helleborus viridus* which occurs on the steep north facing slope, wood vetch *Vicia sylvatica* and Spiked star-of-Bethlehem. The northern boundary of the wood is marked by a stream with nearby marshy areas and a small pond fringed by common reed. Giant horsetail, meadowsweet *Filipendula ulmaria* and sedges dominate open boggy glades.

6.2.68 The wood supports a diverse assemblage of birds and invertebrates.

6.2.69 Clouts Wood SSSI is of high (national) value.

Bincknoll Dip Woods SSSI

6.2.70 The site comprises two blocks of woodland on a steep escarpment and is primarily of interest for the assemblage of rare mosses.

6.2.71 Streams issuing intermittently from beneath the chalk flow within a system of short but deeply incised valleys.

6.2.72 The lower and middle slopes support semi-natural ancient woodland of derelict hazel coppice with a canopy comprised largely of mature pedunculate oak but with ash, field maple, silver birch and goat willow also occurring commonly. There is a diverse shrub layer of elder *Sambucus nigra*, blackthorn *Prunus spinosa*, hawthorn *Crataegus monogyna*, spindle *Euonymus europaeus*, guelder rose, young English elm and hazel. The upper slopes are in part dominated by beech Fagus sylvatica with locally frequent ash and sycamore.

6.2.73 The woods hold at least 39 species of common mosses and liverworts. The site is currently the only known British locality for the extremely rare moss *Barbula glauca*. Another rare moss, *Pylaisia polyantha,* occurs commonly on the bark of elder bushes in damp, well sheltered woodland.

6.2.74 The diverse ground flora contains herbs characteristic of ancient woodland, including abundant bluebell, dog's mercury, and ramsons *Allium ursinum,* wood anemone, yellow archangel *Lamiastrum galeobdolon* and herb-Paris. Ferns are a prominent feature of shady areas. Typical woodland grasses and sedges include wood false-brome *Brachypodium sylvaticum*, giant fescue *Festuca gigantea*, pendulous sedge *Carex pendula* and remote sedge *C. remota.* The woodland is

likely to support varied bird and invertebrate assemblages given the floristic and topographical diversity of the site.

6.2.75 Bincknoll Dip Woods SSSI is of high (national) value.

Local Nature Reserves and Non-statutory Sites

6.2.76 Detailed information on the habitats, species and features of interest in the LNRs and LWSs was not available. Habitat types present in the sites are described in Table 6-5.

6.2.77 All the LWSs and LNRs identified in the desk study are of medium (county) value.

Habitats

6.2.78 The habitats within the Application Site are described briefly below. Full descriptions are given in the Ecological Appraisal in Volume 3 Appendix 6.2 and illustrated on Figure 3 of the Ecological Appraisal. The eight buildings within the site B1- B8 are also shown on this figure and cross referenced in the text below.

Grassland

6.2.79 The grassland within the Application Site was broadly assessed during the Phase 1 habitat survey site walkover. A grassland National Vegetation Classification (NVC) survey was subsequently carried out.

6.2.80 The NVC survey identified three main broadly homogeneous grassland types as described below. Full descriptions are provided in Volume 3 Appendix 6.2 and illustrated on Figure 3.

Neutral Grassland - Area A

6.2.81 Located in the centre of the Application Site, this area was more diverse than other grassland within the Application Site, with high proportion of flowering plants. The grassland did not appear to be regularly managed and included shorter rabbit grazed vegetation and taller tussocks.

6.2.82 The sward was characterised by abundant false oat-grass *Arrhenatherum elatius*,common knapweed *Centaurea nigra* and greater knapweed *Centaurea scabiosa* with frequent red fescue *Festuca rubra*, Yorkshire fog *Holcus lanatus*, yarrow *Achillea millefolium,* greater knapweed *Centaurea scabiosa* and oxeye daisy *Leucanthemum vulgaris.*

6.2.83 Grasses occurring less frequently included cock's-foot *Dactylis glomerata*, perennial ryegrass *Lolium perenne,* smooth meadow-grass *Poa pratensis*, crested dog's-tail *Cynosurus cristatus*, sweet vernal-grass *Anthoxanthum odoratum.*

6.2.84 A diverse range of wildflowers occurred infrequently including some species associated with less improved grassland such as lady's bedstraw *Galium verum* and cowslip *Primula veris* as well as species that also occur on waysides, and other unmanaged grassy sites including creeping cinquefoil *Potentilla reptans*, white clover *Trifolium repens*, musk mallow *Malva moschata*, long-stalked crane's-bill *Geranium columbinum*, field madder *Sherardia arvensis*

6.2.85 Three species of orchid were also noted during the June 2020 survey (Arcadis, 2020): common spotted-orchid *Dactylorhiza fuchsii*, pyramidal orchid *Anacamptis pyramidalis* and bee orchid *Ophrys apifera*.

6.2.86 The NVC surveys classified this area as MG1 *Arrhenatherum elatius* grassland *Festuca rubra* subcommunity, *Centaurea scabiosa* variant

6.2.87 The abundance of false oat grass and the presence of perennial ryegrass within the sward, the lack of management and the development history of the Application Site means the grassland is

not considered to qualify as the UKBAP priority habitat 'Lowland Meadows'. While not characteristic of traditionally managed species-rich meadows, this area is floristically diverse and is of low (district) value.

Neutral Grassland - Area B and Area D

6.2.88 Extending across parts of the north and west of the Application Site, this grassland area had a higher proportion of ruderal species and grasses with a correspondingly lowered proportion of grassland forbs. Scattered scrub of hawthorn *Crataegus monogyna* and bramble *Rubus fruticosus* was also present.

6.2.89 The sward comprised a small number of common grasses with a high proportion of ruderal / tall herb species and scattered scrub. False oat-grass was dominant with abundant red fescue, cock's foot and Yorkshire fog. Hogweed *Heracleum sphondylium* was abundant with frequent teasel *Dipsacus fullonum*, creeping thistle *Cirsium arvense,* spear thistle *Cirsium vulgaris*, ragwort *Senecio jacobaea*, and dock *Rumex sp*. Common nettle and bramble were frequent locally.

6.2.90 Montbretia *Crocosmia sp*. was recorded in one location in the centre north of the grassland. Montbretia is listed as anon - native invasive plant species on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

6.2.91 The NVC surveys classified this area as MG1 *Arrhenatherum elatius* grassland *Festuca rubra* subcommunity.

6.2.92 A separate area of neutral grassland and tall herb vegetation (Area D) lies on the sloped bank adjacent to the southern-most data centre buildings. Grassy areas are characterised by abundant false oat grass and ox eye daisy with occasional common knapweed. Overall there is a relatively high percentage cover of forb species (with locally abundant ox eye daisy). The grassland has not been subject to management in the recent past with coarse grasses making up a substantial component of the species composition. Tall herb species present include common nettle, thistles *Cirsium* spp. and cow parsley *Anthriscus sylvestris*.

6.2.93 These areas of grassland, although supporting a small number of wildflower species associated with neutral and calcareous substrates , the sward is dominated by coarse grasses with abundant ruderals. The grassland is of value at least in the context of the site (negligible).

Semi-improved Neutral Grassland - Area C

6.2.94 Most of the grassland areas on either side of the central road were until recently, regularly cut. At the time of the survey the grassland was not recently cut but had shorter sward with some areas grazed by rabbit *Oryctolagus cuniculus*.

6.2.95 This area of grassland was dominated by a small number of grasses, specifically false oat-grass, Yorkshire fog, red fescue and crested dog's tail. A range of A few herbaceous species occur frequently including yarrow, ribwort plantain *Plantago lanceolata,* lady's bedstraw, bird's-foot trefoil and red clover.

6.2.96 The NVC surveys classified this area as MG1 *Arrhenatherum elatius* grassland *Festuca rubra* subcommunity.

6.2.97 This area of grassland, although supporting some wildflowers associated with less agriculturally improved grassland, was dominated by common grass species including ruderals. The grassland has value in the context of the site (negligible).

Poor Semi-improved Grassland

6.2.98 The grassland areas surrounding the buildings inside the perimeter fences have been very frequently mown until the recent past. These are species-poor areas and lack features associated with higher value grassland. The grassland has low value even in the context of the site (negligible).

Plantation Broadleaved Woodland

6.2.99 Plantation broadleaved woodland delineated the southwest southeast and northeast Application Site boundaries providing arboreal connectivity to Burderop Wood SSSI to the north. A small clump of woodland was also present in the north-west of the site.

6.2.100 The ground flora was generally sparse with frequent common nettle, wood avens *Geum urbanum*, herb-Robert *Geranium robertianum* and Lord's-and-Ladies *Arum maculatum* present. The patchy understory comprised hawthorn, hazel *Corylus avellana*, elder *Sambucus nigra*. The canopy largely comprised beech *Fagus sylvatica*, sycamore *Acer pseudoplatanus* and field maple *Acer campestre*, with wayfaring tree *Viburnum lantana* on the woodland edge.

6.2.101 The woodland had a reasonably even age structure lacking the variations seen in more semi-natural woodland and the species composition was not characteristic of locally occurring ancient woodlands. In the context of extensive ancient and semi-natural woodland present locally, the plantation broadleaved woodland is of site (negligible) value.

Broadleaved Trees

6.2.102 Several semi-mature and mature broadleaved trees were present on site, with the majority to the north of the internal access road and scattered throughout the grassland. A linear belt of semi-mature trees was also present on an embankment to the north of the road, separating the more managed grassland in the south from the tussocky grassland in the north.

6.2.103 The majority of the mature trees were located around the boundaries of the Application Site and included mature oaks along the northern boundary and lines of mature beech along the eastern and south-eastern boundaries. A small number of the more mature trees supported dead wood habitat.

6.2.104 Tree species included cherry *Prunus sp*., silver birch *Betula pendula*, beech, sycamore, pedunculate oak *Quercus robur*, goat willow *Salix caprea*, ash *Fraxinus excelsior* and common lime *Tilia x europaea*.

6.2.105 None of the trees to be felled to enable the development are particularly large or old for their species. Given the extent of woodland locally including ancient semi-natural woodland, the broadleaved trees are of site (negligible) value.

Dense and Scattered Scrub

6.2.106 Dense and scattered scrub was present across the Application Site, but predominantly occurred in the unmanaged grassland in the east of the Application Site, to the north of the road. The scrub comprised bramble, hawthorn and elder.

6.2.107 The small stands of species-poor dense scrub are of negligible (site) value.

Tall Ruderal

6.2.108 Tall ruderal vegetation was present mainly on the embankment and bund in the centre of the site and in the northwest corner of the Application Site. The vegetation comprised a small number of

very common and widespread species including common nettle (which was locally dominant), spear thistle, lesser burdock *Arctium minus*, hogweed and cow parsley *Anthriscus sylvestris*.

6.2.109 Tall ruderal vegetation comprising common nettle, cleavers *Galium aparine* and bramble was also present in dry ditches along the fence-lines that delineated data centre Buildings B4, B5, B7 and B8.

6.2.110 Such tall ruderal vegetation is very common and will be widespread locally on field edges and road margins. The tall ruderal vegetation is of negligible (site) value.

Cypress Tree Line

6.2.111 A mature cypress hedge effectively now a line of closely spaced tall trees was present around the south-western boundary of the Application Site between the plantation broadleaved woodland and Buildings B4 and B5.

6.2.112 As planted non-native species with very low ecological value these trees are of negligible (site) value.

Introduced Shrub and Herb Planting

6.2.113 A small area of ornamental shrubs and herb planting was present along the southern boundary of Building B6. This comprised non-native species such as lavender *Lavandula sp.* and montbretia *Crocosmia x crocosmiiflora*.

6.2.114 The very small extent of ornamental non-native planting is of negligible (site) value.

Buildings and Hardstanding

6.2.115 Eight buildings B1 to B8are present including the large data centre buildings and small ancillary buildings. All the structures are modern and constructed in the last 30 years. (See Volume 3 Appendix 6.2, Figure 3).

6.2.116 Access road car parks and hard standing around buildings comprise a mix of concrete and asphalt.

6.2.117 The buildings and hardstanding are of negligible value.

Protected Species and Other Species of Conservation Interest

Desk Study

6.2.118 The results of the species records data search are summarised in Table 6-6.

Table 6-6. Summary of Species Records from the Last 10 Years Within 2km of the Application Site.

Common name	Scientific name	Nearest distance from site (km)	Number of records	Conservation Status
Flora				
A Lady's-mantle	*Alchemilla filicaulis subsp. vestita*	1.64	1	County
Meadow Brome	*Bromus commutatus*	1.64	1	County
Slender Tuftedsedge	*Carex acuta*	1.85	2	County
Cyperus Sedge	*Carex pseudocyperus*	1.47	3	County
Welsh Poppy	*Meconopsis cambrica*	1.73	1	NS

Common name	Scientific name	Nearest distance from site (km)	Number of records	Conservation Status
Sainfoin	*Onobrychis viciifolia*	0.34	1	NT
Great Yellow-cress	*Rorippa amphibia*	1.47	2	County
Butcher's-broom	*Ruscus aculeatus*	0.83	2	HSD5
Spreading Hedge parsley	*Torilis arvensis*	1.28	1	UKBAP, NERC S.41, NS, EN
Invertebrates				
Purple Emperor	*Apatura iris*	1.73	2	NT
Dotted Bee-fly	*Bombylius discolor*	0.80	1	N
Small Heath	*Coenonympha pamphilus*	0.34	2	UKBAP, NERC S.41, NT
Wall	*Lasiommata megera*	1.73	1	UKBAP, NERC S.41, NT
White-letter Hairstreak	*Satyrium w-album*	1.73	1	UKBAP, NERC S.41, EN
Amphibians				
Common Toad	*Bufo bufo*	1.64	4	WCA5, UKBAP, NERC S.41
Common Frog	*Rana temporaria*	1.15	4	WCA5
Great Crested Newt	*Triturus cristatus*	1.22	17	EPS, WCA5, UKBAP, NERC S.41
Reptiles				
Natrix helvetica	Grass Snake	1.64	2	WCA5, UKBAP, NERC S.41
Birds				
Kingfisher	*Alcedo atthis*	0.83	14	WCA1, Amber
Greylag Goose	*Anser anser*	0.83	18	WCA1
Pochard	*Aythya farina*	0.83	13	Red
Cuckoo	*Cuculus canorus*	1.61	3	UKBAP, NERC S.41, Red
Little Egret	*Egretta garzetta*	1.64	3	BDIR
Reed Bunting	*Emberiza schoeniclus*	1.64	1	UKBAP, NERC S.41, Amber
Hobby	*Falco subbuteo*	1.64	2	WCA1
Herring Gull	*Larus argentatus*	0.83	34	UKBAP, NERC S.41, Red
Linnet	*Linaria cannabina*	1.73	1	UKBAP, NERC S.41, Red
Grey Wagtail	*Motacilla cinerea*	0.60	18	Red
Red Kite	*Milvus milvus*	0.53	10	WCA1, BDIR
Spotted Flycatcher	*Muscicapa striata*	0.60	2	UKBAP, NERC S.41, Red
House Sparrow	*Passer domesticus*	1.54	1	UKBAP, NERC S.41, Red
Osprey	*Pandion haliaetus*	1.64	1	WCA1, BDIR
Marsh Tit	*Poecile palustris*	1.64	8	UKBAP, NERC S.41, Red
Common Tern	*Sterna hirunda*	0.83	16	BDIR, Amber

Common name	Scientific name	Nearest distance from site (km)	Number of records	Conservation Status
Starling	*Sturnus vulgaris*	1.64	9	UKBAP, NERC S.41, Red
Ruddy Shelduck	*Tadorna ferruginea*	1.64	5	BDIR
Green Sandpiper	*Tringa ochropus*	0.83	2	WCA1
Redwing	*Turdus iliacus*	0.60	3	WCA1, Red
Song Thrush	*Turdus philomelos*	0.60	16	UKBAP, NERC S.41, Red
Mistle Thrush	*Turdus viscivorus*	0.60	6	Red
Lapwing	*Vanellus vanellus*	0.83	2	UKBAP, NERC S.41, Red
Mammals (Bats)				
Serotine	*Eptesicus serotinus*	0.83	2	EPS, WCA5
Myotis	*Myotis sp.*	0.26	4	EPS, WCA5, UKBAP, NERC S.41
Daubenton's Bat	*Myotis daubentonii*	1.65	1	EPS, WCA5
Noctule Bat	*Nyctalus noctula*	0.26	5	EPS, WCA5, UKBAP, NERC S.41
Common Pipistrelle	*Pipistrellus pipistrellus*	0.26	26	EPS, WCA5
Soprano Pipistrelle	*Pipistrellus pygmaeus*	0.26	12	EPS, WCA5, UKBAP, NERC S.41
Long-eared Bat species	*Plecotus*	1.98	1	EPS, WCA5, NERC, UKBAP
Brown Long-eared Bat	*Plecotus auritus*	1.99	1	EPS, WCA5, UKBAP, NERC S.41
Mammals				
European Water Vole	*Arvicola amphibius*	1.43	1	WCA5, UKBAP, NERC S.41
West European Hedgehog	*Erinaceus europaeus*	0.43	12	UKBAP, NERC S.41
Brown Hare	*Lepus europaeus*	0.40	5	UKBAP, NERC S.41
European Otter	*Lutra lutra*	1.11	3	EPS, WCA5, UKBAP, NERC S.41
Eurasian Badger	*Meles meles*	0.26	15	PBA

Abbreviations used in Table 3.2: WCA1: Wildlife & Countryside Act Schedule 1; WCA5: Wildlife & Countryside Act Schedule 5; NS: Red List (pre 1994 IUCN guidelines) Nationally Scarce; N: Red List (pre 1994 IUCN guidelines) Nationally Notable; BDIR: Birds Directive Schedule 1; NERC S41: Natural Environment & Rural Communities Act Species of Principal Importance; UKBAP: UK Biodiversity Action Plan priority species; EPS: European protected Species; PBA: Protection of Badgers Act 1992; Birds: Red: Bird Population Status: red; Birds: Amber: Bird Population Status: amber; IUCN EN/NT/VU: Red listing based on 2001 IUCN guidelines Endangered/Near Threatened/Vulnerable; County HSD5

Bats (Roosting)

6.2.119 A daytime ground-based inspection of buildings and trees was undertaken in August 2020 followed by aerial climbing inspections of trees with potential roost features in November 2020. The full results are given in Appendix 6.2 (Document ref 20305S-RPS-XX-XX-RP-P-9712).

6.2.120 The daytime building inspection assessed Buildings B1, B3 and B8 as having low potential value for roosting bats. A single dusk emergence survey during the active season in 2021 will be

undertaken prior to planning determination in accordance with best practice to determine the presence / likely absence of a roost.

6.2.121 All other buildings were assessed as having no or negligible potential to be used by roosting bats and would not require any further survey.

6.2.122 Following the ground inspection and climbing inspection Trees 10 (T76), 11 (T40), 14 (T75), and 21 (T65) were assessed as having features of high potential for bats but no droppings or other signs of bat activity were found in any of the potential roost features. Of these four trees two are located outside the built footprint of the development.

6.2.123 Trees 10, 11, 14, and 21 will be subject to two dusk / dawn or climbing surveys during the active season in accordance with best practice to confirm the presence or likely absence of a roost.

6.2.124 Tree T2 has very low suitability to be used by roosting bats and would be soft felled following best practice guidance in the BCT Good Practice Guidelines (Collins J (Ed)., 2016).

6.2.125 Given the absence of signs of use in potential roost features in the trees, or buildings during the daytime inspection and first tree climbing inspection, the low suitability of the buildings, and the low levels of activity recorded during transect and remote recording it is reasonably assumed that none of the trees or buildings contain an important or frequently used bat roost.

6.2.126 Based on the existing survey information a highly precautionary estimate would be that three small low status roosts used by species that are of low conservation concern in Wiltshire (as listed on Annex B, C and D of the Natural England Mitigation Class Licence CL21)[1]. The features found in the buildings and trees had negligible suitability for use as maternity or hibernation roosts.

Bats (Foraging and Commuting)

6.2.127 Monthly activity transects and remote recording at two different locations each month were undertaken in August, September and October 2020. Full results are given in Appendix 6.2.

6.2.128 A total of five confirmed species, and unidentified Myotis bats were recorded during the activity transects and remote recording.

6.2.129 Common pipistrelle was the most common species recorded during the surveys. The on-site habitats suit them as they typically forage along tall, woody vegetation and over adjoining areas of grassland. Common pipistrelle is a common and widespread species in the UK.

6.2.130 Soprano pipistrelle was also commonly recorded but less so than common pipistrelle. This species favours streams and associated riparian habitat and woodland edges. Soprano pipistrelle is also a common and widespread species in the UK.

6.2.131 Low numbers of Myotis bats were recorded during the surveys. These are most likely to be Natterer's / Brandt's / Whiskered bats which are relatively common and widespread for myotis species. Daubenton's bat is common and widespread throughout Britain but is typically found more often with water bodies and riparian habitat. Bechstein's bat *Myotis bechstenii* is very rare and the Application is outside of the main range of this species in England. Alcathoe bat *Myotis alcathoe* was only discovered in the UK in 2010. It is apparently rare but its similarity to whiskered and Brandt's bat means its distribution is not well understood.

6.2.132 One pass of Lesser horseshoe bat was recorded on site. Lesser horseshoe is rare in Britain and confined to south-west England and South Wales.

[1] Available at https://www.gov.uk/government/publications/bats-licence-to-interfere-with-bat-roosts-cl21/guide-to-using-the-bat-mitigation-class-licence-cl21-registration-criteria-and-how-to-apply#annex-a. Accessed 12th January 2021.

6.2.133 Noctule was recorded in low numbers on site. Noctule is relatively widespread in the UK and is found in a wide range of open habitats such as that found on the Application Site.

6.2.134 Serotine was recorded rarely at the Application Site. Serotine is uncommon and largely restricted to southern and eastern England.

Bat Species Evaluation

6.2.135 Low levels of bat activity were recorded across the Application Site for all species presented including common and soprano pipistrelle which were the most commonly recorded species during transect surveys and remote recording.

6.2.136 Lesser horseshoe bat is on the edge of the range at the Application Site but a single pass by one bat indicates the Application Site is not a regularly used flight line or for foraging by the lesser horseshoe bat and is therefore unlikely to be important for the local population.

6.2.137 Other species were recorded so infrequently as to indicate the Application Site is not of local importance of these species.

6.2.138 The range of potential bat roost features is limited and the absence of droppings and other signs of use indicates that none of the features identified in the buildings or trees has been frequently used by bats or regularly used by numbers of bats that would be important to local bat populations (i.e. as a maternity or large communal roost.

6.2.139 At best the on-site habitats for all bat species recorded are of low (district) value.

Hazel Dormouse

6.2.140 The results of the dormouse nest tube surveys are presented in the Ecological Appraisal in Appendix 6.2 (document ref 20305S-RPS-XX-XX-RP-P-9712).

6.2.141 The desk study returned no records of hazel dormouse within 2km of the Application Site.

6.2.142 The hazel dormouse nest tube survey was carried out with 80 nest tubes being installed in suitable habitats in July 2020, and checked monthly in August, September, October and November. This achieved a survey score of 22.4, exceeding the minim required score of 20 following the methodology described in the Dormouse Conservation Handbook (Bright, Morris and Mitchell-Jones, 2006).

6.2.143 Hazel dormouse is fully protected in England under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.Hazel dormouse is also a species of principal importance under Section 41 of the NERC Act (2006).

6.2.144 The hazel dormouse has shown a long-term decline in Britain with a drop of 51% since 2000 (Wembridge et al, 2019).

6.2.145 No evidence of dormouse was recorded in any of the nest tubes throughout the survey. Dormouse is therefore considered not to use the on-site habitats and is not considered any further in this assessment.

Badger

6.2.146 The desk study returned 15 records of badgers, the closest being approximately 0.26km northwest of the Application Site.

6.2.147 During the Phase 1 Habitat Survey completed by Arcadis (Arcadis, 2020) multiple mammal paths through the grassland and scrub was identified, but these could not be conclusively identified as

badger paths. No badger setts were noted on site, but dense vegetation prevented a thorough inspection at the time.

6.2.148 An updated survey completed on the 8th October 2020 by RPS (see Appendix 6.2 document ref 20305S-RPS-XX-XX-RP-P-9712) identified one badger dropping in the open and not in a dung pit or well used latrine. No other signs of badger were recorded.

6.2.149 All mammal runs / pathways and push throughs under fences were small or narrow and not large enough or well-worn to be made by badger.

6.2.150 The survey findings indicate badgers are not resident within the Application Site and that it does not form an important part of and badger social group territory. Use of the Application Site by badger is likely limited to very occasional and irregular foraging / commuting.

6.2.151 Badger is not a species of conservation concern although it is legally protected (under the Protection of Badgers Act 1992).

6.2.152 In Wales and England, there has been a marked increase in the badger population since the 1980s with the population in 2017 estimated to be 485,000 (Judge et al, 2017).

6.2.153 Habitat within the Application Site has negligible (site) value for badgers.

Breeding Birds

6.2.154 Within the Application Site, the habitats most likely to be of value for breeding birds are the woodland and dense scrub. These habitats provide potential nesting habitat and foraging areas of many bird species. The grassland also provides foraging habitat for birds. The grass is too long and does not proved sufficiently open spaces away from boundary woodland to be of value for ground nesting birds.

6.2.155 The Application Site is likely to support an assemblage of common and widespread bird species associated with nearby woodland habitats and the surrounding intensively managed agricultural land. There are, however, no extensive habitats within the Application Site limiting its value for breeding birds.

6.2.156 The Application Site is therefore considered to be of value for breeding birds only in the context of the site and its surrounding (negligible value).

Reptiles

6.2.157 The desk study returned two records of grass snake *Natrix helvetica*, the closest being 1.64km northeast of the Application Site.

6.2.158 The reptile surveys (Appendix 6.2) identified a small population of slow worm at the Application Site, with a peak count of three slow worm on a single visit. Male and female slow worms were recorded although no juveniles were recorded at a time of year when juveniles would be expected to be present if a significant breeding population was present (September / October).

6.2.159 The slow worms were all found along the northern edge of the Application Site closet to the boundary with Burderop Wood SSSI to the north.

6.2.160 The long grassland provides potential foraging habitats for slow worm. Mammal burrows in the grassland, and root systems in the woodland are places where reptiles would potentially, hibernate.

6.2.161 The unmanaged neutral grassland with dense structure creates extensive cover and foraging opportunities and has higher value than much of the habitats immediately surrounding the Application Site (woodland and intensively managed farmland).

6.2.162 The Application Site has value for slow worm in the context of the site and its surrounds, and potentially in the parish context (negligible value).

Amphibians

6.2.163 The desk study returned four records of common toad *Bufo bufo*, four records of common frog *Rana temporaria*, and 17 records of great crested newt with 2km of the Application Site. The closest record for great crested newt was approximately 1.22km north-west, beyond the M4 motorway.

6.2.164 There was no aquatic habitat on site and there are no off-site ponds within 250m of the Application Site. The nearest off-site pond is a small ornamental pond 255m from Application Site and enclosed by buildings in Burderop Park.

6.2.165 Given that the closest records for great crested newt is over 1.2km from the Application Site boundary and separated from the Application Site by landscape features that are considered to be significant barriers to dispersal, it is considered unlikely that amphibians including great crested newt would be present on site during their terrestrial phase.

6.2.166 Great crested newts and other amphibians are therefore considered unlikely to use habitats within the Application Site and are not considered further in this assessment.

Invertebrates

6.2.167 The desk study did not return any records invertebrates from within the Application Site.

6.2.168 An invertebrate survey comprising a September and an October site visit in 2020 identified 119 invertebrate species representing 13 groups of invertebrates in total (covering several insect groups, spiders, harvestmen, woodlice, millipede centipedes and slugs and snails). Full results are given in Appendix 6.2.

6.2.169 The relatively low number of species reflects the lateness of the survey when many flying insects would not be airborne and when other species with narrow seasonal emergence periods would not be present.

6.2.170 Most of the species were common and widespread and would be expected on sites throughout southern England.

6.2.171 Eleven species of conservation interest were identified from the September and October survey samples. These were:

- *Chaetocnema arida*, a minute metallic bronze flea-beetle (Status: very local);
- *Corizus hyoscyami*, a large black and red ground bug (Status: very local);
- *Discomyza incurva*, a small dark hunch-backed fly (Status: very local);
- *Eledona agricola*, a small black fungus beetle (Status: very local);
- *Hippodamia variegata*, the Adonis ladybird (Status: nationally scarce);
- *Longitarsus dorsalis*, a very small black and yellow flea beetle (Status: very local);
- *Rhinusa antirhini*, a very small black weevil, (Status: very local);
- *Rugilus similis*, a small brown rove beetle, (Status: nationally scarce);
- *Stictopleurus abutilon*, a medium-sized brown leaf bug Status: extinct (Kirby, 1992), but now recolonized (Bantock, 2016);
- *Stictopleurus punctatonervosus*, a medium-sized brown leaf bug, (Status: extinct (Shirt, 1987, Kirby, 1992), but now recolonising and spreading across Britain (Bantock, 2016); and

- *Thyreocoris scarabaeoides*, a tiny black shieldbug (Status: Nationally scarce - Bantock, 2016).

6.2.172 The Application Site has five main habitat types of value for invertebrates:

- a few large old trees (some dead) along the northern edge, abutting Burderop Wood;
- rough wildflower grassland in the northern part of the site;
- previously mown grassland alongside the road, becoming rank;
- plantation woodland with scrub; and
- disturbed/ bare ground.

6.2.173 The larger trees with deadwood and the longer more flower-rich grassland are the habitats of higher value for invertebrates within the Application Site. These areas yielded a very local fungus beetle (found in a bracket fungus on a larger tree); and one nationally scarce and two very local species found in the longer grassland in the northern half of the Application Site.

6.2.174 The bare ground and disturbed areas near to the buildings can be important for ground-nesting bees and wasps. The lateness of the survey meant that no such species were found. However, these areas yielded one uncommon species and two species until recently thought extinct but now recolonizing quite widely in southern England and associated with brownfield and dry sparsely vegetated grassy places.

6.2.175 The more closely mown and less species rich grassland, and the planted landscape trees are generally of lower value for invertebrates.

6.2.176 The survey did not identify any unusual or uncommon invertebrate habitat. Although the survey was late in the season the survey concluded the Application Site is not likely to have high invertebrate interest overall. Further surveys in May and June will be undertaken will be undertaken prior to planning determination to assert the value of the Application Site for invertebrates (see paragraphs **Error! Reference source not found.**).

6.2.177 In this context the Application Site is predicted to be of low (local value).

Non-Native Invasive Species

6.2.178 Montbretia is a non-native invasive species listed on Schedule 9 of the Wildlife and Countryside Act which is potentially present on site and has the potential to have a negative effect on the native species present. It is an offence to allow any species listed on Schedule 9 to grow in the wild.

6.2.179 While the small stand of montbretia has no intrinsic ecological value, its potential to spread means that it's presence within the Application Site is detrimental to the sites overall ecological value.

Future Baseline Conditions

6.2.180 There is the potential for changes in the baseline conditions in the medium to long term as a result of climate change.

6.2.181 The UK Climate Change Risk Assessment for Wales (HM Government, 2012) identified the main potential risks to the natural environment as a result of climate change. Those risks relevant to the Application Site are:

- reduction in soil moisture and lower river flows, and an increase in the frequency and magnitude of droughts;

- low water levels and reduced river flows leading to increased concentration of pollutants from agriculture, sewage and air pollution damaging freshwater habitats and other ecosystem services;
- soil moisture deficits and erosion impacting biodiversity and soil carbon and increasing risk of wildfires;
- increased prevalence of invasive non-native species, pests and pathogens impacting on animal, plant and biodiversity;
- loss of climate space, with species unable to track climate change; and
- changes in the timing of seasonal events.

6.2.182 The UK Climate Change Risk Assessment 2017 (HM Government, 2017), confirmed that the following changes had already been recorded due to climate change:

- changes to the distribution of UK biodiversity;
- changes to the composition of terrestrial, coastal and freshwater ecosystems;
- northward shift in species distributions; and
- changes in the timings of seasonal events.

6.2.183 While there are potential effects of climate change on the future ecological baseline it is difficult to accurately predict and quantify the potential impacts of climate change on ecological systems.

6.2.184 The complexity of ecosystems and the myriad interactions between species and physical environmental characteristics present a challenge to modelling these systems.

6.2.185 In the context of the Application site, anthropogenic effects on biodiversity i.e. management and land use, are likely to be more significant to the future baseline conditions.

6.2.186 Morecroft, M.D. & Speakman, L. (2015) provide qualitative assessments of observed biodiversity changes, and of likely biodiversity changes due to climate change. Observations and predictions for habitats relevant to the Application Site are described below.

Grassland and Tall Ruderal

6.2.187 Increasing temperatures have promoted earlier spring greening of grasslands and a longer growing season which may be beneficial for plant species and their associated invertebrate assemblages.

6.2.188 However, decreased or less reliable summer rainfall could result in less plant biomass and changes in plant community species composition favouring species adapted to warmer drier conditions. This could in turn effect on the abundance and species composition of the associated invertebrate assemblage.

6.2.189 Many grasslands are likely to remain similar in character with a temperature rise of a few degrees unless those grassland are on the edge of their climatic range.

Woodland

6.2.190 Tree death following drought has been recorded at long-term monitoring sites. Those species most sensitive to this effect are beech, birch and sycamore Such effects can lead to major changes in the composition and structure of woodland. Some tree species also show reduced growth rates during dry summers.

6.2.191 Changes in woodland composition are possible as a result of decreased rainfall and longer, warmer summers. The different responses of canopy and ground flora plant species may also lead to changes in woodland composition.

6.2.192 Additional effects may occur due to changes in pest and disease ranges and prevalence or the introduction of new pests.

Mammals

6.2.193 Juveniles are often more vulnerable than adults to extreme weather events (e.g. spring drought, flooding and cold winters). Therefore, there can be knock-on impacts on mammal populations. Persistent heavy rain can decrease flying insect prey availability for bats.

6.2.194 Higher summer rainfall has been associated with greater insect abundance, increasing survival rate of some bats species although the opposite effect is seen with drier springs and summers. Warmer winters resulting in reduced hibernation periods can reduce body condition, breeding success and survival rates.

Birds

6.2.195 Warmer winters since the 1990s have increased bird survival rates of many common a widespread bird species. Bird ranges in the UK have shifted north and warming has been associated with an increase in the diversity of bird communities, of generalist species populations.

6.2.196 Changes to invertebrate prey abundance and diversity due to changes in soil moisture and rainfall could impact on many bird species. Increased winter rainfall may adversely affect winter survival if it reduces prey availability.

Reptiles

6.2.197 Modelling indicates that some reptiles could expand their range northwards provided there is suitable habitat connectivity.

Invertebrates

6.2.198 Climate warming has resulted in northward range shifts of many southern and common British invertebrates and changes in butterfly communities.

6.2.199 The impact of changes in temperature and precipitation varies between butterfly species, with the negative effects of warm wet winters greatest in species that overwinter as caterpillars or pupae.

6.2.200 Areas of climate suitability might increase for some species although species will vary in their capacity to benefit, especially in fragmented landscapes. Some invertebrate species may respond with behavioural or evolutionary adaptation to changing conditions. More extreme rainfall patterns are likely to affect flight periods and food availability for many insects

6.3 Mitigation Measures Adopted as Part of the Project

Habitat Retention and Enhancement

6.3.1 The site layout has been designed to retain as much of the existing habitat as possible within the limitations of the security requirements of the operational data centre. Those requirements are for a minimum level of security lighting and the avoidance of planting close to the buildings or security fence.

6.3.2 Details of the retained habitats are shown in the Landscape Strategy (Figure 5.45) and the Tree Retention and Loss Plan in the Arboricultural Impact Assessment (Appendix 5.5)

6.3.3 The following habitats will be retained:

- mature plantation broad-leaved woodland on the site boundaries (approximately 1.5ha);
- semi-improved neutral grassland in the north-western quarter of the site, along the boundary of the SSSI woodland, in the south-eastern area adjoining plantation woodland; ; and
- a large number of mature and semi mature trees.

6.3.4 The areas of retained grassland are not currently managed and are becoming rank. The grassland would be cut, and where it is currently species-poor would be scarified and over sown with a wildflower seed mix appropriate to the soil type. A cutting regime will be implemented to promote floristic diversity and prevent domination by grasses (see Grassland Management Plan Figure 6.5).

Habitat Protection

6.3.5 Construction fencing would be installed around the perimeter of the construction area to protect adjacent retained habitats. Fencing would prevent access to contractors, machinery and vehicles and the storage of vehicles, machinery, equipment and materials in areas outside of the fence line.

6.3.6 Measures would be adopted with reference to industry and regulatory pollution prevention guidelines and would protect the environment from potential construction related discharges to ensure negative effects on water and air quality are minimised during construction.

6.3.7 Environmental protection measures are specified in the Code of Construction Practice (CoCP (Volume 3 Appendix 2.1) and includes measures for dust control, surface water control, spill prevention management and designating secure areas for refuelling and storing chemicals in line with appropriate regulations and guidelines.

6.3.8 Tree protection measures will also be implemented during construction to protect retained trees and trees within Burderop Wood SSSI as specified in the Arboricultural Impact Assessment (Appendix 5.5 document ref 20305S-RPS-XX-XX-RP-P-9712) and are in accordance with BS5837(2012) Tree in Relation to Design, Demolition and Construction

6.3.9 Prior to the start of ecologically sensitive works, an Ecological Clerk of Works (ECoW) would deliver a toolbox talk to the site construction team, briefing them on all ecology and nature conservation requirements on site, including the mitigation measures described below. The ECoW would oversee all works potentially affecting sensitive ecological features.

Landscaping

6.3.10 In addition to habitat retention and protection, the landscaping scheme would include the translocation of approximately 1ha of wildflower rich neutral grassland (the most ecologically valuable grassland within the Application Site).

6.3.11 The grassland will be translocated as turves from the centre of the site and placed in prepared receptor areas located on the eastern boundary and in the demolished footprint of the Alpha building in the south-western part of the site. The translocation will be undertaken following the Outline Grassland Translocation and Soil Management Method Statement in Volume 3 Appendix 6.6 (20305S-RPS-XX-XXRP-P-9740). The method statement defines the preparatory works to be implemented in the donor area and the receptor sites, the method to be employed including of the type of equipment and the aftercare commitments during the initial bedding down period. The method statement will be refined with information from discussions with specialist contractors and soil sampling prior to determination of the application. Natural England will be kept informed of updates to the method statement.

6.3.12 Retained and translocated grassland will be over sown with locally harvested Barbury Castle Meadow mixture wildflower grassland seed mix[2] as an enhancement measure.

6.3.13 The following features are also incorporated into the soft landscaping proposals:

- Close mown grass wildflower turf- on either side of the security fence and throughout the Application Site, using a species-rich wildflower turf which is tolerant of frequent mowing to maximise biodiversity value of close mown grassland (a requirement for security).
- Wildflower mix (max height 300mm) – using locally harvested Barbury Castle Meadow Mixture wildflower grassland to create a border outside the security fence and around retained grassland within the Application Site. This is to be maintained as a longer sward (max 300mm) using locally harvested Barbury Castle Meadow Mixture wildflower grassland.
- Wetland seed mix – species-rich native wetland wildflower grassland mix, tolerant of wetting, sown in the base of the attenuation basin.
- Pond edge wildflower mix – native wildflower meadow grassland mix tailored to less frequent wetting sown around the edge of the attenuation basin.
- Pond edge plug planting of native plants suitable for wetter areas occasionally inundated.
- Permeable paving – sown with native wildflower grassland mix to maximise the biodiversity value of parking areas.
- Understorey / scrub planting – around the Application Site entrance using native species suited to the Application Site soil conditions and following recommendations in Promoting Nature in Cities and Towns (Malcom Emery, for the Ecological Parks Trust ,1986).
- Native broadleaf and conifer tree planting – within retained grassland around the Application Site edges.

6.3.14 The implementation of the landscaping plan would be aligned to the construction programme as appropriate.

6.3.15 Potential remedial measures could be required if created habitats do not achieve the anticipated condition as part of the delivery of the landscape scheme. This would be informed by monitoring with potential measures including supplementary wildflower seeding / plug planting including the introduction specific wildflower species adapted to mowing regimes or meadow style management for the translocated grassland.

Species Protection

Bats

6.3.16 If the loss of one or more bat roosts is unavoidable, this will be addressed through species protection, mitigation and the provision of alternative roost features. The detailed measures would be agreed with Natural England and would be covered by an EPS mitigation licence.

6.3.17 The licence would be obtained prior to any works affecting any of the potential bat roosts in trees or buildings identified in the baseline surveys.

6.3.18 Based on the likely type of roosts three new bat roost boxes would be provided for each low status roost where loss is unavoidable. Installation of new boxes on new buildings impractical due to the minimum level of security lighting required and therefore, all the bat boxes would be installed on retained mature trees located on the northern and south-eastern boundaries.

[2] Available from https://wildseed.co.uk/mixtures/view/72/barbury-castle-meadow-mixture

6.3.19 Each box would be installed at least 3m above ground with a south-east or south west facing aspect in locations not exposed to any light spill from artificial lighting; and

6.3.20 Details of the mitigation will be presented in the Method Statement which will accompany the licence application the following measures would be undertaken:

- installation of replacement roosts would be installed in advance of roost closure to provide receptacles where relocated bats could be moved;
- bats would be excluded from roosts using devices fitted during suitable weather and in the active season and left in place for a suitable period to allow bats to leave.
- Confirmed and potential roost features in buildings would be subject to hand search, soft stripping of structures under direct ecological supervision and destructive closure in advance of full demolition;
- all works to be supervised by the Named Ecologist on the EPS mitigation licence or their agent.

6.3.21 In the absence of any bat roosts within the development, a minimum of six long lasting bat boxes constructed from woodcrete (or equivalent) would be installed in the boundary plantation woodland on the northern and western boundaries of the development to provide additional opportunities for roosting bats. Boxes would be installed two to a tree with two different box designs on each tree to provide a range of roosting micro-conditions.

Breeding Birds

6.3.22 As construction (involving tree clearance on the Application Site) is likely to commence in Q3 (July to September) 2021, it is likely to be outside of the optimal bird nesting season (mid-March to mid-June). The nesting season continues to potentially the end of August so if tree clearance operations have to take place during the period then an Ecological Clerk of Works (ECoW) shall check in advance that there are no birds nesting in the planned area of operation. . The checks would be undertaken no more than 48 hours prior to removal of the tree. Any active nests would be protected with an exclusion zone (minimum 5m radius) established around the nest within which no work would be permitted.

6.3.23 The exclusion zone would be demarcated with posts and barrier tape or similar materials. The nest would be monitored regular and no works would be undertaken within the exclusion zone until the ECoW has confirmed the young birds have fledged and the nest is no longer in use.

6.3.24 Ten long lasting bird boxes constructed from woodcrete (or equivalent) will be installed in the boundary plantation woodland on the eastern and south-eastern boundaries of the development to provide additional opportunities for breeding birds

Reptiles

6.3.25 A precautionary working method will be followed for the removal of suitable reptile habitat to ensure that any animals within the working area are displaced into the retained grassland around the edges of the Application Site.

6.3.26 The detailed working method is provided in Appendix 6.4. Following the working method, suitable reptile habitats will be cleared only during the time of year and during suitable weather conditions when reptiles will be active. Habitat will be systematically degraded with cutting in stages progressing to removal to ground level to allow animals to move out of the construction area. Habitats will be cleared moving from the centre of the Application Site working towards the Application Site boundaries where grassland habit will be retained. Retained grassland into which animals will be displaced will be protected with suitable fencing or other barrier fixed to the ground.

Potential hibernation or shelter features will be dismantled and removed by hand and any reptiles placed in the retained grassland minimising animal handling time. A final destructive clearance will render the working area unsuitable for reptiles.

6.3.27 Systematic vegetation removal, dismantling of shelter features and destructive clearance will be carried under the guidance and supervision of an experienced ECoW.

Badger

6.3.28 To minimise the risk of mammals being harmed, a means of escape from any larger excavations (i.e. excavations over 0.5 m depth) left open overnight would be provided as necessary, such as the provision of a scaffold plank as a ramp (at no more than 45° angle), or the profiling of at least one wall of an excavation to provide a gentle slope (no more than 45°) that an individual could use to exit the excavation. Alternatively, where practicable the excavation would be covered.

6.3.29 Best practice measures implemented during construction would include hazardous material being safely stored in a locked container away from potential disturbance by animals.

Biodiversity Net Gain Off-site Compensation

6.3.30 A Biodiversity Net Gain (BNG) Assessment has been undertaken to identify the biodiversity gain or loss based on the existing habitats which are mapped on the Habitat Plan (Volume 2, Figure 6.2). The Landscape Strategy has been designed to maximise biodiversity value within the Application Site through the retention of neutral grassland and semi-improved neutral grassland. Where the loss of grassland within species-rich areas cannot be avoided, as a last resort the habitat will be subject to translocation within the Application Site. The grassland will be restored to an equivalent condition or higher through appropriate meadow management to control the abundance of coarse grasses and ruderals, and to create opportunities for wildflower species to thrive. The retention and enhancement of the boundary woodland will also contribute to the biodiversity value of the operational site.

6.3.31 The BNG assessment setting out the habitats, conditions and scores is presented in Appendix 6.3 of the ES.

6.3.32 Although on-site credits have been maximised there is small overall loss of biodiversity habitat units. A contribution to an off-site grassland creation scheme will provide the compensation needed for the development to deliver a 10% gain. The loss of a tree line and ornamental hedgerow is been mitigated through the creation of a new native hedgerow with trees and associated ditch which will result in a biodiversity gain in terms of linear habitats.

6.4 Assessment of Construction Effects

Statutory Designated Sites

Burderop Wood SSSI

6.4.1 Burderop Wood SSSI lies on a north facing slope adjoining the northern boundary of the Application Site. The slope potentially exacerbates the potential for impacts from spills of surface water discharge from the Application Site during construction.

6.4.2 There is also the potential for the deposition of dust arising from construction on the woodland canopy immediately adjacent to the Application Site. Typically, construction dust is deposited a few 10s of meters from the source. The new access road and building are set back from the woodland edge by approximately 25m limiting the potential for any adverse effects.

6.4.3 Best practice construction measures implemented during construction and described in section 6.3 would minimise the risk and magnitude of potential impacts from dust or other contamination.

6.4.4 The new access road and building are set back from the woodland edge by approximately 25m limiting the potential for any adverse effects.

6.4.5 Although the section of grassland adjoining the SSSI slopes down towards the woodland, the construction site slopes away from the woodland and during periods of heavy rain surface water will not flow from areas of bare soil into the SSSI.

6.4.6 Once constructed the data centre will shade the ground immediately to the north for periods during each day. The habitats that will be affected by this are principally the mown wildflower turf. In relation to potential shading of the SSSI, the new building is set back from the woodland edge trees by over 22m and in the context any potential shading effect would be limited to trees and shrubs on the southern boundary.

6.4.7 The sun's path and elevation in the sky will change throughout the day and year. There is potential for shading on woodland edge trees during part of the day when the sun is lower in the sky. This would be for more extended periods in winter, when the sun is at its lowest, but shading at this time of year would be no effect on trees and shrubs during their period of dormancy.

6.4.8 Any shading of the trees would be limited to trees on the woodland edge and only for a small proportion each day but due to the distance of the building from the woodland edge the trees would receive sunlight for a large proportion of each day in early spring and autumn and would be virtually unshaded in mid summer when the sun is at its highest. Any effect on the trees, shrubs or herbaceous species on the southern boundary will be very limited. Early spring daylight on the woodland floor below the tree canopies within the woodland will remain unchanged.

6.4.9 Heat will be generated from the data servers and other IT equipment in the Data Hall. Where required, excessive heat from the Data Hall is extracted to ensure the servers and computer processing equipment are maintained at an optimum efficiency. This will be automatically managed by the Building Management System which constantly regulates internal temperatures. A series of central air shafts transfer the warmed air to roof-mounted plant either to discard or recirculate the air depending on the seasonal space heating and cooling requirements of the building. Modelling undertaken by the Applicant has shown that any heat from the facility has dispersed and dissipated by the time is passes the north façade of the building.

6.4.10 Noise from general construction activity could affect activity on the southern boundary of the woodland with the potential for a temporary reduction in nesting activity. The modelling of predicted noise levels during the construction phase is presented in the Noise Impact Assessment for Ecology (Volume 3 Appendix 6.5. In summary during construction 24% of the SSSI will be exposed to noise between 50 and 70dB that could result in behavioural changes such as alarm calling or change in feeding/roosting activity. A small area approximately 350m2 would be subject to noise levels higher than 70dB where birds could disperse away from woodland closest to noise generating activities. For the vast majority of the SSSI, noise levels would be below 50 dB LAeq,T and therefore the impact would be low, although there would be some areas exposed to a moderate to high impact for some of the time.

6.4.11 Based on this data any potential dispersal effect would be localised and only affect a small proportion of the local populations. Noise from general construction activity could affect activity on the southern boundary of the woodland with the potential for a temporary reduction in nesting activity. The modelling of predicted noise levels during the construction phase is presented in the Noise Impact Assessment for Ecology (Volume 3 Appendix 6.5. In summary during construction 24% of the SSSI will be exposed to noise between 50 and 70dB that could result in behavioural changes such as alarm calling or change in feeding/roosting activity. A small area approximately 350m2 would be subject to noise levels higher than 70dB where birds could disperse away from

woodland closest to noise generating activities. For the vast majority of the SSSI, noise levels would be below 50 dB LAeq,T and therefore the impact would be low, although there would be some areas exposed to a moderate to high impact for some of the time.

6.4.12 Based on this data any impact would dispersal effect would be localised and only affect a small proportion of the local populations.

6.4.13 Overall, the magnitude of all potential construction impacts is predicted to be negligible. The worst-case effect would be of minor adverse significance. This is not significant in the EIA terms of this assessment.

Coate Water SSSI / LNR

6.4.14 Of the other statutory designations within 5km of the Application Site, Coate Water SSSI and LNR is the closest to the Application Site at 1.6km. Coate Water is also potentially sensitive to construction impacts being designated in part for its use by populations of woodland and wildfowl bird species, the populations of which may at least in part depend on habitats outside of the SSSI.

6.4.15 Although situated 1.6km from the Application Site, Coate Water SSSI and LNR is separated from the Application Site by the M4 motorway and by Burderop Wood. This physical separation precludes the potential for any direct impacts during construction.

6.4.16 The permanent woodland loss within the Application Site as a result of the development is limited to 0.1ha of plantation woodland; a very small proportion of the on-site woodland and a negligible part of the woodland in the wider local area. Therefore, woodland loss will not affect populations of woodland bird species associated with the SSSI / LNR.

6.4.17 There are no waterbodies within the Application Site, and the long grassland with scattered scrub has very low potential value as habitat for waders and wildfowl which breed or feed at the SSSI. The absence of waterbodies means the Application Site will also not be of importance as supplementary habitat for the dragonfly and damselfly species associated with the SSSI.

6.4.18 Overall, the magnitude of the impact during construction is predicted to be negligible. The worst-case effect would be of minor adverse significance. This is not significant in the EIA terms of this assessment.

Other Statutory Designated Sites

6.4.19 All other statutory Designated sites are located at least 2.3km from the Application site. No impact pathways have been identified between the Application Site construction activities and these sites. Therefore, no potential construction impacts are anticipated resulting in no change.

Non-Statutory Designated Sites

Burderop Combe LWS

6.4.20 The closest non-statutory site is Burderop combe LWS situated approximately 50m west of the Application Site and designated for its grassland.

6.4.21 The LWS is shielded by plantation woodland, approximately 40m wide on the western boundary of the Application Site. This creates a significant buffer between development activities and the boundary of the designated site. The LWS is also shielded from noise disturbance by Ladder Hill, an elevated grassland plateau and escarpment which forms a barrier between the Application Site and the LWS. Due to this physical separation no construction impacts are anticipated on Burderop Combe LWS resulting in no change. This is not significant in the EIA terms of this assessment.

Other Non-statutory Designated Sites

6.4.22 All other non-statutory designated sites are located at least 0.5km from the Application Site. No impact pathways have been identified at any other non-statutory designated sites. As a result, there would be no change to all other non-statutory sites. This is not significant in the EIA terms of this assessment.

Habitats

6.4.23 The following habitats would be lost or impacted by the proposed development:

- species diverse neutral grassland (Area A);
- rank neutral grassland (Area B);
- semi-improved neutral grassland (Area C);
- species-poor semi-improved grassland (around existing buildings)
- plantation broadleaved woodland;
- broadleaved trees
- dense mixed scrub;
- introduced scrub; and
- other habitats (tall ruderal, ornamental shrub and herb planting, Cypress hedge).

Species-diverse Neutral Grassland (Area A)

6.4.24 Part of the species diverse semi-improved neutral grassland in the centre of the Application Site would be permanently lost during construction mainly to accommodate the replacement data centre building.

6.4.25 The areas of species-rich grassland will be subject to translocation within the Application Site; with the turves and the substrate being used to re-establish neutral grassland in a south-western receptor area on the footprint of the Alpha Building which will be demolished with a second eastern receptor area alongside the new SuDS basin. An Outline Grassland Translocation and Soil Management Method Statement is presented in Appendix 6.6.

6.4.26 The translocated grassland (and the other wildflower grassland in the operational site) will be subject to aftercare and meadow management as part of the permanent soft landscaping. Following the movement of turves/soil there would be a delay before the translocated grassland becomes established.

6.4.27 The creation of areas of new wildflower grassland would provide additional grassland habitat with the potential to develop the same value as the existing grasslands which were created following the demolition of the hospital site to enable redevelopment as a data centre.

6.4.28

6.4.29 Overall, the translocation of species diverse neutral grassland would be of moderate magnitude and of minor adverse significance. This is not significant in the EIA terms of this assessment.

6.4.30 A successful translocation coupled with long term management will have the potential in the medium term to establish areas of species-rich vegetation larger in extent than are currently present within the site.

Rank Neutral Grassland (Areas B and D)

6.4.31 A significant proportion of the neutral grassland will be protected and retained during construction and subject to enhancement. The largest area of retained grassland in the western part of the site and along the northern boundary. A small area is located in the south-western part of the site. e

6.4.32 Part of this grassland will be permanently lost during construction to accommodate the new data centre buildings and soft landscaping around the buildings. There will be temporary loss on the alignment of the temporary access road which will be constructed from an open matrix which will be filled with soil and sown with the native wildflower seed mix.

6.4.33 The extent of loss is low and will be fully offset by the enhancement of the retained grassland which will be scarified with all leaf litter removed and then over-sown with the native wildflower grassland mix.

6.4.34 Overall, there would be low magnitude impact with an effect of negligible adverse significance. This is not significant in the EIA terms of this assessment. Over time the species-richness of the retained vegetation will increase and raising the value of Area B and Area D.

Semi-improved Neutral Grassland (Area C)

6.4.35 Most of the semi-improved neutral grassland which extends across much of the southern part of the Application Site will be permanently lost during construction.

6.4.36 The retained areas will be enhanced with wildflower over-sowing as part of the landscape strategy.

6.4.37 Creation of new wildflower grassland in the landscape strategy would provide partial replacement habitat in the medium to long term after an establishment period.

6.4.38 This would be a high magnitude impact with an effect of minor adverse significance. This is not significant in the EIA terms of this assessment.

Species-poor Semi-improved Grassland

6.4.39 Small extents of species-poor grassland are present around the existing data centre buildings in the eastern and south-western parts of the site.

6.4.40 The grassland around the eastern data buildings will be lost, but much of the grassland around the Alpha Building will be retained or enhanced or where disturbed during demolition will be restored to wildflower meadow.

6.4.41 This would be a low magnitude impact with an effect of negligible or minor beneficial significance. This is not significant in the EIA terms of this assessment.

Plantation Broadleaved Woodland

6.4.42 The plantation broadleaved woodland within the Application Site will be retained and protected during construction.

6.4.43 A small extent of new woodland edge planting will fully mitigate the loss. However, the replacement planting is isolated from existing retained woodland reducing its potential value. There would also be a delay of several years for the new woodland to establish.

6.4.44 There would be a negligible effect on the plantation broadleaved woodland. This is not significant in the EIA terms of this assessment.

Broadleaved Trees

6.4.45 Tree removal will be mainly in the centre of the Application Site and around the Application Site entrance.

6.4.46 Trees around the perimeter of the Application Site will be retained and protected during construction. Replacement tree planting with a good range of native species will have a small mitigating effect in the short term. This would increase in the long term as new trees mature.

6.4.47 Tree loss would be a high magnitude impact with an effect of minor adverse significance. This is not significant in the EIA terms of this assessment.

Dense Mixed Scrub

6.4.48 Most of the native species-poor dense scrub growing within the grassland habitats will be permanently removed during construction to accommodate buildings infrastructure or as part of the enhancement of the retained grasslands. Self-seeded scrub and bramble in the north-western corner of the Application Site will be retained and allowed to form a wide edge to the plantation woodland. Groups of new native shrub planting on the boundary of the plantation will over time form further areas of dense scrub. The loss/creation of dense scrub would be a moderate magnitude impact of negligible adverse significance. This is not significant in the EIA terms of this assessment.

Other Habitats

6.4.49 There will be permanent loss of the majority of other habitats of very limited ecological value and small extents within the Application Site. Tall ruderal vegetation will be partly lost to accommodate wildflower grassland. The row of Cypress tree beside building B4 will be partly removed and cut back, and small area of ornamental shrub and herb planting around buildings B7 and B8. This will have, at worst, a high magnitude impact with an effect of no more than minor adverse significance. This is not significant in the EIA terms of this assessment.

Biodiversity Net Gain Assessment

6.4.50 A formal assessment of habitat loss and gain is presented in the Biodiversity Net Gain Assessment in Volume 3, Appendix 6.3 (Document ref 20305S-RPS-XX-XX-RP-P-9712).

Species

Roosting Bats

6.4.51 Based on the survey information from 2020 the development is likely to result in the loss of up to three bat roosts of low conservation status of one or more of the following species (three roosts in total): common pipistrelle, soprano pipistrelle, brown long-eared, serotine, whiskered, Brandt's, Daubenton's, Natterer's bats and Lesser horseshoe *Rhinolophus hipposideros* bat.

6.4.52 In the absence of mitigation, the loss of the roosts would result in the permanent loss of all roosting potential on Application Site for the species concerned. There is the potential for very small numbers of bats to be harmed or killed during buildings demolition / refurbishment or tree removal.

6.4.53 The worst-case (pre-mitigation) would be the removal of all bat roosts (of low conservation status) resulting in a high magnitude impact with an effect of minor significance. This is not significant in the EIA terms of this assessment.

Foraging / Commuting Bats

6.4.54 Most of the grassland within the centre of the Application Site, and small extents of boundary woodland will be removed during construction with the permanent loss of bat foraging habitat. The retention and protection of boundary woodland and adjoining grassland especially along the northern and eastern boundaries will mean key bat flight lines and foraging area are largely retained.

6.4.55 Night-time working would potentially cause light disturbance of retained flight lines along woodland edges which would deter many species of bats. Some common species of bats (e.g. common pipistrelle and noctule) may forage around lights but this could be due to invertebrate prey being attracted away from their normal feeding areas rather than a true preference. Thus, there is the potential for disturbance of regular feeding behaviour.

6.4.56 Overall, construction would have a medium magnitude impact with an effect of minor significance. This is not significant in the EIA terms of this assessment.

Badger

6.4.57 With no known badger setts within or adjacent to the Application Site, and very low levels of badger activity within the Application Site, potential effects on badger are limited to loss of infrequently used potential foraging habitats which does not form a significant part of a territory. The low levels of activity indicate the Application Site is not an important route for badgers moving through the landscape, and the retention of boundary woodland and grassland will ensure the passage of badgers is not significantly obstructed.

6.4.58 There is a very low likelihood of roaming badgers being harmed as a result of disturbing potentially harmful materials stored at the construction site or becoming trapped in excavations.

6.4.59 Overall, the badger population is expected to be largely unaffected by the Swindon Data Centre Project. The magnitude of the impact is negligible and the potential significance of the effect on the badger population is negligible adverse, which is not significant in terms of this EIA chapter methodology.

Breeding Birds

6.4.60 Bird nesting habitat will be lost through the permanent removal of dense scrub and individual trees during construction. Typically, the mature dense scrub has higher value than the individual trees as it provides better cover for nest building but is comparatively small in extent. Ground nesting birds are unlikely to be affected due to the very low suitability of the on-site grassland. The retention of boundary woodland will reduce the magnitude of the effect. Removal of grassland trees and scrub would also reduce the extent of suitable foraging habitat within the Application Site.

6.4.61 Removal of nesting habitats (scrub and trees) during the spring and summer when birds are nesting will have the potential to disturb birds occupying nests causing them to abandon eggs or dependant young There is also a risk of nests and eggs being destroyed.

6.4.62 There is the potential for birds nesting in retained scrub or trees to be disturbed by constructing noise which could also cause bird to abandon their nests.

6.4.63 Elevated noise levels above 70dB during construction could result in lower levels of bird activity in section of boundary plantation closest to the development activities.

6.4.64 Modelling of noise in the SSSI woodland indicates that the behaviour of individuals could change in the part of the SSSI closest to development activities but dispersal of birds away from the site is very unlikely to occur away from the boundary.

6.4.65 There would be a high magnitude impact on breeding birds resulting in an effect of minor adverse significance. This is not significant in terms of this EIA chapter methodology.

Reptiles (Slow Worm)

6.4.66 Removal of the grassland and scrub across the Application Site in the absence of any species protection measures will potentially harm or kill individual slow worm.

6.4.67 The loss of grassland during construction will remove a large proportion of suitable slow worm habitat within the Application Site which currently supports a small slow worm population. Most slow worm were recorded in the grassland along the northern Application Site boundary and this will be retained and protected during construction. Suitable grassland habitat will also be retained along the western and southern edges of the Application site and will provide suitable alternative slow worm habitat for animals displaced during construction.

6.4.68 The loss of slow worm habitat will have a high magnitude impact on the small slow worm population at the Application Site resulting in an effect of minor adverse significance. This is not significant in terms of this EIA chapter methodology.

Invertebrates

6.4.69 Construction will result in the loss of a larger proportion of the higher value habitats for invertebrates within the Application Site. This includes plantation woodland with larger trees which provide features such as deadwood and fungus; a large extent of the more species-rich neutral grassland; and areas of disturbed ground around buildings. Most of the species-poor semi-improved grassland and a large proportion planted trees within the grassland would also be lost, although these are of lower interest for invertebrates. Conversion of longer rank grassland to shorter mown grassland through landscaping will likely decrease its potential invertebrate value.

6.4.70 Retained habitats around the edges of the Application Site include some areas of moderately species diverse semi-improved grassland.

6.4.71 With the loss of a significant proportion of the higher value invertebrate habitats, construction would have a moderate magnitude impact on the Application Site's invertebrate interest. Under a precautionary approach the effect could have minor adverse significance. This is not significant in terms of this EIA chapter methodology.

Invasive Plant Species

6.4.72 The small extent of *Crocosmia sp* in the ornamental planting around buildings B7 and B8 would be removed during construction. As a species listed on Schedule 9 of the Wildlife and Countryside act, any plant material which could potentially be spread in the wild would be treated as controlled waste and disposed of at a licenced landfill.

6.4.73 The removal of montebretia from the Application Site would be a low magnitude impact resulting in a minor beneficial effect preventing the inadvertent spread of plant material during earthmoving and construction activities. This is not significant in terms of this EIA chapter methodology.

Future Monitoring

6.4.74 New bat roosts provided under a Natural England EPS mitigation licence would be monitored in accordance with the details specified in the licence. Monitoring typically would comprise a physical roost inspection and emergency / re-entry survey in the year following installation of replacement with further inspections biennially up to five years after installation depending on the conservation status of the roosts being replaced.

6.4.75 New habitat creation for biodiversity gain would normally be monitored in the first year after creation to assess initial establishment of new habitats. For the translocated, new and enhanced grassland areas, botanical surveys at the appropriate time of years (usually early and late summer) would record vegetation cover and species composition against the grassland specification. Further monitoring would typically be carried out in years two or three and year five.

6.4.76 The findings of monitoring would be used to inform management with management practices modified where necessary to ensure biodiversity objectives are being met. Where there is a significant short fall in the objectives being achieved, remedial measures would be recommended such as resowing.

6.4.77 Formal biodiversity objectives are defined in the Biodiversity Management and Monitoring Plan (BMP) [document reference Appendix 6.7 (Document ref 20305S-RPS-XX-XX-RP-P-X) which includes a timetable for implementation and monitoring, defined roles and responsibilities for monitoring and management and formal management review after each monitoring round.

6.4.78 Removal of Montbretia would require a sterile working method to ensure that the removal is successful, and any contaminated material is not spread. Monitoring of the success of the removal would form part of the BMMP (Volume 3, Appendix 6.7), with the annual management review including on-going or new measures for control as appropriate.

6.4.79 Species protection measures implemented at the start of construction should be monitored to ensure they remain in place and effective for the duration of the period of risk. This would include:

- monitoring of bird nests (if active nests are found that need to be protected from disturbance);
- monitoring of measures to prevent injury to badgers; and
- monitoring and ongoing maintenance of the reptile exclusion fence to exclude reptiles from the construction site after displacement.

6.4.80 Monitoring during construction typically will be the responsibility of a nominated member of the site staff (usually the site manager) and is recorded in a log which is kept in the site office at all times and regularly updated.

Accidents and/or Disasters

6.4.81 Best practice measures will be implemented at the outset of construction. Pollution prevention and other environmental protection measures will be built into the working practices for all relevant construction activities. These measures will follow relevant guidance to minimise the risk of accidents with the potential to adversely impact on ecological receptors. Measures will include construction fencing to protect adjacent retained habitats and Burderop Wood SSSI to the north of the Application Site, tree protection fencing in line with BS5837(2012), dust control surface water control, spill prevention and management, and designating secure refuelling and storage areas (refer to the Code of Construction Practice (Volume 3 Appendix 2.1)).

6.5 Assessment of Operational Effects

Air Quality During Operation

6.5.1 An assessment of potential impacts from predicted air quality changes has been carried out and is presented in the Air Quality Assessment Report (Volume 3 Annex D of Appendix 8.2).

6.5.2 In line with Environment Agency guidance on ‘Screening for protected conservation areas’ (EA, 2020) the assessment looked at potential impacts on European designated nature conservation sites within 10km, and other nature conservation designations within 2km of the Application Site.

6.5.3 The assessment modelled predicted emissions nitrogen oxides (NO_x), acid deposition, nitrogen (N) deposition and sulphur dioxide (SO_2). These were then compared to the relevant critical levels (concentration of a pollutant in the air) or critical load (amount of pollutant deposited from air to the ground) for the relevant habitat type or interest feature at each site.

6.5.4 Emissions were predicted for the following scenarios:

- Testing Scenario 1 – each generator unit tested separately at 25% load for 0.5 hour every two weeks per year and 1 hour each quarter, i.e. 17 hours per generator;
- Testing Scenario 2 – each generator unit tested separately at 100% load for 1.5 hours, twice a year, i.e. 3 hours per generator; and
- Scenario 3 (Emergency in the event that there is a complete loss of power from the national grid) – all 11 generators operating at 100% load for 72 hours.

6.5.5 The former National Data Centre was an operational facility until summer 2020 with a system of diesel generators to protect the operation from power failures. These generators were periodically tested under a regime that will be consistent with the operational requirements of the redevelopment proposal.

6.5.6 The criteria for determining significant are published by the Environment Agency guidelines (EA, 2020) and the Institute of Air Quality Management: A guide to the assessment of air quality impacts on designated nature conservation sites (IAQM, 2020). The criteria are explained fully in the Air Quality Assessment (Volume 3 Annex D of Appendix 8.2).

Annual Mean NO_x

6.5.7 The Air Quality Impact Assessment determined that the annual mean NO_X PC is less than 1% of the critical level and thus is not significant in accordance with EA guidance at all receptors and for all modelled scenarios except for one location at Burderop Wood SSSI. At this location under the emergency scenario, the PC exceeds 1% of the critical level. But the PC and background concentration combined remain below the critical threshold. Consequently, there is unlikely to be a significant effect.

6.5.8 The combined PC and background concentration in the emergency scenario at this one location still remains below the critical threshold for NO_x and thus a significant effect is extremely unlikely in line with EA guidance.

Daily NO_x

6.5.9 For the testing scenarios (scenarios 1 and 2), the PC is above 10% of the critical threshold at the Burderop Wood SSSI and 100% at the other sites; however, the PEC is below the critical threshold at all sites. As such, the impact during testing is not likely to have a significant effect.

6.5.10 Under the emergency scenario, the PEC exceeds the daily NO_x critical threshold at several locations close to the Application Site. Modelling for the worst meteorological year predicts that the background upper daily NO_x critical level will be exceeded on 68 days, while the lower daily NO_x critical level will be exceeded on 133 days.

6.5.11 Statistical modelling (as set out in Annex D of the Air Quality Assessment (Chapter XX) indicates the likelihood of an emergency occurring on any randomly selected days when background levels exceed critical thresholds is less 1%. Thus, an exceedance is considered highly unlikely.

6.5.12 Although there is a short-term (24hr) critical level set for vegetation in relation to NOx (75 µg/m3), daily doses are generally not considered to be as important in terms of effects on plants as the annual mean concentration since the effects of NOx are additive over long periods of time (particularly in relation to the fertilization effect); indeed, Centre for Ecology and Hydrology (CEH)-

based authors, state that 'UN/ECE Working Group on Effects strongly recommended the use of the annual mean value, as the long-term effects of NOx are thought to be more significant than the short-term effects' (Sutton et al. 2013).

6.5.13 The high concentrations of NOx within the SSSI will only occur for a short duration in an emergency situation when all generators on site were operating simultaneously before power from the national grid is restored. Therefore, in this very worst-case scenario where power is lost for 72 hours, there may be some short-term impacts on vegetation within the SSSI at a biochemical level within leaves due to the elevated NOx, the most likely impact being transient enhanced nitrate reductase activity (WHO 2000). However, given the very short duration and fact that it is long-term exposure to elevated levels that result in ecologically-meaningful effects to habitats/species, the short exposure predicted during an emergency would be insufficient to result in any significant long-term effect that would be significant in EIA terms.

Nitrogen Deposition

6.5.14 The maximum nitrogen deposition PC is below 1% of the critical load at all receptors, except for one location at Burderop Woods SSSI where the emergency scenario gives a PC 1.0% of the upper end of the critical load range. On that basis, the impact is not likely to have a significant effect.

SO_2

6.5.15 The maximum annual-mean SO_2 PC is below 1% of the critical level at all sites for all and for all scenarios. As such, there is unlikely to be a significant effect.

Acid Deposition

6.5.16 The maximum acid deposition PC is below 1% of the critical load at all sites. On that basis, the impact is not likely to have a significant effect.Overall, the magnitude of impact on ecological features associated with emissions to air from the operational power station is negligible, and the significance of effect negligible adverse, which is not considered significant.

Statutory Designated Sites

North Wessex Downs AONB

6.5.17 The potential operational impacts on species or species groups and habitats which contribute to the AONB designation are dealt with separately under the relevant sections of this chapter.

Burderop Wood SSSI

6.5.18 Burderop Wood SSSI lies on a north facing slope adjoining the northern boundary of the Application Site. In the completed development there will be an 8-16m wide area of retained grassland alongside the woodland. A 16m wide strip of and short sown wildflower grassland associated with the two perimeter fences will maintain a buffer zone of between 24m and 32m between the hardstanding access road and the SSSI woodland. The gradation from short mown to longer grassland, designed to have a significant wildflower component will create a woodland edge ecotone with structural and species diversity. The artificial lighting scheme has been specifically designed to avoid any light spill onto the SSSI.

6.5.19 The section of grassland adjoining the SSSI slopes down towards the woodland. All surface water runoff from hardstanding and process water will enter the drainage system for the site with no connectivity with the SSSI. There is potential for a diffuse flow movement of rainwater from the

adjoining grassland. The majority of the grassland generally slopes away from the woodland and soil moisture levels should remain unchanged within and adjoining the woodland boundary.

6.5.20 In relation to potential shading, the sun's path and elevation in the sky will change throughout the day and year. The new building is set back from the woodland edge trees by over 22m and in the context any potential shading effect would be limited to trees and shrubs on the southern boundary. There is potential for low level of shading on woodland edge trees during part of the day when the sun is lower in the sky. This would be for more extended periods in winter, when the sun is at its lowest, but shading at this time of year would be no effect on trees and shrubs during their period of dormancy.

6.5.21 Any shading of the trees would be limited to trees on the woodland edge and only for a small proportion each day but due to the distance of the building from the woodland edge the trees would receive sunlight for a large proportion of each day in early spring and autumn and would be virtually unshaded in mid summer when the sun is at its highest. Any effect on the trees, shrubs or herbaceous species on the southern boundary will be very limited. Early spring daylight on the woodland floor below the tree canopies within the woodland will remain unchanged.

6.5.22 Heat is generated from the data servers and other IT equipment in the Data Hall. Where required, excessive heat from the Data Hall is extracted to ensure the servers and computer processing equipment are maintained at an optimum efficiency. This is automatically managed by the Building Management System which constantly regulates internal temperatures. A series of central air shafts transfer the warmed air to roof-mounted plant either to discard or recirculate the air depending on the seasonal space heating and cooling requirements of the building. Modelling undertaken by the Applicant has shown that any heat from the facility has dispersed and dissipated by the time is passes the north façade of the building.

6.5.23 Noise from general construction activity could affect activity on the southern boundary of the woodland with the potential for a temporary reduction in nesting activity. The modelling of predicted noise levels during the construction phase is presented in the Noise Impact Assessment for Ecology (Volume 3 Appendix 6.5. In summary during construction 24% of the SSSI will be exposed to noise between 50 and 70dB that could result in behavioural changes such as alarm calling or change in feeding/roosting activity. A small area approximately 350m2 would be subject to noise levels higher than 70dB where birds could disperse away from woodland closest to noise generating activities. For the vast majority of the SSSI, noise levels would be below 50 dB LAeq,T and therefore the impact would be low, although there would be some areas exposed to a moderate to high impact for some of the time.

6.5.24 Based on this data any potential dispersal effect would be localised and only affect a small proportion of the local populations. Noise from general construction activity could affect activity on the southern boundary of the woodland with the potential for a temporary reduction in nesting activity. The modelling of predicted noise levels during the construction phase is presented in the Noise Impact Assessment for Ecology (Volume 3 Appendix 6.5. In summary during construction 24% of the SSSI will be exposed to noise between 50 and 70dB that could result in behavioural changes such as alarm calling or change in feeding/roosting activity. A small area approximately 350m2 would be subject to noise levels higher than 70dB where birds could disperse away from woodland closest to noise generating activities. For the vast majority of the SSSI, noise levels would be below 50 dB LAeq,T and therefore the impact would be low, although there would be some areas exposed to a moderate to high impact for some of the time.

6.5.25 Based on this data any impact would dispersal effect would be localised and only affect a small proportion of the local populations.

6.5.26 Overall, the magnitude of the operational impact is predicted to be negligible, with a negligible adverse significance of effect. This is not significant in the EIA terms of this assessment.

Coate Water SSSI / LNR

6.5.27 The separation and distance of Coate Water SSSI and LNR from the completed operational site over 1.6km to the north of the opposite side of the M4 motorway means that there would be no direct or indirect impacts from the operation of the site.

6.5.28 Overall, the magnitude of the impact during operation is negligible (neutral) with a negligible adverse significance of effect. This is not significant in the EIA terms of this assessment.

Other Statutory Designated Sites

6.5.29 All other statutory designated sites are located over at least 2.3km from the Application Site. No impact pathways have been identified between the Application Site construction activities and these sites. Therefore, no potential construction impacts are anticipated resulting in no change.

Non-Statutory Designated Sites

Burderop Combe LWS

6.5.30 The closest non-statutory site is Burderop combe LWS situated approximately 50m west of the Application Site and designated for its grassland.

6.5.31 The LWS is shielded by a 40m wide plantation woodland beyond the western boundary of the Application Site with no potential for direct impacts. The operation of the site would not lead to any significant increase in the recreational activity in the LWS. Any increase in noise would be insignificant level within the LWS and would not any affect features for which the site is designated.

6.5.32 The magnitude of the impact during operation would be neutral (negligible) with a negligible adverse effect significance. This is not significant in the EIA terms of this assessment.

Other Non-statutory Designated Sites

6.5.33 All other non-statutory designated sites are located over 500m from the boundary of the Application Site. No impact pathways as a result of site operation have been identified at any other non-statutory designated sites. As a result, there would be no change to all other non-statutory sites. This is not significant in the EIA terms of this assessment.

Habitats

6.5.34 There is limited potential for adverse impacts on retained and created habitats within the site as a result of the operation of the development.

6.5.35 The retained grassland areas will become part of the soft landscaping of the site with enhancement through over-sowing with native wildflower seeds.

6.5.36 Management of habitats should maintain their value for wildlife over the lifetime of the development. The close mowing of the majority of the grasslands within the perimeter fences for critical operational reasons is likely to limit the potential diversity of the grassland with populations of wildflower species that are resilient to close mowing expected to be a self-sustaining component of the habitat.

6.5.37 Management of the SuDS attenuation basin will have the potential to result in disturbance to the translocated grassland and the machinery used and the method adopted should protect the interest and value of the grassland.

6.5.38 The operation of the data centres will have a negligible impact magnitude with a negligible adverse significant effect on the retained boundary woodland and the new and existing wildflower grassland habitats located primarily on the perimeter of the site. This is not significant in the EIA terms of this assessment.

Species

Bats – Roosts

6.5.39 The provision of bat boxes either for artificial roost creation under licence as mitigation for the loss of bat roosts and/or to offset the loss of features of high and moderate bat roost potential is built into the development proposal.

6.5.40 All the bat boxes will be located on large trees within dark corridors that would not be subject to light spill. The unlit northern, eastern and south-eastern boundaries will retain their value of the wood edge as suitable locations for roost establishment close to good foraging habitat.

6.5.41 The magnitude of the impact during operation would be negligible (neutral). This is not significant in the EIA terms of this assessment.

Bats – Foraging and Commuting

6.5.42 The existing site is subject to very low levels of commuting and foraging activity with the retained edge habitats being the principal habitats that are utilised as flight corridors. No prolonged foraging activity was recorded.

6.5.43 The lighting strategy is shown in Volume 3 Appendix 6.7. In the completed development the woodland edges along the western, northern and eastern boundaries will be dark corridors with light levels below 1 Lux. The demolition of the buildings in the south-western part of the site and establishment of wildflower grassland will create new feeding areas sheltered on three sides by the existing plantation blocks. The features along with the adjoining grassland and attenuation basin will provide flight corridors maintaining connectivity across the site and with the surrounding landscape as well as future foraging resources.

6.5.44 Once operational the retained woodland edge boundaries will have equivalent value as foraging habitat for bats.

6.5.45 The creation of the attenuation basin will introduce a wetland land which will be associated with higher abundance of airborne invertebrates. This feature will be located in a sheltered location between the data centre and plantation woodland increasing the potential for favourable foraging conditions.

6.5.46 The lighting associated with the developed data centre will be attractive to some species of invertebrates which may disperse into the site attracted towards the lights and reflected light on the buildings. This would be expected to increase prey availability for species with low sensitivity to light (for example common and soprano pipistrelle bats and the noctule bat).

6.5.47 Typically, species will move towards light sources from up to 130m away and the development is expected to attract moths from the edge of the adjoining woodlands. The use of hoods and cowls on the lights would limit the direct visibility of lighting sources from the SSSI and linear plantation woodland reducing the potential magnitude of this effect.

6.5.48 Based on the pre-development levels of activity the potential low magnitude of the impact and its significance would be negligible. This is not significant in the EIA terms of this assessment.

Breeding Birds

6.5.49 A consistent low-level operational noise will be associated with the running of the data centre 24 hours a day. The site has been used by operational data centres up until summer 2020 and the birds in the locality will be habituated to this consistent low decibel level noise. The modelling completed for the Noise Assessment (Volume 3 Appendix 8.1) has concluded that there will be no adverse change in ambient sound level at day or night with noise associated with the operation lower than existing background noise levels during the day and night.

6.5.50 Consistent with the recent operations at the site, there will be intermittent higher levels of noise associated with the emergency back-up diesel generators which will be subject to periodic tests and used in the rare occurrence of an emergency, involving a loss of the power from the national grid.

6.5.51 Each of 11 generators will be subject to periodic testing. A test would involve each generator running for 0.5hr periods at 25% power with the total test time being 17 hours per year. The total time for operational testing for all 11 generators combined would be less than four days equating to 1% of the time, if each generator were tested in isolation. Alternatively, each generator could be tested at 100% power for 1.5hrs twice a year; 33 hours in total for all generators combined.

6.5.52 Test periods will be short and intermittent. All the generators are located on the southern side of the data centre and the building will shield the SSSI woodland limiting the noise levels on the edge of the habitat. The 25cm wide plantation woodland on the south-eastern (boundary and to a lesser extent eastern and western boundaries) will be subject periodic noise from generators.

6.5.53 During normal operation the noise levels that would be generated would be below background ambient noise with no potential to affect bird behaviour or activity.

6.5.54 Bird species on the southern boundary of Burderop Wood (and in the other plantation woodlands bordering the site) would become habituated to the quieter sound of individual generators being tested for relatively short periods. Due to the infrequent nature of the testing and the consistent nature of the noise there is no anticipated adverse effect of local bird populations in the woodland. The assemblage of species that currently breeds in and around the site should continue to do so in the redeveloped site.

6.5.55 In an emergency, following the complete loss of the power from the grid, all 11 generators would need to operate continuously at 100% load until such time as the power was restored. Modelling of the worst case predicted operational noise levels for the site when all the generators are required following an emergency power outage shows that the noise level in the SSSI woodland would remain below ambient noise levels during the daytime but there would be up to 46dB on the boundary of the SSSI.

6.5.56 Although there would be a short term increase the maximum dB level is below the threshold where bird behaviour may change.

6.5.57 During emergency operational periods, the modelled noise levels would be unlikely to result in individuals changing their behaviour and activity.

6.5.58 Emergency power would be required only in exceptional circumstances and therefore would not be associated with any extended effect on local bird populations.

6.5.59 The redeveloped operational site will continue to be artificially lit around the data centre and perimeter fence. Under the new scheme the key woodland habitat on the northern, western and eastern boundaries will be fully protected from light spill with the scheme design minimising effects on boundaries while maintaining the functionality required within the data centre site for security.

6.5.60 Increased light levels at night would be expected to result in beneficial and adverse effects on bird behaviour. Species that are common in urban environments will feed for longer and invertebrates

attracted to lights within the site would increase prey availability. Conversely, lighting also has the potential to affect behaviour that is adapted to day length including courtship, mating, migration and moulting and lighting around the south western plantation could result in localised changes in behaviour of a small number of birds.

6.5.61 Although levels of bird activity observed in the boundary plantations adjacent to the buildings was low, artificial lighting could result in a minor impact magnitude with negligible adverse significance for the local populations. This is not significant in the EIA terms of this assessment.

Reptiles

6.5.62 The partial retention of grasslands and the creation of new scrubby woodland edge habitat on the western boundary will retain good quality reptile habitat within the operational site, protecting the recorded slow worm population.

6.5.63 The extent of potential reptile habitat will be reduced but the survey concluded that the existing population size is small, and that the majority of individuals were selecting the woodland edge habitat for cover, shelter and prey.

6.5.64 There will be no additional adverse impacts beyond those identified during the construction phase.

6.5.65 Based on the provision of habitats that will have value for reptiles in the landscape scheme, the potential magnitude of the impact is negligible, and the effect would not be significant. This is not significant in the EIA terms of this assessment.

Breeding Birds

6.5.66 Although levels of bird activity observed in the boundary plantations adjacent to the buildings was low, artificial lighting could result in a minor impact magnitude with negligible adverse significance for the local populations. This is not significant in the EIA terms of this assessment.

Invertebrates

6.5.67 Impacts on invertebrates during operation will relate to the inclusion of habitats that have been designed to promote invertebrate diversity and abundance as well as the potential effects of artificial light on their behaviour and susceptibility to predation.

6.5.68 The grasslands in the completed development include perimeter areas of new native wildlife grassland managed to have sward heights between 5cm and 30cm which will adjoin the retained grassland on the edges of the woodlands. Although much of the grassland within the perimeter fences has to be frequently close mown grassland, the use of a Flowering Lawn mix should allow the establishment of some wildflowers including clovers that are favoured by pollinators. Wet grassland and marsh wildflowers will be established in the base of the attenuation basin which will be connected to the translocated species diverse grassland. This range of new habitats will increase the niches available to invertebrates.

6.5.69 The artificial lighting installed at the site for the former data centres would have been expected to attract some invertebrates from the adjoining woodland and grassland. These invertebrates are at higher risk of predation and mortality with potential effects of the population of some species.

6.5.70 The proposed development will require a new lighting scheme which has been designed to protect boundary habitats from light spill. The use of hoods and cowls on the lights would limit the direct visibility of lighting sources from the SSSI and linear plantation woodland reduces the potential magnitude of this effect.

6.5.71 Overall, the magnitude of the impact during operations would be medium and the effect could have minor adverse significance. This is not significant in the EIA terms of this assessment.

Future Monitoring

Habitats

6.5.72 Monitoring will be used to demonstrate the delivery of the Biodiversity Net Gain through the enhancement of existing and establishment of new habitats that together provide value for wildlife over the operational life of the development.

6.5.73 Monitoring would be low key, utilising standardised and easily repeatable monitoring methods that quantify site status against the BNG quantifiable targets for each habitat. Particular focus would be placed on translocated grassland. The status of the habitat during the initial period will inform aftercare management and need for remedial measures such as increased watering or removal of colonising ruderals that would affect the ecological value of the grassland. Additional remedial measures would be identified through monitoring if there are areas where the turves have not successfully established.

6.5.74 Periodic habitat monitoring will review the outcomes of management for wildlife covering the attenuation basin, translocated grassland, new wildflower grassland areas.

Species

6.5.75 Targeted species surveys for reptiles and bat activity would be undertaken 2 years after the completion of the development. The reptile survey would assess continued use of the boundary grasslands by a slow-worm population while the level of bat activity and species assemblages would be assessed using remote recorders to record activity over 5 night periods in the core activity season June, July and August supplemented by a transect survey.

6.5.76 If any bat roosts are affected by the development monitoring of replacement roost features would be subject to monitoring under the EPS licence, comprising inspections of bat boxes in early autumn to record evidence of use. Bat droppings would be sent for DNA analysis to confirm species identification.

Potential Changes to the Assessment as a Result of Climate Change

6.5.77 As described in paragraphs 8 to 6.2.200, potential changes as a result of climate change are difficult to predict. Anthropogenic factors such as site management are likely to be more significant for the biodiversity of the site and it is very unlikely that climate change would significantly affect the findings of this assessment.

6.6 Assessment of Cumulative Effects

6.6.1 The developments assessed for cumulative effects, and a brief summary of potential effects is given in Table 6.7. Summary text is provided below.

Table 6-7. Developments Considered for Potential Cumulative Effects on Ecology.

Application Ref	Description	Distance from Site	Planning Status	Potential for Cumulative Effect
S/17/0128 S/19/0441	Demolition of the pavilions, change of use of offices and ancillary buildings to 25no.	10m	Approved Approved	Long term negligible /

Application Ref	Description	Distance from Site	Planning Status	Potential for Cumulative Effect
S/19/1765 S/20/0926 S/20/1234	apartments/dwellings, erection of 52no. dwellings, construction of new access and associated works		Approved Pending Pending	minor beneficial through BNG delivery Cumulative tree loss of minor adverse significance
S/19/1892 S/20/0924	Erection of 6no. additional dwellings	10m	Approved Pending	Long term negligible / minor beneficial through BNG delivery
S/OUT/15/0912 S/RES/19/1852	Erection of 103no. dwellings and associated works	1km	Allowed on appeal Approved	As above
S/17/2075	Installation of new surface car park with photo-voltaic canopies and associated landscaping, including a pedestrian and power supply cable link to Nationwide House.	1.1km	Pending	As above
S/18/1774	Erection of 44 dwellings and associated works.	1.2km	Approved	As above
S/OUT/14/1005 S/RES/17/0635 S/18/1403	Erection of 100 residential dwellings, with open space, landscaping, internal roads & footpaths, parking including garages and other associated infrastructure.	1.2km	Allowed on appeal Approved Approved	As above
S/16/0487	Demolition of buildings on site and the construction of 38 no. residential units of Retirement Living accommodation including communal facilities, guest suite, landscaping and car parking.	1.35km	Approved	As above
S/17/2097	Erection of 13no. dwellings and associated works	1.4km	Approved	As above
S/OUT/17/2080	Outline application for the erection of 12no dwellings, and associated works - All Matters reserved.	1.4km	Pending	As above
S/RES/19/1852	Erection of 103no. dwellings and associated works – reserved matters pursuant to planning permission S/OUT/15/0912	1.5km	Approved	As above
S/15/1750 S/OUT/20/0556	Erection of 104no. dwellings, traffic roundabout, roads and associated works - Means of Access, Layout and Scale not reserved	1.6km	Approved Pending	As above
S/18/1033	Erection of 18no. dwellings with associated access, parking and landscaping.	1.7km	Approved	As above
S/20/0120	Erection of 30no. dwellings with associated access, parking and landscaping	1.75km	Approved	As above
S/15/1190 S/17/0286	Erection of 13no. dwellings and associated works.	1.8km	Approved Approved	As above
S/OUT/15/1338 S/RES/19/0446	Erection of 10no. dwellings and associated works	1.9km	Approved Approved	As above

Application Ref	Description	Distance from Site	Planning Status	Potential for Cumulative Effect
S/18/0181	Erection of 70no. dwellings and associated access, open space and infrastructure (phased development).	2km	Approved	As above
S/OUT/15/2051 S/AMEND/18/1327 S/AMEND/18/1481	Hybrid application f to include - full details of the erection of 91no. dwellings & 74no. age-restricted retirement dwellings and associated works and an outline proposal for up to 313no. dwellings, public open space and play area (Means of Access not reserved)	2km	Approved Approved Approved	As above
S/14/2137	Demolition of energy centre and erection of a mixed use four storey building with a convenience retail store (Class A1) on the ground floor with 18no. apartments above and 16no. houses and associated works.	2km	Approved	As above
S0427	Site area of 16.51Ha with a dwelling capacity of 350 and gross employment floorspace of 32,500m2	0.6km	N/A	As above
S0369	Site area of 0.52Ha with a dwelling capacity of 13	1.3km	S/17/2097 approved	As above
S0072	Site area of 9.1Ha with a dwelling capacity of 250	1.3km	N/A	As above
S0071	Site area of 7.95Ha with a dwelling capacity of 219	1.6km	N/A	As above
S0078	Site area of 2.6Ha with a dwelling capacity of 40	1.85km	N/A	As above
S0297	Site area of 5.27Ha with a gross employment floorspace of 21,080m2	1.8km	N/A	As above

Designated Sites

6.6.2 The are no anticipated cumulative impacts on Burderop Wood from the approved and pending planning applications. There are no public footpaths or bridleways through the woodland which is in private ownership eliminating the potential for recreational activities that can result in localised damage or disturbance of habitats.

Habitats

6.6.3 The approved and pending residential developments in the wider area are primarily located on intensively agricultural land (improved pasture / arable) bounded by hedgerows. Only the Land to the rear of Woodland View is located on long established grassland that has not been intensively managed in the recent past. The Land at Marlborough Park development site comprises a series of purpose-built platforms (mown recently established grassland) with the road infrastructure and SuDS swale and pond constructed in advance.

6.6.4 Each of the developments will be required to deliver a Biodiversity Net Gain (BNG) with the emphasis on replacement of any existing higher value habitats affected. The BNG proposals attached to each of the residential developments should significantly increase the extent of neutral grassland/ meadow grassland within areas of public open space. At Burderop Park mown amenity grassland will be converted to wildflower meadow to create a naturalistic buffer alongside woodland habitats.

6.6.5 Any loss of grassland associated with the developments will be fully offset through on-site and/or under off-site mitigation and there would be no cumulative adverse effect on grassland habitats. The long-term cumulative effect of all the developments has the potential to be beneficial and of minor significance consistent with the rationale for BNG delivered through management focussed on wildlife value supported by monitoring.

6.6.6 The Burderop Park development footprints are largely aligned to the existing car parks. The existing woodland areas and the parkland are being retained and protected but if a proportion of the trees adjoining existing car parks and roads will be lost. The cumulative effect would be a loss across the two developments. This considered to be of magnitude moderate and minor adverse significance (not significant in terms of EIA).

Species

6.6.7 The residential developments will result in additional artificial lighting at least along streets and road junctions including the Burderop development to the south. Within this adjoining development site, the new residential roads will be subject to artificial lighting. The adoption of good practice to minimise light spill beyond the footprint of the development will avoid cumulative effects on species present in woodland habitats adjacent to the development.

Bats

6.6.8 Night lighting will make the developed areas sub-optimal for bat species that typically avoid elevated lux levels including some Myotis species and lesser horseshoe bats.

6.6.9 The Application Site was associated with negligible levels of foraging activity, with the woodland and parkland with waterbodies in Burderop Park and Burderop Wood having high value as foraging habitat for these species outside of the Application Site.

6.6.10 Maintenance of flight lines around the developments and protection off-site habitats in the wider park will maintain flight lines outside the residential development

6.6.11 The implementation of environmentally sensitive lighting schemes to maintain dark corridor flight lines around the developments and protecting the connectivity of the adjoining landscape will avoid the potential for any cumulative adverse effects in relation to the use of the landscape by bats.

Birds

6.6.12 The scheme design has been devised to minimise potential changes in bird behaviour in the immediate vicinity of the developed site, and in particular keeping woodland area unlit will minimise the potential for change in the behaviour of individuals in the developed sites. The Burderop Park development has been designed to avoid adverse impacts on the parkland/ woodland setting. There are no predicted cumulative adverse effects on the local populations or any bird species.

Invertebrates

6.6.13 Artificial lighting in the Application Site and Burderop Park development to the south could increase any invertebrate activity, with the light units in both developments likely to draw in invertebrates from the locality. The level of effect would vary between species. Mitigation measures have been built into the proposals to protect the dark context of woodland so that any effect would have limited magnitude and no more than minor significance for individual invertebrate species. In the context of environmentally sensitive design, the effect at each scheme will be minimised and there should not be any cumulative adverse effect.

6.6.14 In summary there would be no cumulative noise impacts with other approved or pending developments.

6.6.15 In addition to the developments listed in table 6.7 above, infrastructure upgrades to the Application Site are proposed (please refer to Volume 3, Appendix 4.3).

6.6.16 The main potential ecology and biodiversity impacts associated with the infrastructure upgrade works would be related to the construction period for such works; no impacts on ecology and biodiversity are predicted once the upgraded infrastructure is operational.

6.6.17 Works to install the upgrades would be undertaken by the utility providers and would follow standard construction methodologies. Whilst the routes haves not been identified, the works would not lead to any cumulative effects on Burderop Woods SSSI. The works would be installed within part of the public highway or adjacent to part of the public highway where possible and any habitats would be restored following completion of the works. works would not lead to any cumulative effects on Burderop Woods SSSI. The construction programme would be short in duration. The works would be undertaken during normal working hours so disturbance to bats from construction lighting would be avoided. and any habitats would be restored following completion of the works. On this basis, any cumulative impacts on habitats and protected species would not be significant.

6.7 Inter-relationships

6.7.1 There are inter-relationships between the ecology assessment, landscape design, and SuDS. The proposals have evolved with input from each of the technical disciplines to inform the landscape strategy. The output is described in the built-in mitigation section and considered in the assessment of impacts and effects. The hydrological modelling has informed the habitats to be established in the base of the attenuation basin which has been generated from the engineering design and predicted volumes of surface water input from the development.

6.7.2 The noise assessment sets out the background noise levels at the site and modelled operational noise in the vicinity of the site. The findings of this assessment provide a broad guide to the anticipated levels of noise in habitats around the operational site during normal working, the testing of back-up generators and in the event of a total power failure (emergency scenario).

6.7.3 The detailed lighting scheme has informed the assessment of the effects on a number of species particularly bats, birds and invertebrates.

6.8 Summary of Effects

6.8.1 A summary of the assessment of potential impacts on ecology is presented in Table 6-8

Table 6-8. Summary of Likely Effects of the Swindon Data Centre on Ecology

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant
Construction phase						
Designated Sites						
Burderop Wood SSSI	High (National)	Potential disturbance to birds through increased noise levels during construction activities.	Short term	Negligible	Minor adverse	Not significant
Coate Water SSSI and LNR	High (National)	Potential disturbance to birds through increased noise levels during construction activities.	Short term	Negligible	Minor adverse	Not significant
All other designated sites	Medium (County) to High (National)	None	n/a	No change	No change	Not significant
Habitats						
Neutral grassland (NVC Area A)	Low (District)	Partial permanent loss within the construction area. Temporary loss of translocated grassland	Short and medium term	High	Minor adverse	Not significant
Neutral grassland (NVC Area B and D)	Negligible (Site)	Partial permanent loss and temporary disturbance of retained habitat.	Short and medium term	Medium	Minor adverse	Not significant
Semi-improved Neutral grassland (NVC Area C)	Negligible (Site)	Partial permanent loss and temporary disturbance of retained habitat.	Short and medium term	Medium	Minor adverse	Not significant
Species-poor semi-improved grassland	Negligible (Site)	Partial loss and tempoary disturbance	Short and medium term	Low	Negligible adverse	Not significant
Plantation broadleaved woodland	Negligible (Site)	No loss- potential for indirect effects	Short term	Low	Negligible adverse	Not significant
Broadleaved trees	Negligible (Site)	Permanent loss of the majority of trees.	Short term	High	Minor adverse	Not significant
Dense scrub	Negligible (Site)	Permanent loss of around half the scrub	Short term	Low	Neglibler adverse	Not significant
Tall ruderal	Negligible (Site)	Permanent loss of around half the scrub	Short term	High	Minor adverse	Not significant
Cypress Tree Line	Negligible (Site)	Permanent loss of around two thirds of the treeline	Short term	High	Minor adverse	Not significant
Introduced shrub and herb planting	Negligible (Site)	Permanent loss	Short term	High	Minor adverse	Not significant

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant
Buildings and hardstanding	Negligible (Site)	N/A	N/A	N/A	N/A	N/A
Species						
Bat Roosts	Low (district)	Permanent loss of potential roost features and roosts (if present). Killing or injuring of small numbers of bats.	Short term	High	Negligible	Not significant
Foraging bats	Low (district)	Potential temporary reduction in suitability of habitats bounding development areas for foraging bats due to noise and lighting.	Short term	High	Minor adverse	Not significant
Badger	Negligible (Site)	Potential disturbance of foraging activity.	Short term	Negligible	Negligible adverse	Not significant
Breeding birds	Negligible (Site)	Loss of nesting habitat (scrub and trees) Disturbance of nests in retained scrub and trees	Short term	High	Minor adverse	Not significant
Reptiles	Negligible (Parish)	Potential for disturbance, injury and killing of slow worm present in grassland and scrub Permanent loss of Reptile habitat.	Short term	High	Minor adverse	Not significant
Invertebrates	Low (Local)	Permanent partial loss of species rich and semi-improved grassland and scrub, trees and woodland.	Short term	High	Minor adverse	Not significant
Invasive plant species	Negligible (site)	Permanent removal of two stands of Montbretia	Short term	Low	Minor beneficial	Not significant
Operational phase						
Designated Sites						
Burderop Wood SSSI	High (National)	Potential disturbance to birds through increased noise levels from diesel generator operation	Long term	Negligible	Negligible adverse	Not significant
Coate Water SSSI and LNR	High (National)	Potential disturbance to birds through increased noise levels during construction activities.	Long term	Negligible	Negligible adverse	Not significant
Burderop Combe LWS	Medium (County)	Potential noise disturbance	Long term	Negligible	Negligible adverse	Not significant
All other designated sites	Medium (County) to High (National)	None	n/a	No change	No change	Not significant

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant
Habitats						
All habitats	Low (local) to Negligible (Site)	Very small-scale light spill and noise disturbance. Disturbance from management.	Long term	Negligible	Negligible adverse	Not significant
Species						
Bat Roosts	Up to low (district)	Very small-scale light spill on associated flight lines. Sporadic noise disturbance from diesel generators.	Long term	Negligible	Negligible adverse	Not significant
Foraging bats	Low (local)	Very small-scale light spill on flight lines. Light impacts affecting invertebrate prey. Sporadic noise disturbance from diesel generators.	Long term	Negligible	Negligible adverse	Not significant
Breeding birds	Negligible (Site)	Very small-scale light spill Sporadic noise disturbance from diesel generators	Long term	Negligible	Negligible adverse	Not significant
Reptiles	Negligible (Parish)	Reduced habitat extent	Long term	Negligible	Negligible adverse	Not significant
Invertebrates	Low (Local)	Improved habitat diversity. Artificial lighting increasing predation.	Long term	Medium	Minor adverse	Not significant
Invasive plant species	Negligible (site)	Permanent removal of two stands of Montbretia	Short term	Low	Minor beneficial	Not significant

6.9 References

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PROPOSED REPLACEMENT DATA CENTRE

ENVIRONMENTAL STATEMENT: VOLUME 2 FIGURES

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton, Swindon

20305S-RPS-XX-XX-RP-P-9711

PROPOSED REPLACEMENT DATA CENTRE

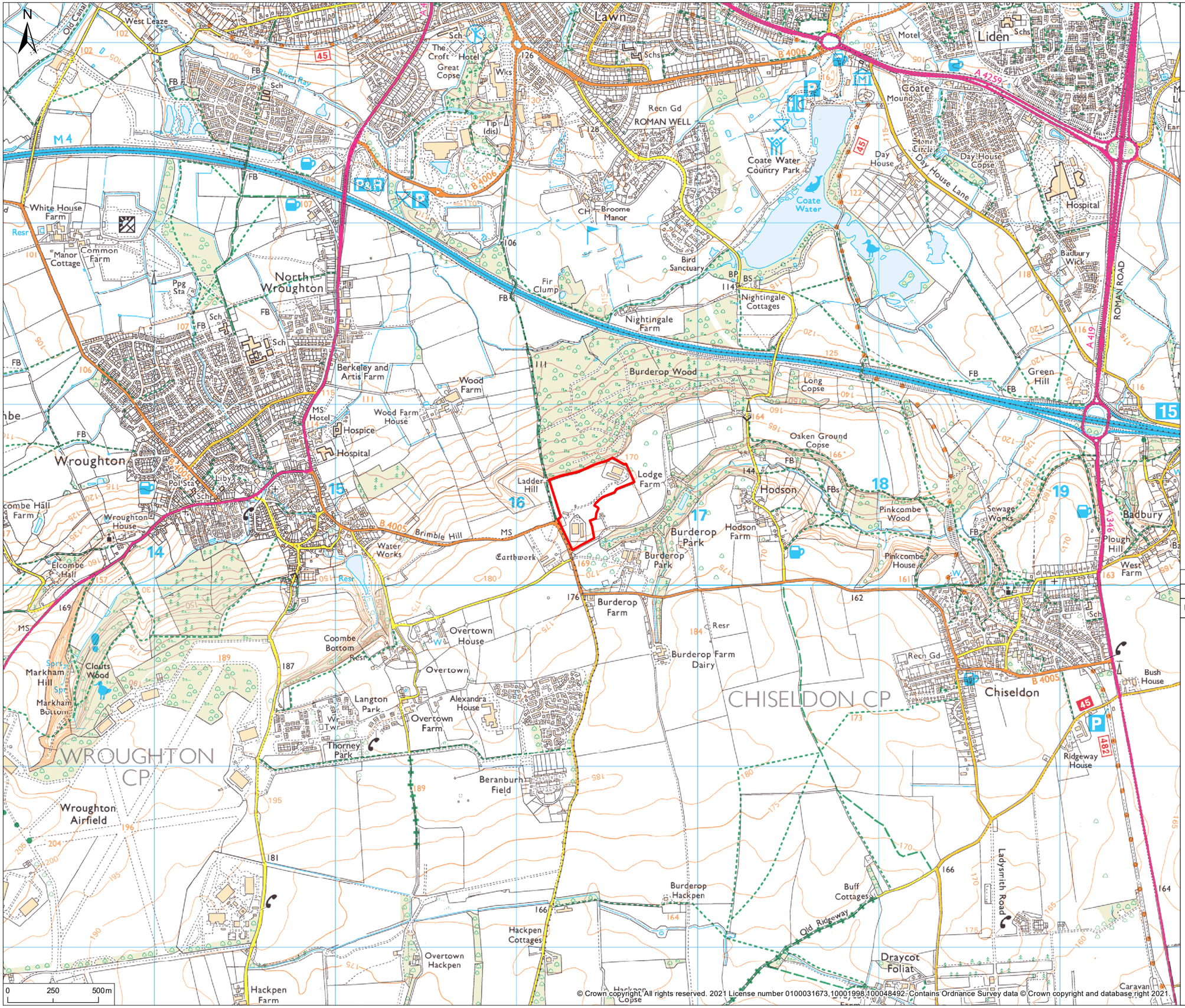
Environmental Statement: Volume 2 Figures

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton Swindon

March 2021

Final

Volume 2: Figures



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Legend

Site boundary

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Client: Replacement Data Centre, Swindon

Project: Proposed Replacement Data Centre

Title: Site Location Plan

Status	Drawn By	PM/Checked By
DRAFT	BG	CR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:20,000	MAR 2021
Figure Number		**Rev**
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Legend

Site boundary

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Title Site Layout

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2.1		**-**

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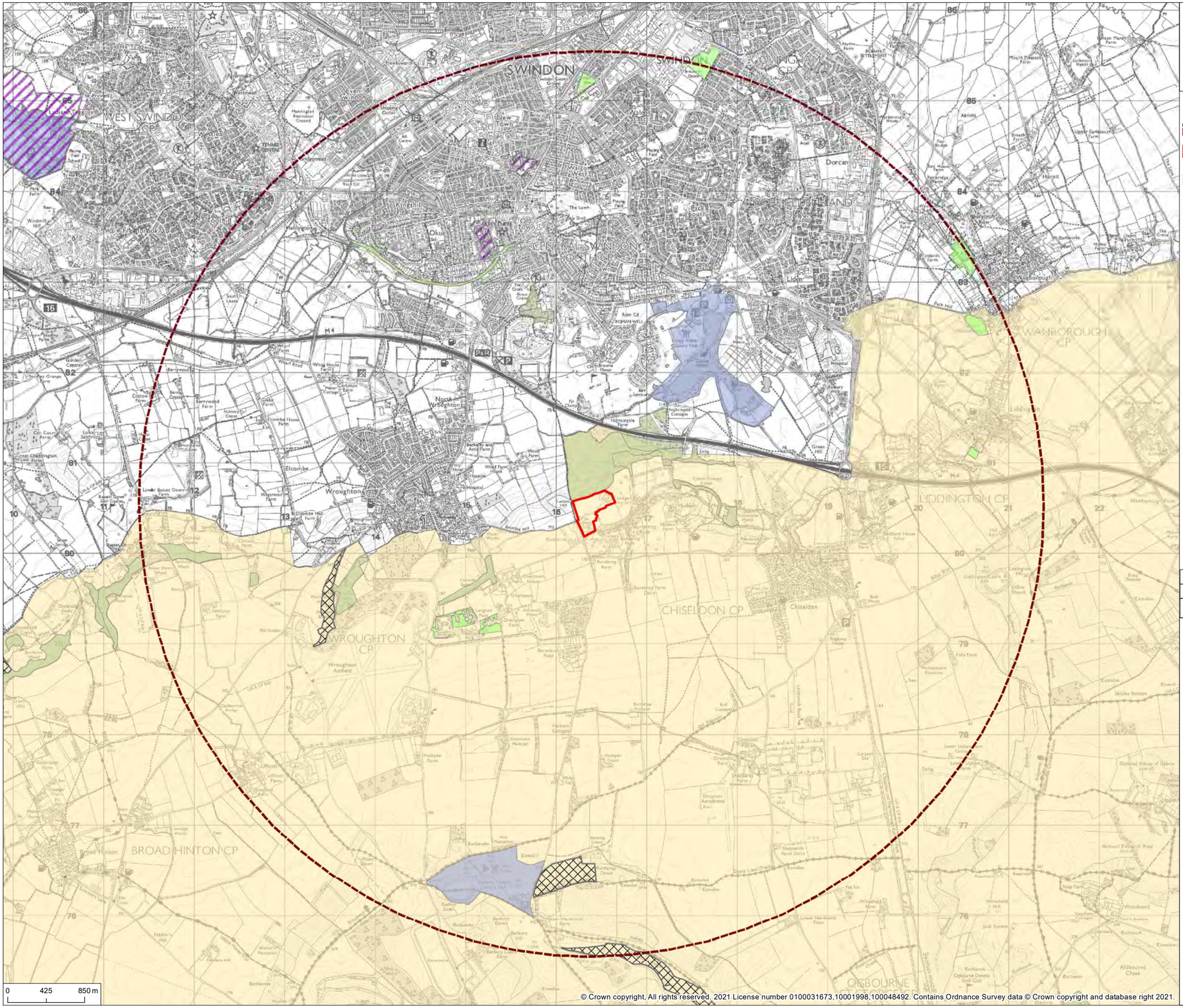
11741-0041-02



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Legend

- Study Area (5km Radius)
- Application Site Boundary
- Countryside Rights of Way (CRoW) Access Land
- Registered Parks and Gardens
- Ancient Woodland
- North Wessex Downs Area of Oustanding Natural Beauty (AONB)
- Country Parks

Swindon Local Plan 2026

- Open Space (Policy

N

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

Lakesbury House, Hiltingbury Road, Chandlers Ford,Hampshire SO53 5SS
T:02380 810 440 E: rpsso@rpsgroup.com

Client

Project: Replacement Data Centre, Swindon

Title: Site Location and Landscape Planning Designations

Status	Drawn By	PM/Checked By
FOR PLANNING	GL	CD
Project Number	**Scale @ A3**	**Date Created**
JSL3708	1:40,000	MAR 2021

Figure Number: **5.1** Rev: **-**

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JSL3708_Swindon_Figure 5.1_ Site Location and Landscape Planning Designations

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Legend

- Study Area (5km Radius)
- Application Site Boundary

National Landscape Character Areas (NCA)

- Berkshire and Marlborough Downs
- Midvale Ridge
- Upper Thames Clay Vales

N

Midvale Ridge

Upper Thames Clay Vales

Berkshire and Marlborough Downs

0 425 850 m

Rev	Description	By	CB	Date

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Client

Project: Replacement Data Centre, Swindon

Title: National Landscape Character Areas (NCAs)

Status	Drawn By	PM/Checked By
FOR PLANNING	GL	CD
Project Number	**Scale @ A3**	**Date Created**
JSL3708	1:40,000	MAR 2021

Figure Number: **5.2** Rev: **-**

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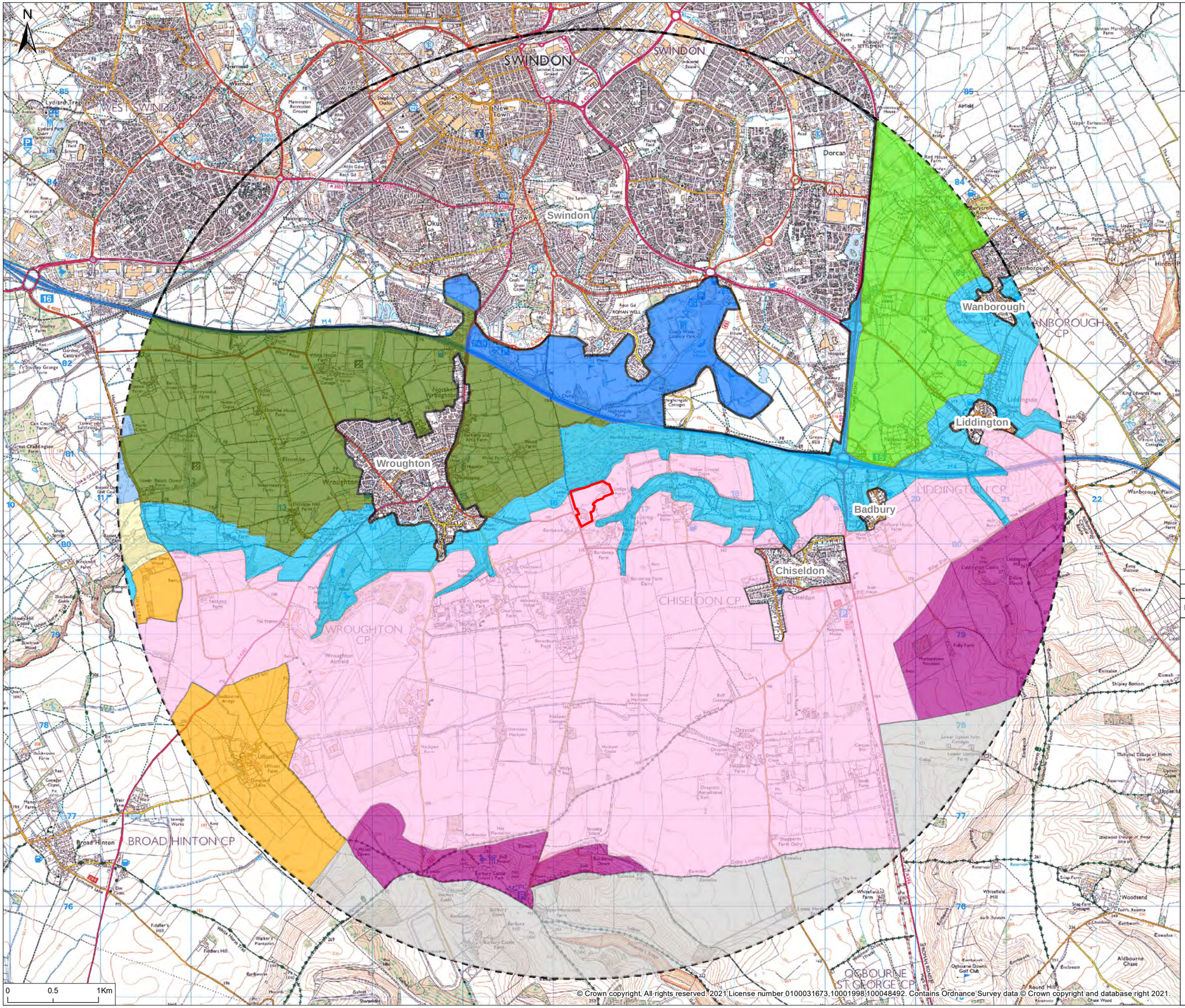
JSL3708_Swindon_Figure 5.2_National Landscape Character Areas



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Legend

- Application Site Boundary
- Study Area (5km Radius)

Swindon Borough Landscape Character Areas

- Down Plains
- High Downs
- Mid Vale Ridge
- Scarp
- Settlement Boundary
- Vale of the White Horse
- Wroughton Vale

Wiltshire County Landscape Character Areas

- Avebury Plain
- Hilmarton Rolling Lowland
- Liddington Scarp
- Marlborough Downs

Rev	Description	By	CB	Date

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Client -

Project Replacement Data Centre, Swindon

Title Local Landscape Character Areas

Status	Drawn By	PM/Checked By
FOR PLANNING	BG	CD
Project Number	**Scale @ A3**	**Date Created**
JSL3708	1:40,000	MAR 2021
Figure Number		**Rev**
5.3		-

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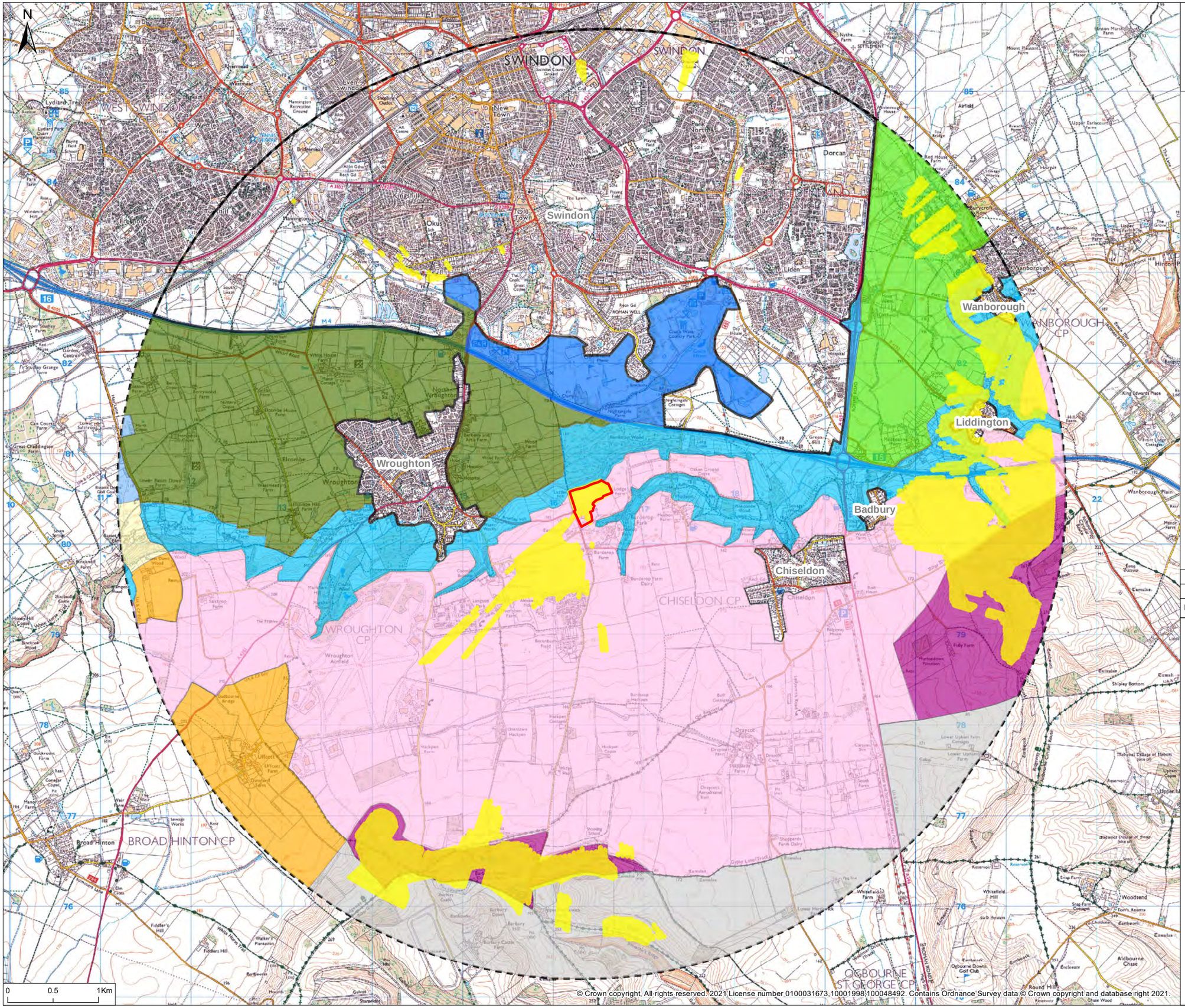

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Legend

- Application Site Boundary
- Study Area (5km Radius)
- Zone of Theoretical Visibility

Swindon Borough Landscape Character Areas

- Down Plains
- High Downs
- Mid Vale Ridge
- Scarp
- Settlement Boundary
- Vale of the White Horse
- Wroughton Vale

Wiltshire County Landscape Character Areas

- Avebury Plain
- Hilmarton Rolling Lowland
- Liddington Scarp
- Marlborough Downs

Rev	Description	By	CB	Date

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Client -

Project Replacement Data Centre, Swindon

Title Local Landscape Character Areas and ZTV

Status	Drawn By	PM/Checked By
FOR PLANNING	BG	CD
Project Number	**Scale @ A3**	**Date Created**
JSL3708	1:40,000	MAR 2021
Figure Number		**Rev**
5.4		-

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Legend

- Application Site Boundary
- Study Area (5km Radius)

North Wessex Downs AONB Landscape Character Areas

- 5A - Avebury Plain
- 5B - Chiseldon - Wanborough Plain
- 5E - Clyffe Pypard - Badbury Wooded Scarp
- 5F - Liddington - Letcombe Open Scarp
- 1A - Marlborough Downs
- 6C - Wanborough Vale

Rev	Description	By	CB	Date

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Client -

Project Replacement Data Centre, Swindon

Title North Wessex Downs AONB Landscape Character Areas

Status	Drawn By	PM/Checked By
FOR PLANNING	BG	CD
Project Number	**Scale @ A3**	**Date Created**
JSL3708	1:40,000	MAR 2021

Figure Number **5.5** Rev **-**

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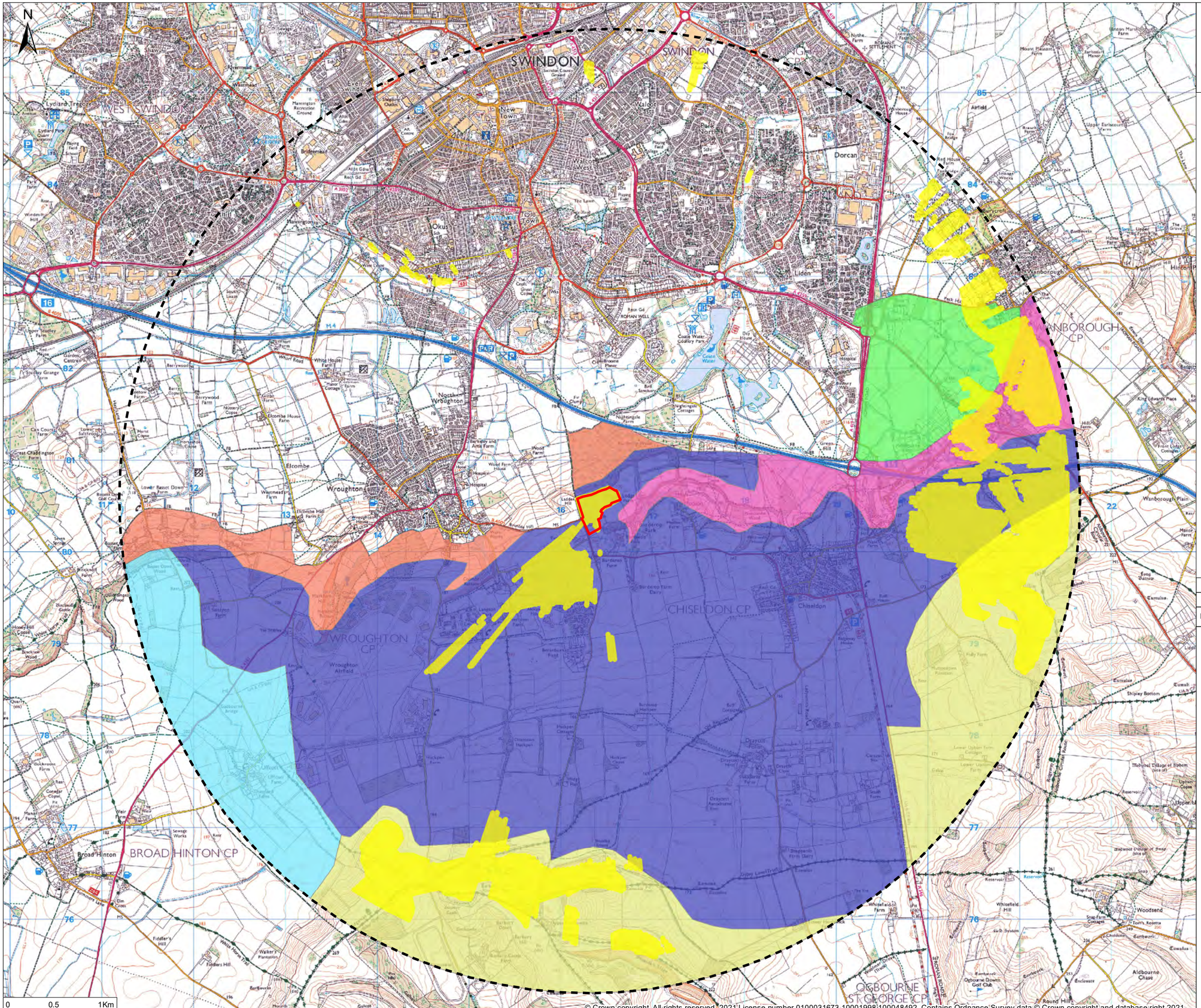
3708-0018-07

0 0.5 1Km



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Legend

- Site boundary
- Study Area (5km
- Zone of Theoretical Visibility

North Wessex Downs AONB Landscape Character Areas

- 5A - Avebury Plain
- 5B - Chiseldon - Wanborough Plain
- 5E - Clyffe Pypard - Badbury Wooded Scarp
- 5F - Liddington - Letcombe Open Scarp
- 1A - Marlborough Downs
- 6C - Wanborough Vale

Rev	Description	By	CB	Date

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Client -

Project Replacement Data Centre, Swindon
North Wessex Downs AONB

Title Landscape Character Areas and ZTV

Status	Drawn By	PM/Checked By
FOR PLANNING	BG	CD
Project Number	**Scale @ A3**	**Date Created**
JSL3708	1:40,000	MAR 2021

Figure Number **5.6**

Rev -

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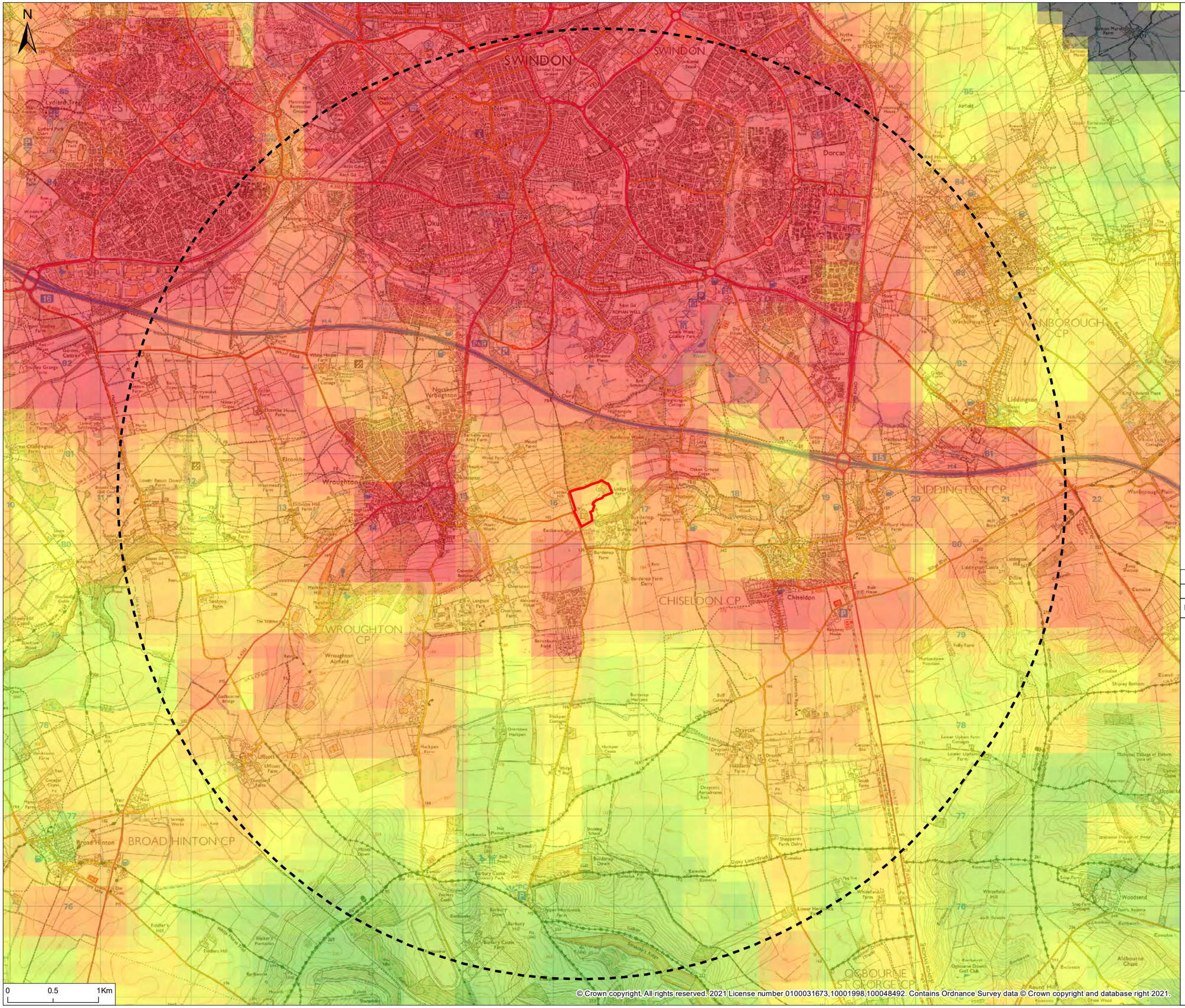
3708-0019-05



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Legend

- Application Site Boundary
- Study Area (5km Radius)
- Most tranquil
- Least tranquil

Rev	Description	By	CB	Date

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Client -

Project Replacement Data Centre, Swindon

Title CPRE Tranquility Map

Status	Drawn By	PM/Checked By
FOR PLANNING	BG	CD
Project Number	**Scale @ A3**	**Date Created**
JSL3708	1:40,000	MAR 2021

Figure Number **5.7** Rev -

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3708-0016-06

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Legend

- Study Area (5km Radius)
- Application Site Boundary

Night Lights

(NanoWatts / cm2 /sr)

- >32 (high)
- 16 - 32
- 8 - 16
- 4 - 8
- 2 - 4
- 1 - 2
- 0.5 - 1
- 0.25 - 0.5
- < 0.25 (low)

N

Each pixel shows the level of radiance (Night Lights) shining up into the night sky. These have been categorised into colour bands to distinguish beween different light levels.

CPRE Night Lights Data (June 2016)

Rev	Description	By	CB	Date

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Client

Project: Replacement Data Centre, Swindon

Title: CPRE Dark Skies Map

Status	Drawn By	PM/Checked By
FOR PLANNING	GL	CD
Project Number	**Scale @ A3**	**Date Created**
JSL3708	1:40,000	MAR 2021
Figure Number		**Rev**
5.8		-

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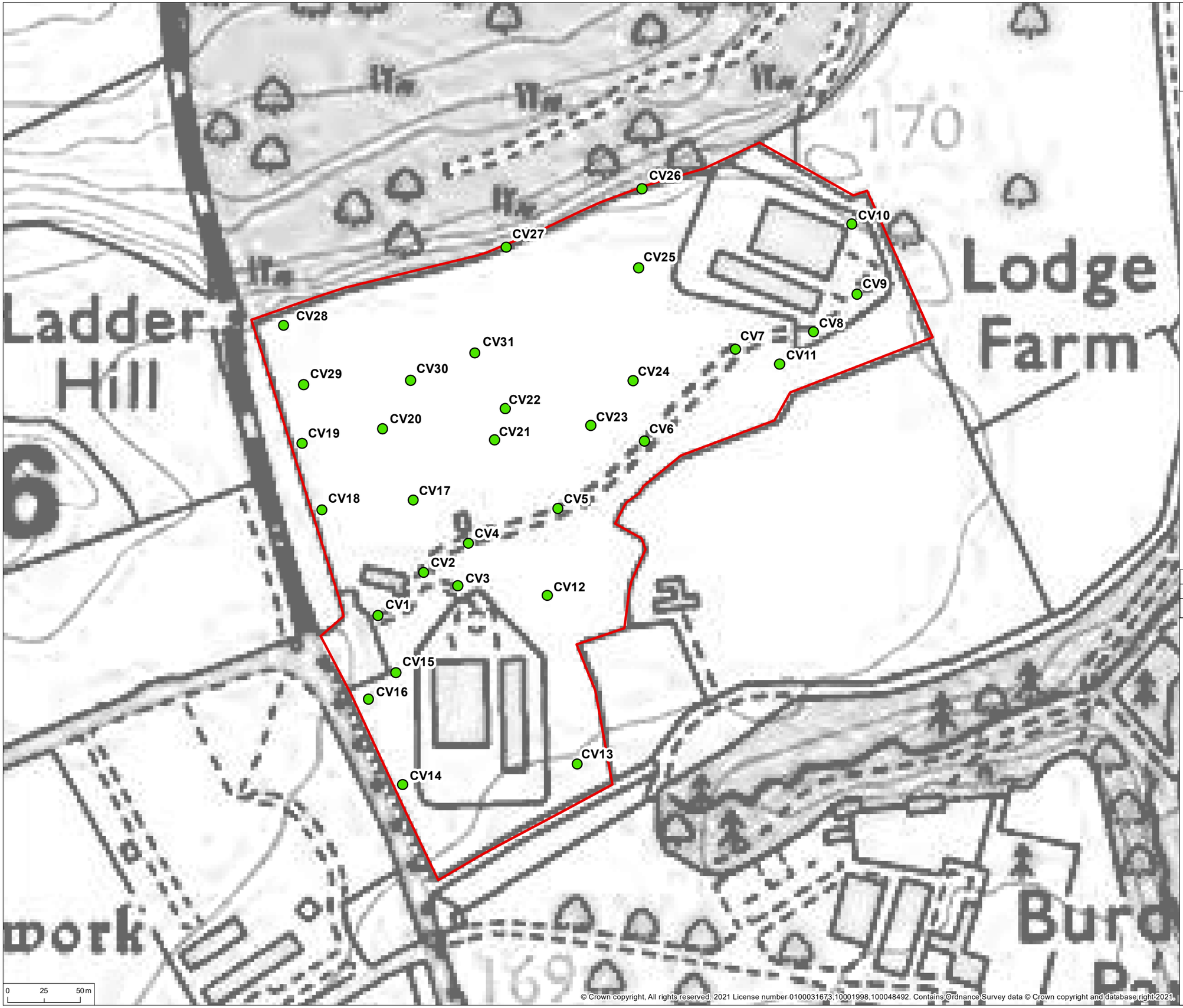
0 425 850 m

JSL3708_Swindon_Figure 5.8_CPRE Dark Skies Map



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Legend

- Application Site Boundary
- Character Viewpoint Locations CV1

N

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

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Client

Project: Replacement Data Centre, Swindon

Title: Character Viewpoint Location Plan

Status	Drawn By	PM/Checked By
FOR PLANNING	GL	CD
Project Number	**Scale @ A3**	**Date Created**
JSL3708	1:2,500	MAR 2021

Figure Number: **5.9** Rev: **-**

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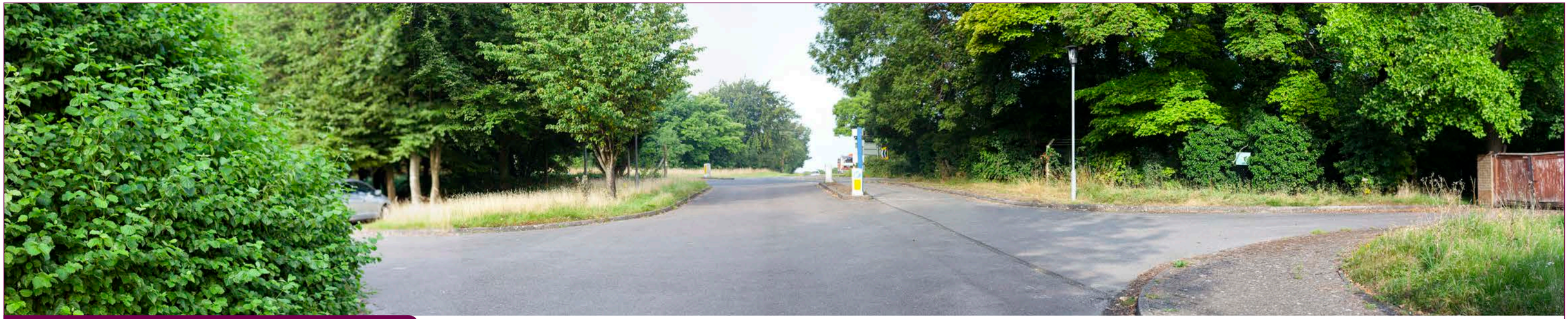
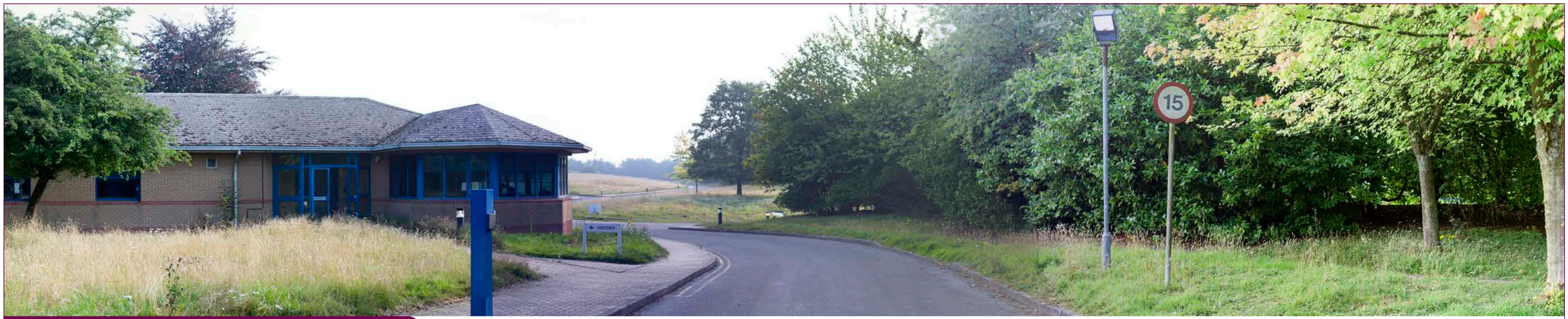
JSL3708_Swindon_Figure 5.9_Characcter Viewpoint Location Plan



Viewpoint C1a: View south west from entrance gate.



Viewpoint C1b: View north east from entrance gate.

Viewpoint C2a: View south west from reception building.

3708-0007-07

MAKING COMPLEX EASY

Date of photographs: 11/08/20
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.10

Viewpoint C2b: View north east from reception building.

Viewpoint C3a: View south east towards Alpha.

Viewpoint C3b: View north west towards reception building from road to Alpha.

3708-0007-07

MAKING COMPLEX EASY

Date of photographs: 11/08/20
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.11

Viewpoint C4a: View south west towards reception building from central road adjacent to group of service buildings.

Viewpoint C4b: View north east along centre road adjacent to group of service buildings.

Viewpoint C5a: View north west from central road at layby.

3708-0007-07

MAKING COMPLEX EASY	Date of photographs: 11/08/20 Lens type: 50mm	**Replacement Data Centre, Swindon** **Figure: 5.12**

Viewpoint C5b: View south west towards Alpha from central road at layby.

Viewpoint C6a: View north west towards central belt of trees opposite mast.

Viewpoint C6b: View south east of belt of trees on southern boundary opposite mast.

Viewpoint C7a: View east along central road to eastern data centre.

Viewpoint C7b: View west along central road.

Viewpoint C8a: View north east of eastern data centre within secure fence.

3708-0007-07

MAKING COMPLEX EASY

Date of photographs: 11/08/20
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.14

Viewpoint C8b: View west of entrance gate to eastern data centre.

Viewpoint C9a: View south east along perimeter fence of eastern data centre.

Viewpoint C9b: View north west along perimeter fence of eastern data centre.

3708-0007-07

MAKING COMPLEX EASY	Date of photographs: 11/08/20 Lens type: 50mm	**Replacement Data Centre, Swindon** **Figure: 5.15**

Viewpoint C11: View north east towards eastern data centre from bank adjacent to southern boundary.

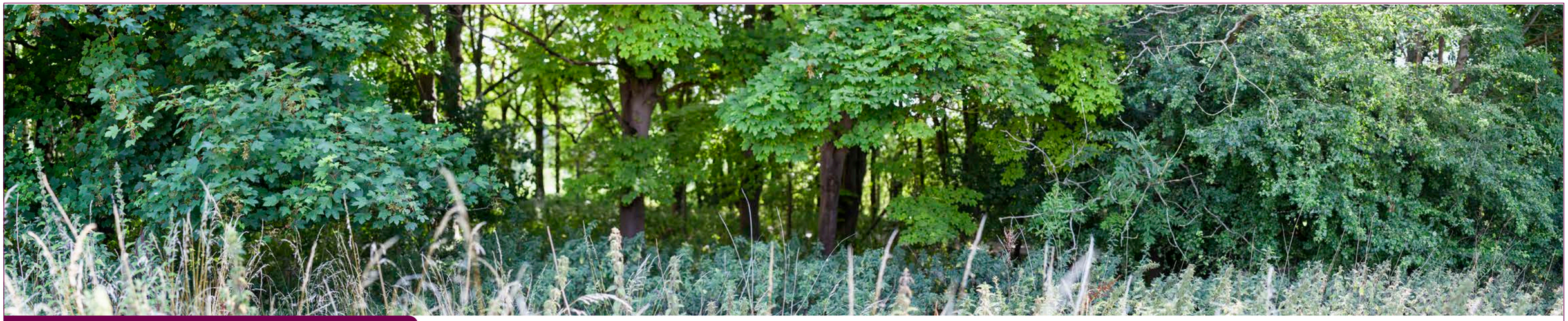
Viewpoint C12a: View south west from area of high ground towards Alpha.

Viewpoint C12b: View north east towards central road and belt of trees from area of high ground to the north and Alpha.

3708-0007-07

MAKING COMPLEX EASY	Date of photographs: 11/08/20 Lens type: 50mm	**Replacement Data Centre, Swindon** **Figure: 5.16**

Viewpoint C13a: View west from land between Alpha and eastern boundary.



Viewpoint C13b: View east from land between Alpha and eastern boundary.

Viewpoint C14: View north from western perimeter fence around Alpha.

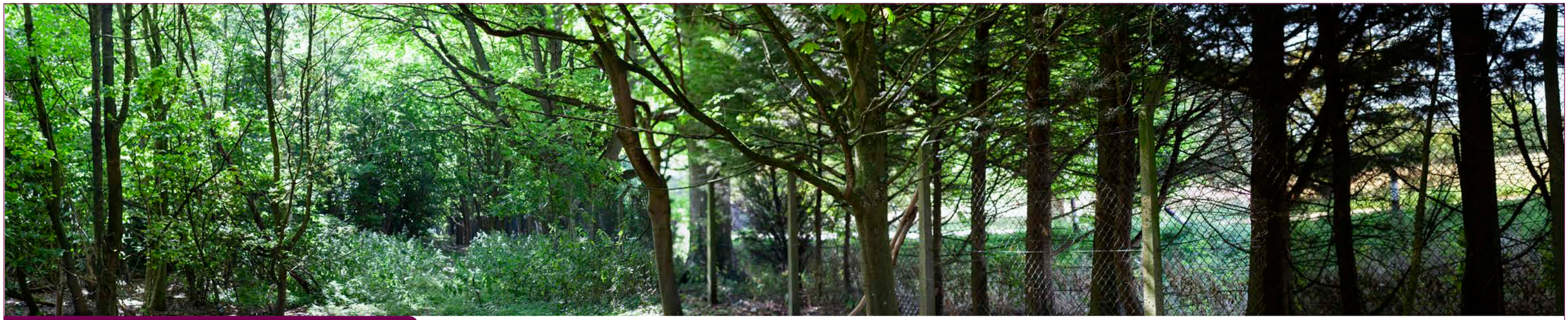
3708-0007-07

MAKING COMPLEX EASY

Date of photographs: 11/08/20
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.17

Viewpoint C15: View west from within woodland close to western boundary.



Viewpoint C16: View east from within woodland close to western boundary.

Viewpoint C17a: View south from grassland to the north of the central road close to service buildings.

3708-0007-07

MAKING COMPLEX EASY

Date of photographs: 11/08/20
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.18

Viewpoint C17b: View north from grassland to the north of service buildings.

Viewpoint C18: View south east from western boundary fence.

Viewpoint C19: View east from western boundary fence.

3708-0007-07

MAKING COMPLEX EASY	Date of photographs: 11/08/20 Lens type: 50mm	**Replacement Data Centre, Swindon** **Figure: 5.19**

Viewpoint C20a: View south from central belt of trees.

Viewpoint C20b: View north from central belt of trees.

Viewpoint C21: View north adjacent to maintenance buildings on central tree belt.

3708-0007-07

MAKING COMPLEX EASY

Date of photographs: 11/08/20
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.20

Viewpoint C22: View north across northern grassland to ancient woodland beyond northern boundary.

Viewpoint C23a: View south west towards reception building from central tree belt.

Viewpoint C23b: View north east towards Alpha from central belt of trees.

3708-0007-07

MAKING COMPLEX EASY	Date of photographs: 11/08/20 Lens type: 50mm	**Replacement Data Centre, Swindon** **Figure: 5.21**

Viewpoint C24: View north from central tree belt.

Viewpoint C25: View south west from high ground to the west of Alpha.

Viewpoint C26: View south east towards Alpha from high ground to the west.

3708-0007-07

MAKING COMPLEX EASY

Date of photographs: 11/08/20
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.22

Viewpoint C27: View south west along perimeter fence on northern boundary.

Viewpoint C28: View north east along perimeter fence as norther boundary.

Viewpoint C29a: View north to ancient woodland from high ground close to northern boundary.

3708-0007-07

MAKING COMPLEX EASY	Date of photographs: 11/08/20 Lens type: 50mm	**Replacement Data Centre, Swindon** **Figure: 5.23**

Viewpoint C29b: View south east from high ground clsoe to nrothern boundary.

Viewpoint C30a: View south from within northern grassland.

Viewpoint C30b: View north from within northern grassland.

3708-0007-07

MAKING COMPLEX EASY	Date of photographs: 11/08/20 Lens type: 50mm	**Replacement Data Centre, Swindon** **Figure: 5.24**

Viewpoint C31a: View north east towards Beta from northern grassland.

Viewpoint C31b: View south west towards central tree belt from northern grassland.

MAKING COMPLEX EASY	Date of photographs: 11/08/20 Lens type: 50mm	**Replacement Data Centre, Swindon** **Figure: 5.25**

3708-0007-07

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Legend

- Application Site Boundary
- Study Area (5km Radius)
- Candidate Viewpoint
- ZTV (Indicative extent of the surround landscape from where views to the proposed development may be available)
- Building
- Substantial Woodland Block
- CRoW Access Land

Note:
ZTV compiled assuming observer height as 1.5m at eye level, and takes into account screening effects of local settlements at 9m and existing vegetation / woodland at a height of 12m. Woodland local to the Application Site, where height data has been provided (Ref. 999/4414/1, dated June 2020), are as follows:

-Woodland to the north western Application Site Boundary @ 20m;
-Woodland to the south eastern Application Site boundary @17m; and
-Woodland to the south westernmost Application Site boundary @ 10m.

Five origin points, from within the application site have been used to illustrate the ZTV. It is based upon a maximum height of a proposed development at 15m AOD. Representing the maximum height of the flues, i.e. worst case.

OS Terrain 5 data has been used for generating the ground model.

Rev	Description	By	CB	Date

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Client -

Project Replacement Data Centre, Swindon

Title Zone of Theoretical Visibility (ZTV) and Candidate Viewpoints

Status	Drawn By	PM/Checked By
FOR PLANNING	BG	CD
Project Number	**Scale @ A3**	**Date Created**
JSL3708	1:40,000	MAR 2021

Figure Number **5.26** Rev **-**

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3708-0020-08

0 0.5 1Km

Viewpoint 1 : View south-west from children's play area at Upper Wanborough.

Viewpoint 2: View south-west from footpath WA3, to the south of Upper Wanborough.

3708-0011-11

MAKING COMPLEX EASY

Date of photographs: 04/11/2020
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.27

Viewpoint 3: View west from junction of footpath LN18 with The Ridgeway (road) north of Liddington Castle hillfort.

Viewpoint 4: View west from triangulation point at Lidding Castle hillfort.

3708-0011-11

MAKING COMPLEX EASY

Date of photographs: 04/11/2020
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.28

Viewpoint 5: View west-north-west from the Ridgeway National Trail south of Liddington Castle hillfort.

Viewpoint 6: View north-east-north from the northernmost point of Barbury Castle hillfort.

3708-0011-11

MAKING COMPLEX EASY

Date of photographs: 04/11/2020
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.29

Viewpoint 7: View north-east-north from Barbury Castle Country Park.

Viewpoint 8: View north from seating area adjacent to carpark at Barbury Castle Country Park.

3708-0011-11

MAKING COMPLEX EASY

Date of photographs: 04/11/2020
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.30

Viewpoint 9: View north-east from footpath WR25 / minor road south of Overtown.

Viewpoint 10: View north-east from minor road north of Overtown.

3708-0011-11

MAKING COMPLEX EASY

Date of photographs: 04/11/2020
Lens type: 50mm

Replacement Data Centre, Swindon
Figure: 5.31

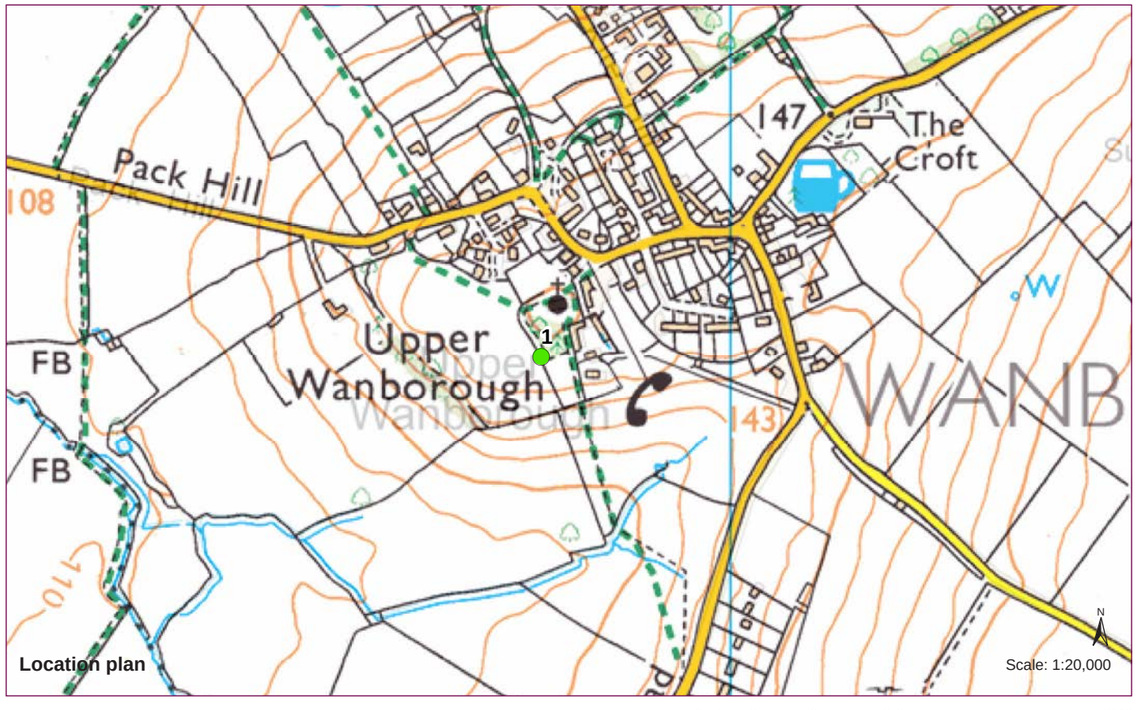
Viewpoint 11: View east from public bridleway WR36, adjacent to Application Site.

Viewpoint 12: View north-west-north from B4005, at junction of entrance to Burderop Park (house).

3708-0011-11

MAKING COMPLEX EASY	Date of photograph Viewpoint 11: 04/11/2020	Date of photograph Viewpoint 12: 22/01/2021 Lens type: 50mm	**Replacement Data Centre, Swindon** **Figure: 5.32**

Existing view



Location plan

Ref: 11741-0017-07

Replacement Data Centre, Swindon	Date of Photo: 04/11/2020 Lens Type: 50mm	Distance to site: 4.5 km OS reference: 420747, 182500	Direction to site: southwest Viewpoint height: 149 m AOD		**Existing View and Photo Location: Viewpoint 1** **Figure: 5.33**

Existing view

Ref: 11741-0017-07

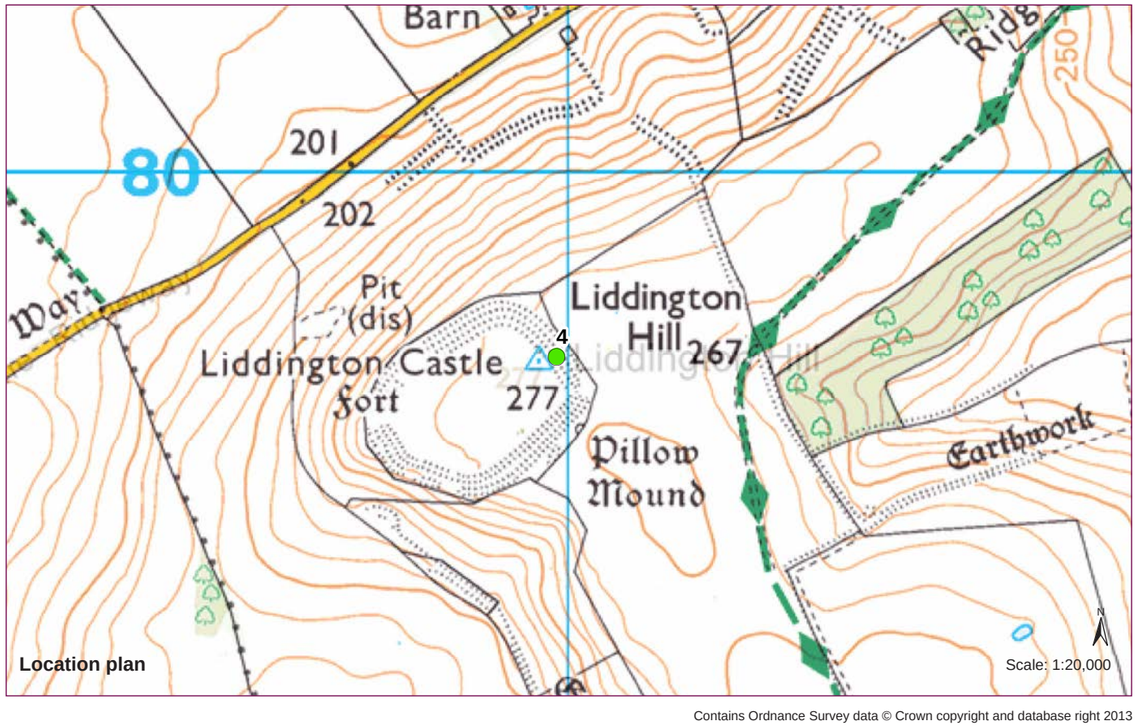
Replacement Data Centre, Swindon	Date of Photo: 04/11/2020 Lens Type: 50mm	Distance to site: 4.5 km OS reference: 420747, 182500	Direction to site: southwest Viewpoint height: 149 m AOD	Horizontal field of view: 39.6^{0} To be viewed at comfortable arms length	**Existing view: Viewpoint 1** **Figure: 5.34**

Proposed view

Ref: 11741-0017-07

Replacement Data Centre, Swindon	Date of Photo: 04/11/2020 Lens Type: 50mm	Distance to site: 4.5 km OS reference: 420747, 182500	Direction to site: southwest Viewpoint height: 149 m AOD	Horizontal field of view: 39.6^{0} To be viewed at comfortable arms length	**Proposed view: Viewpoint 1** **Figure: 5.35**

Existing view



Location plan

Scale: 1:20,000

Ref: 11741-0017-07

Replacement Data Centre, Swindon	Date of Photo: 04/11/2020 Lens Type: 50mm	Distance to site: 4.4 km OS reference: 420985, 179754	Direction to site: west Viewpoint height: 278 m AOD		**Existing View and Photo Location: Viewpoint 4** **Figure: 5.36**

Existing view

Ref: 11741-0017-07

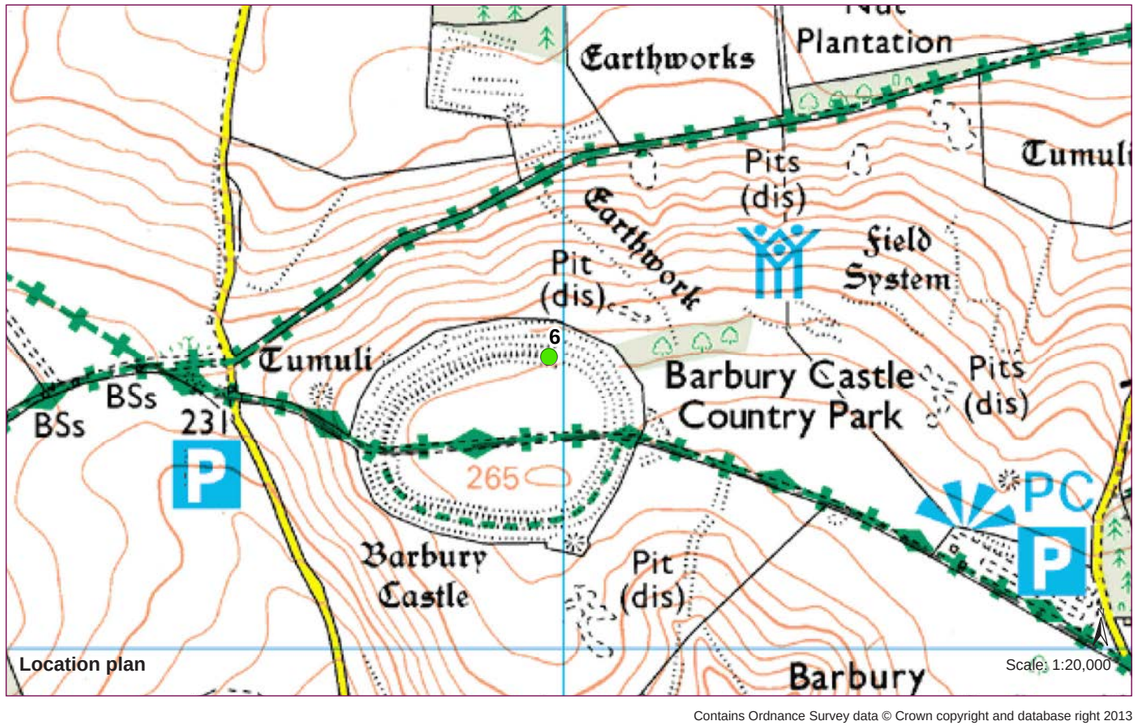
Replacement Data Centre, Swindon	Date of Photo: 04/11/2020 Lens Type: 50mm	Distance to site: 4.4 km OS reference: 420985, 179754	Direction to site: west Viewpoint height: 278 m AOD	Horizontal field of view: 39.6^{0} To be viewed at comfortable arms length	**Existing view: Viewpoint 4** **Figure: 5.37**

Proposed view

Ref: 11741-0017-07

Replacement Data Centre, Swindon	Date of Photo: 04/11/2020 Lens Type: 50mm	Distance to site: 4.4 km OS reference: 420985, 179754	Direction to site: west Viewpoint height: 278 m AOD	Horizontal field of view: 39.6^0 To be viewed at comfortable arms length	**Proposed view: Viewpoint 4** **Figure: 5.38**

Existing view



Location plan

Scale: 1:20,000

Ref: 11741-0017-07

Replacement Data Centre, Swindon	Date of Photo: 04/11/2020 Lens Type: 50mm	Distance to site: 4.3 km OS reference: 414980, 176391	Direction to site: north Viewpoint height: 261 m AOD		**Existing View and Photo Location: Viewpoint 6** **Figure: 5.39**

Existing view

Ref: 11741-0017-07

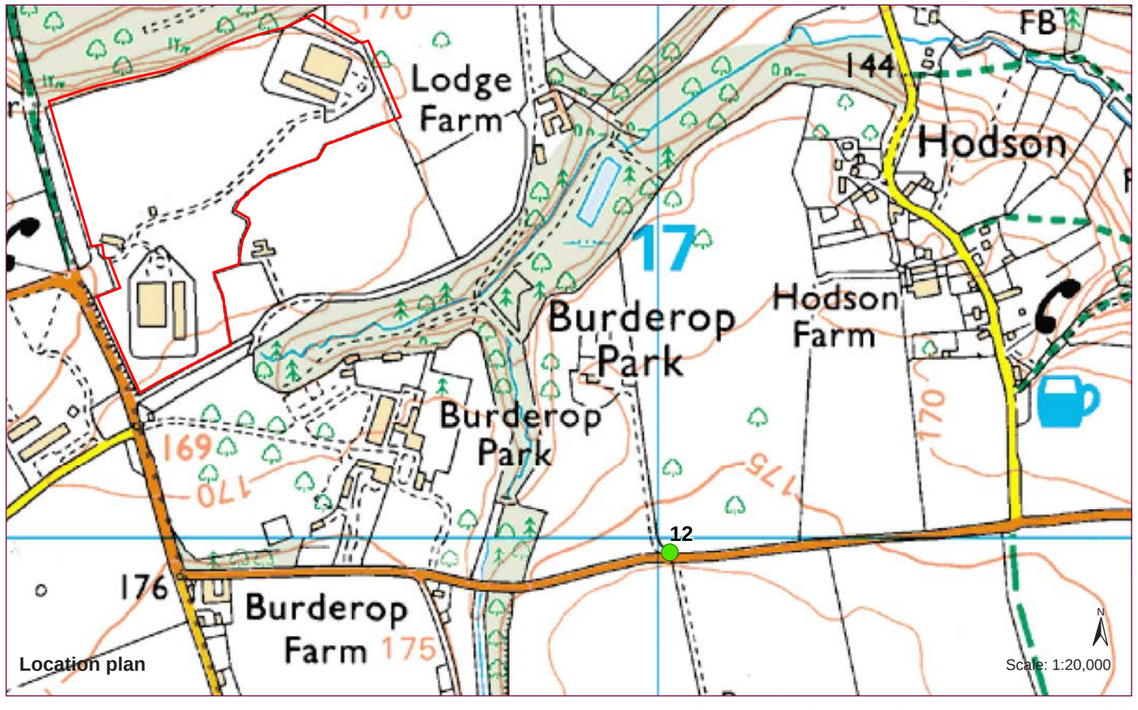
Replacement Data Centre, Swindon	Date of Photo: 04/11/2020 Lens Type: 50mm	Distance to site: 4.3 km OS reference: 414980, 176391	Direction to site: north Viewpoint height: 261 m AOD	Horizontal field of view: 39.6^0 To be viewed at comfortable arms length	**Existing view: Viewpoint 6** **Figure: 5.40**

Proposed view

Ref: 11741-0017-07

Replacement Data Centre, Swindon	Date of Photo: 04/11/2020 Lens Type: 50mm	Distance to site: 4.3 km OS reference: 414980, 176391	Direction to site: north Viewpoint height: 261 m AOD	Horizontal field of view: 39.6^0 To be viewed at comfortable arms length	**Proposed view: Viewpoint 6** **Figure: 5.41**

Existing view



Location plan

Scale: 1:20,000

Ref: 11741-0017-07

Replacement Data Centre, Swindon	Date of Photo: 22/01/2021 Lens Type: 50mm	Distance to site: 0.8 km OS reference: 417016, 1799816	Direction to site: northwest Viewpoint height: 181 m AOD		**Existing View and Photo Location: Viewpoint 12** **Figure: 5.42**

Existing view

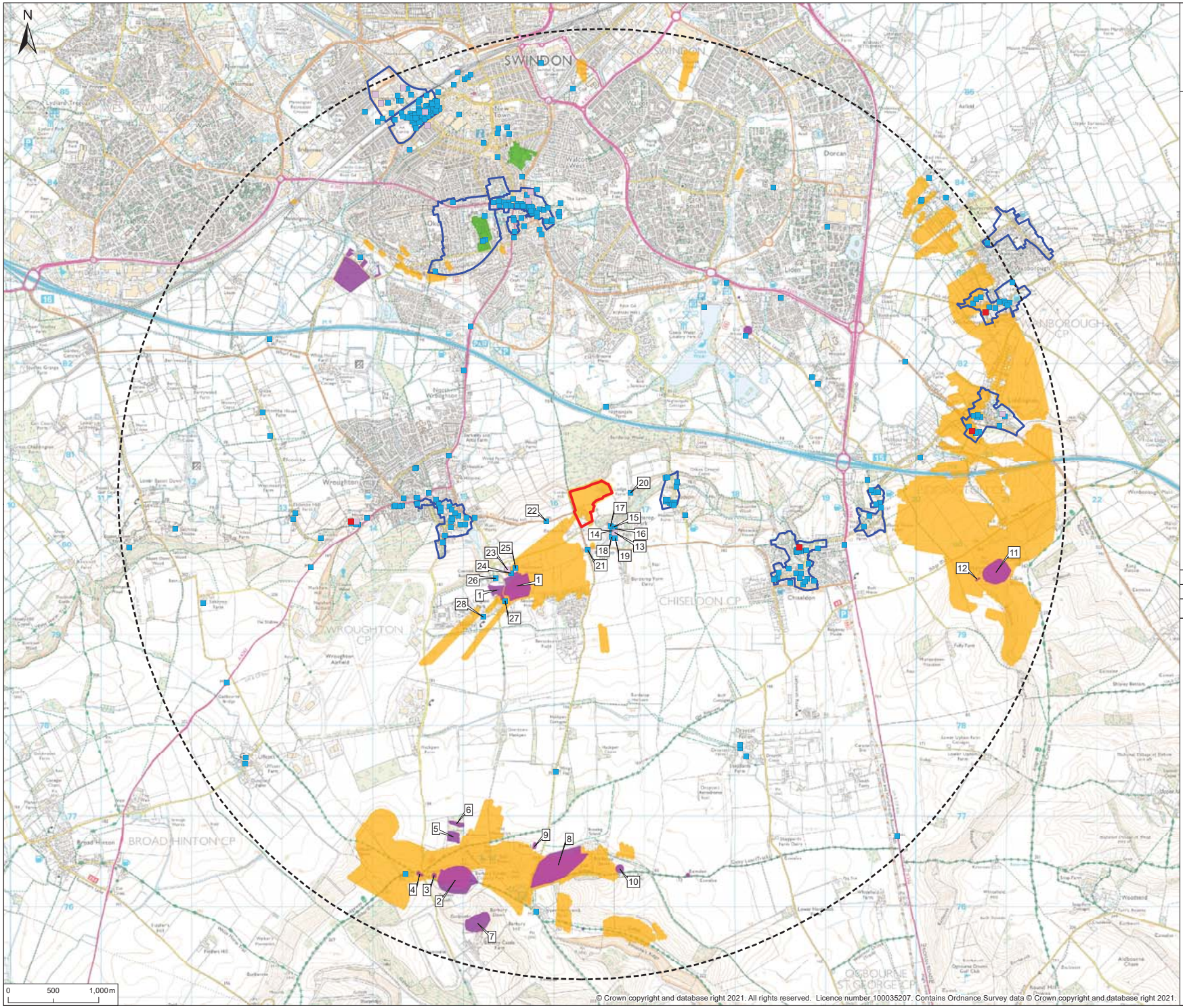
Ref: 11741-0017-07

Replacement Data Centre, Swindon	Date of Photo: 22/01/2021 Lens Type: 50mm	Distance to site: 0.8 km OS reference: 417016, 1799816	Direction to site: northwest Viewpoint height: 181 m AOD	Horizontal field of view: 39.6^0 To be viewed at comfortable arms length	**Existing view: Viewpoint 12** **Figure: 5.43**

Proposed view

Ref: 11741-0017-07

Replacement Data Centre, Swindon	Date of Photo: 22/01/2021 Lens Type: 50mm	Distance to site: 0.8 km OS reference: 417016, 1799816	Direction to site: northwest Viewpoint height: 181 m AOD	Horizontal field of view: 39.6^0 To be viewed at comfortable arms length	**Proposed view: Viewpoint 12** **Figure: 5.44**



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Legend

- Site Boundary
- 5km Buffer
- ZTV
- Registered Park & Garden
- Scheduled Monument
- Grade I Listed Building
- Grade II* Listed Building
- Grade II Listed Building
- Conservation Area

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

20 Farringdon Street, London EC4A 4AB
T: +44(0)20 7583 6767

Client -

Project Proposed Replacement Data Centre

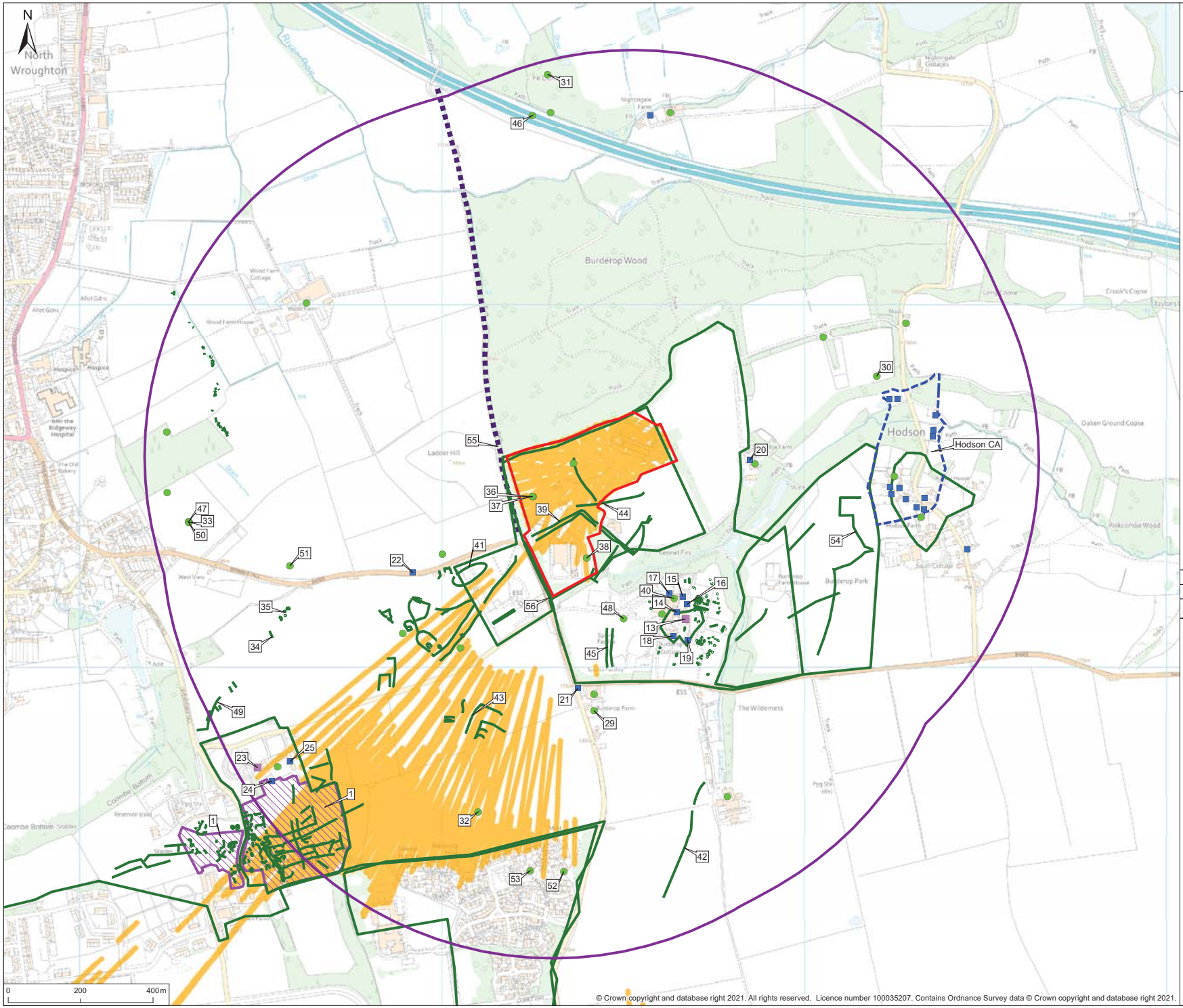
Title Designated heritage assets within 5km

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:40,000	MAR 2021

Figure Number **7.1** Rev -

rpsgroup.com

26675 / ES Figure 7-1



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Legend

- Site Boundary
- 1km search radius
- ZTV
- Scheduled Monument
- Grade II* Listed Building
- Grade II Listed Building
- Conservation Area
- HER Feature (Point)
- HER Feature (Line)
- Other Heritage Feature

Rev	Description	By	CB	Date

20 Farringdon Street, London EC4A 4AB
T: +44(0)20 7583 6767

Client -

Project Proposed Replacement Data Centre

Title Designated and non-designated heritage assets within 1 km

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:10,000	MAR 2021

Figure Number **7.2** Rev -

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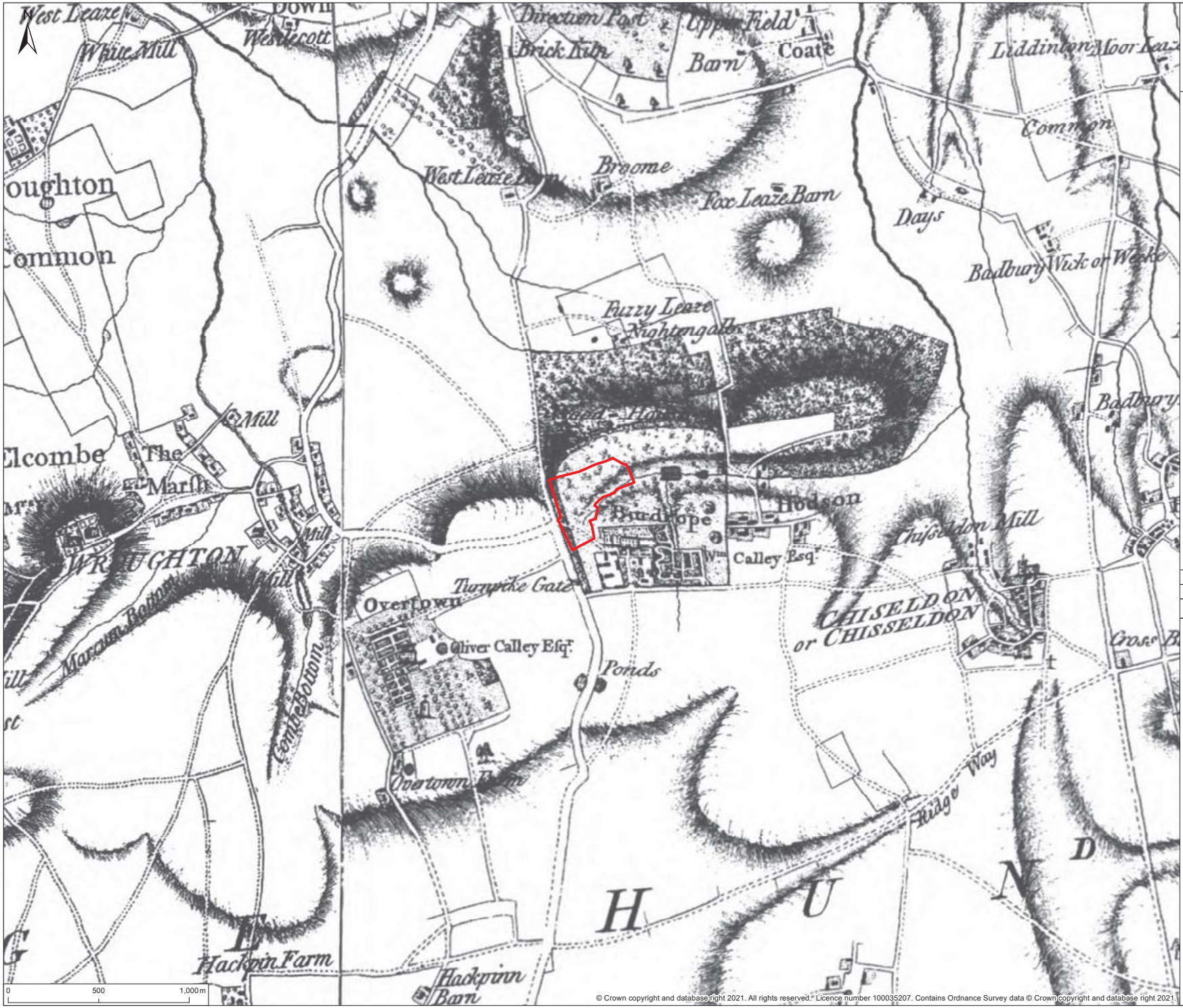
26675 / ES Figure 7.2



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Legend

Approximate Site Location

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

20 Farringdon Street, London EC4A 4AB
T: +44(0)20 7583 6767

Client -

Project Proposed Replacement Data Centre

Title Andrews and Drury map of Wiltshire, 1773

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:20,000	MAR 2021

Figure Number **7.3** Rev **-**

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26675 / ES Figure 7.3

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Approximate Site Location

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

20 Farringdon Street, London EC4A 4AB
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Client -

Project Proposed Replacement Data Centre

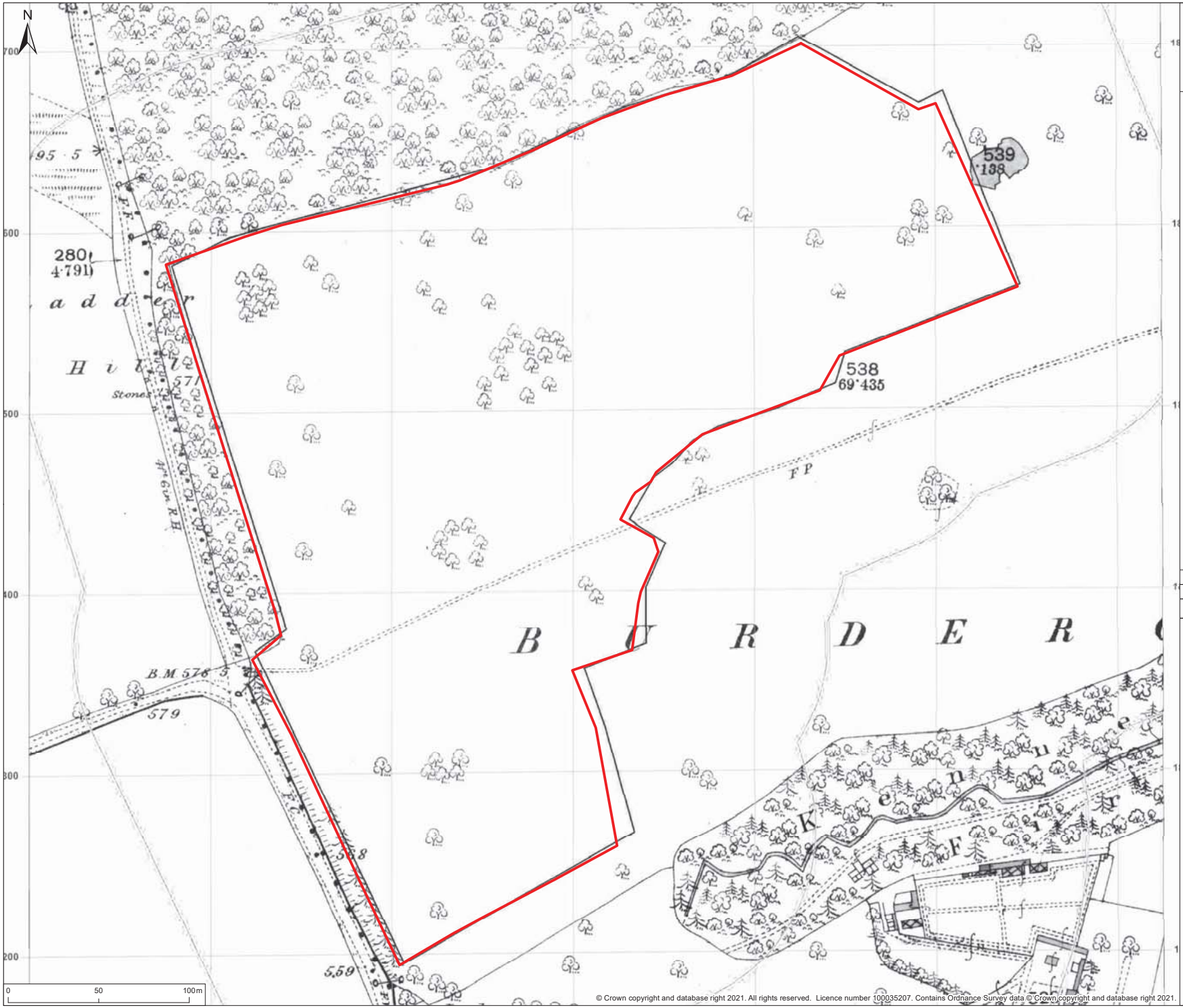
Title William Stanley map (Ordnance Survey Drawing), 1818

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:10,000	MAR 2021

Figure Number **7.4** Rev **-**

rpsgroup.com

26675 / ES Figure 7.4



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Legend

Site Boundary

Rev	Description	By	CB	Date

20 Farringdon Street, London EC4A 4AB
T: +44(0)20 7583 6767

Client -

Project Proposed Replacement Data Centre

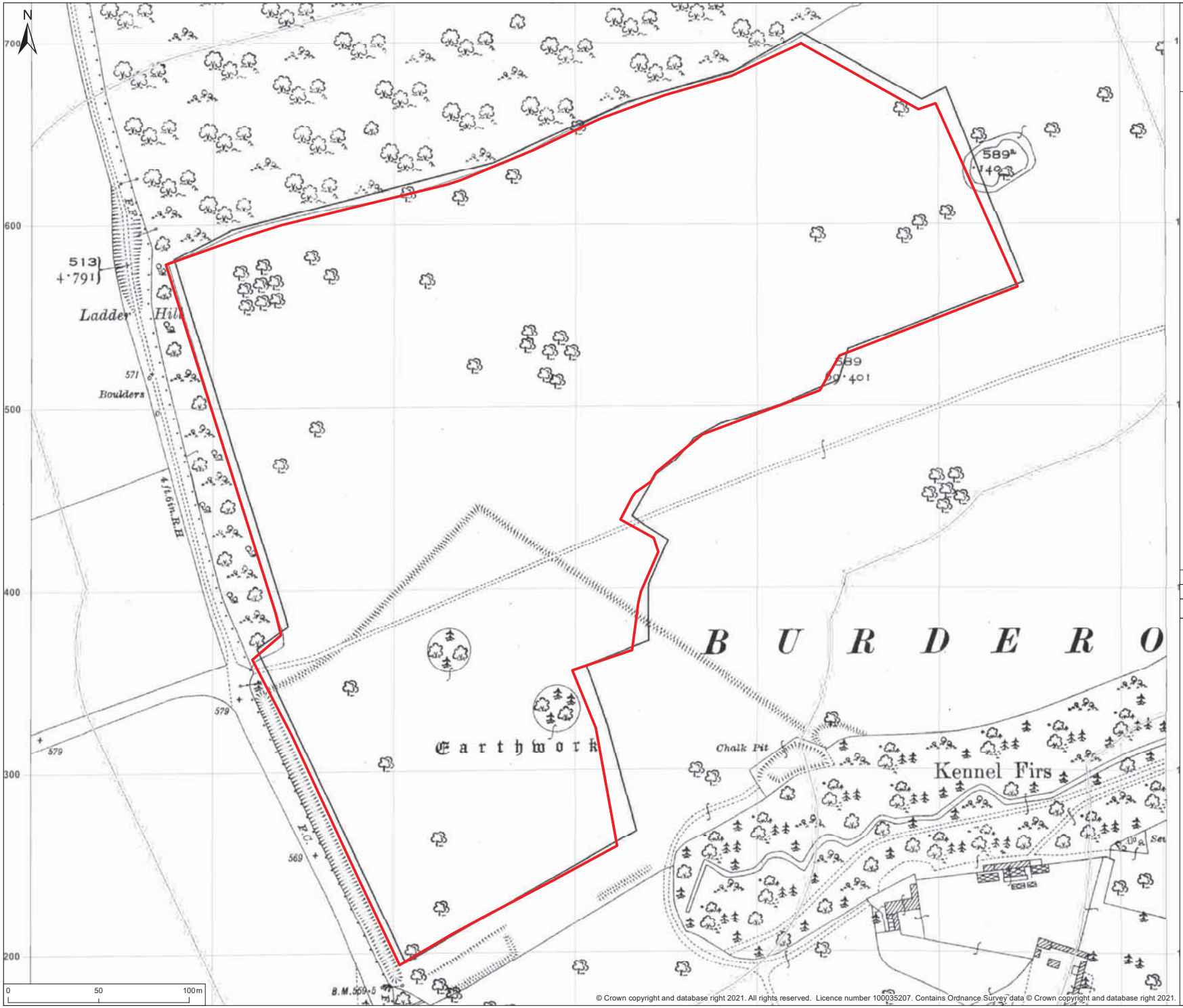
Title 1st edition OS 25" to the mile map, 1886

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:2,000	MAR 2021

Figure Number **7.5** Rev **-**

rpsgroup.com

26675 / ES Figure 7-5



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Site Boundary

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

20 Farringdon Street, London EC4A 4AB
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Client -

Project Proposed Replacement Data Centre

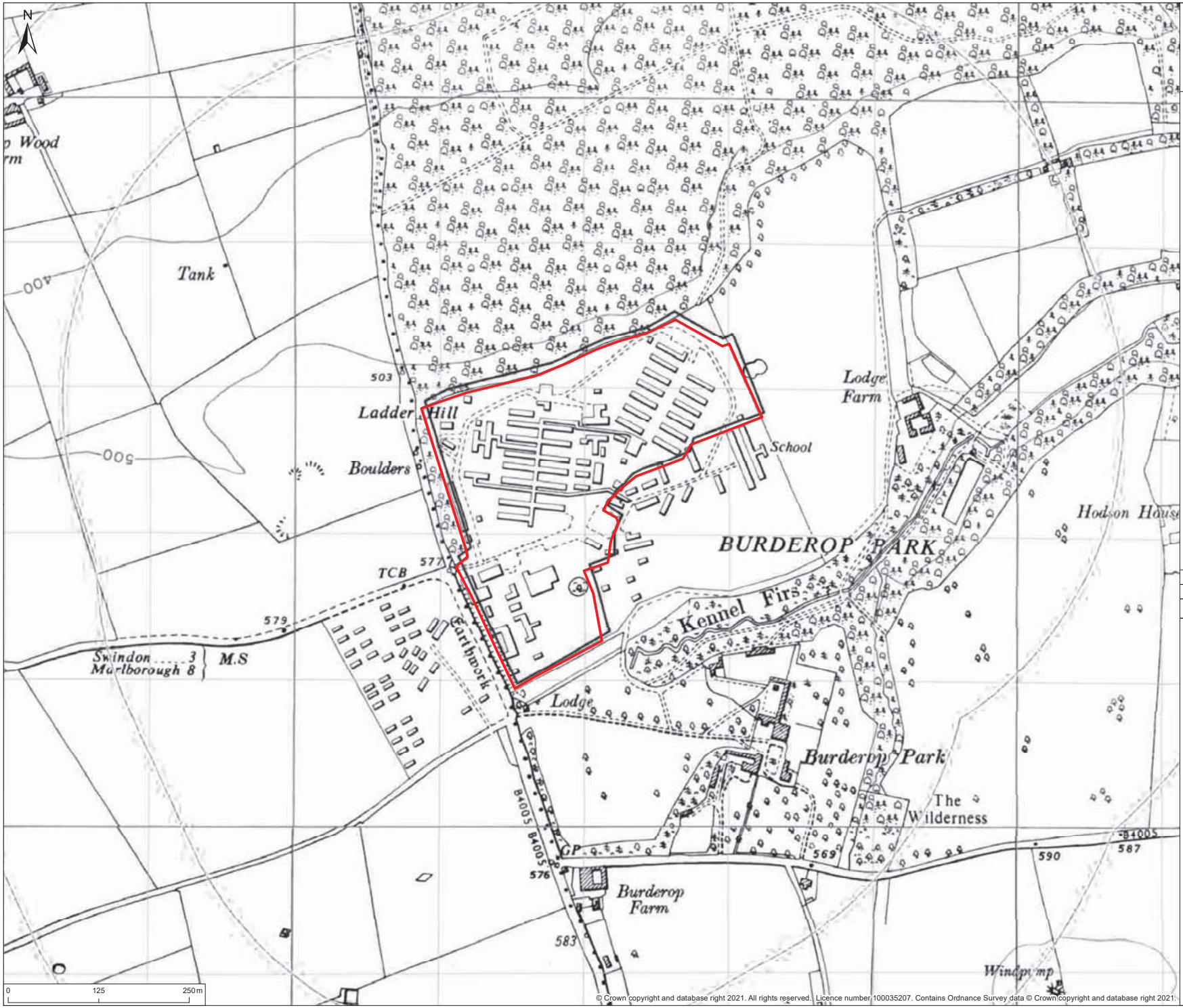
Title 3rd edition OS 25" to the mile map, 1924

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:2,000	MAR 2021

Figure Number **7.6** Rev -

rpsgroup.com

26675 / ES Figure 7.6



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Site Boundary

Rev	Description	By	CB	Date

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20 Farringdon Street, London EC4A 4AB
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Client -

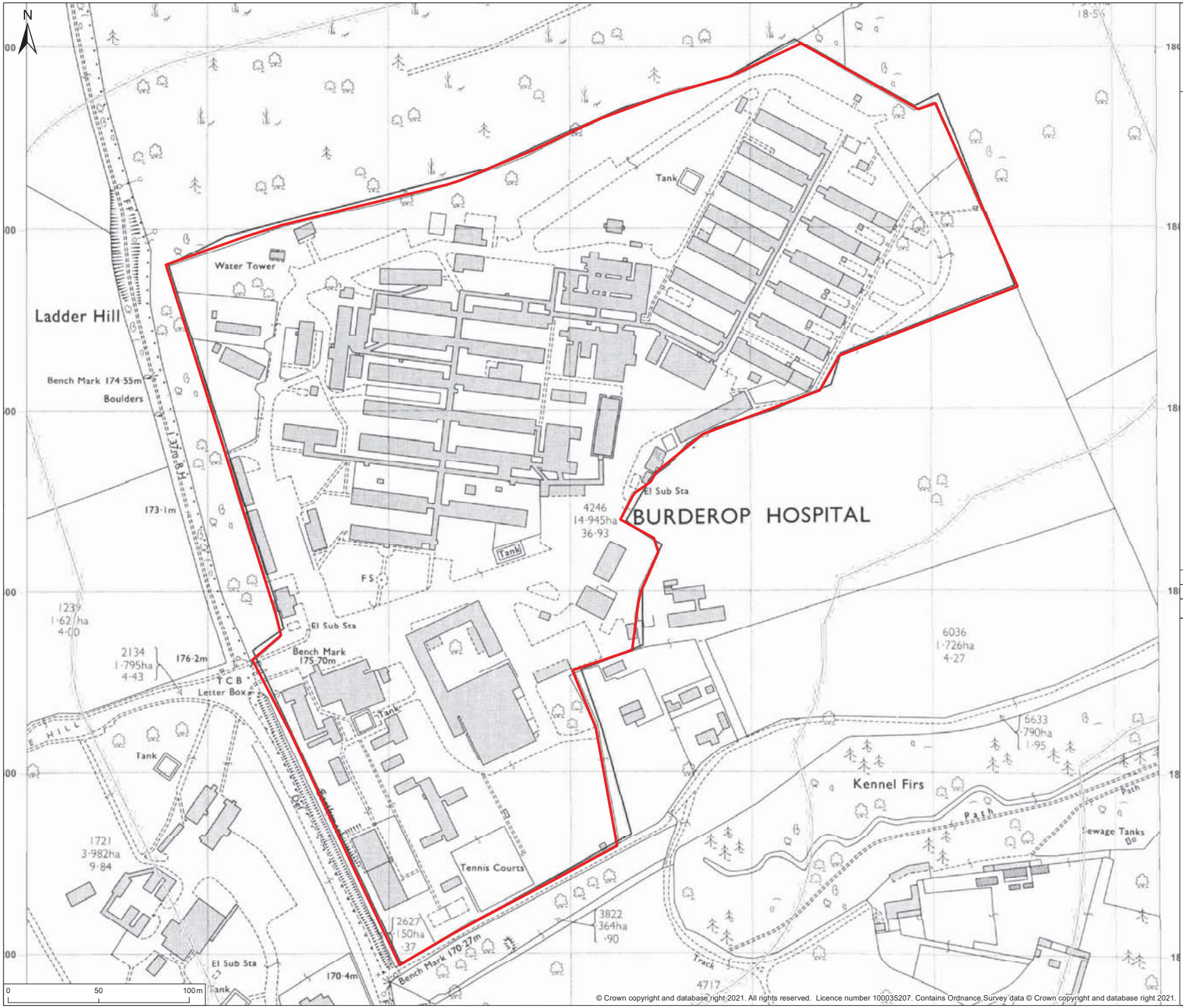
Project Proposed Replacement Data Centre

Title OS 1:10,560 map, 1956

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:5,000	MAR 2021
Figure Number		**Rev**
7.7		-

rpsgroup.com

26675 / ES Figure 7-7



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Site Boundary

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

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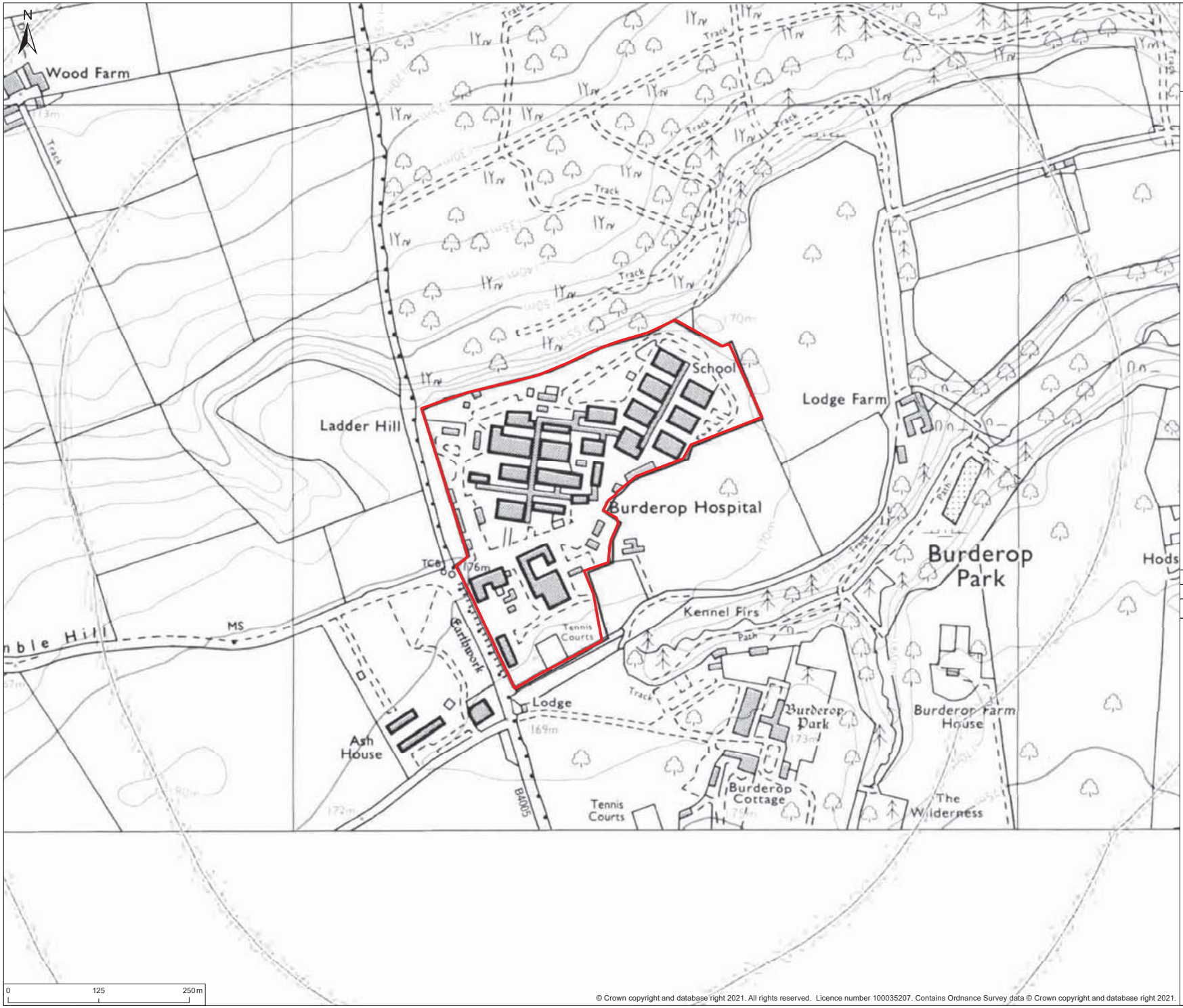
Client -

Project Proposed Replacement Data Centre

Title OS 1:2,500 map, 1969

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:2,000	MAR 2021
Figure Number		**Rev**
7.8		-

rpsgroup.com



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Site Boundary

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

20 Farringdon Street, London EC4A 4AB
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Client -

Project Proposed Replacement Data Centre

Title OS 1:10,000 map, 1985

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:5,000	MAR 2021

Figure Number **7.9** Rev **-**

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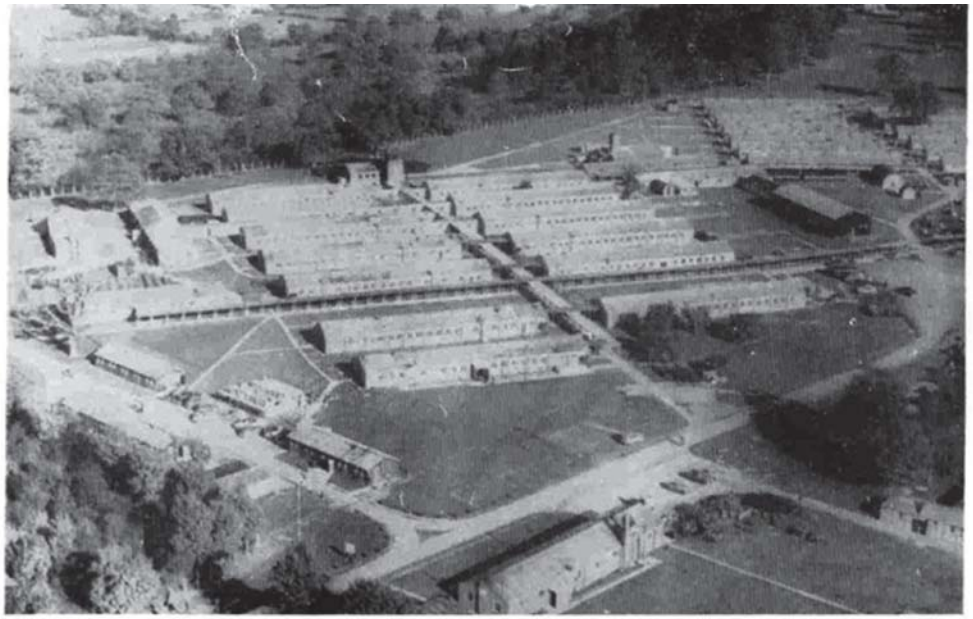
26675 / ES Figure 7-9



UNITED STATES AIR FORCE HOSPITAL, BURDEROP PARK, WILTSHIRE, ENGLAND.
November, 1951.

Hospital redeveloped for civilian use

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Legend

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

20 Farringdon Street, London EC4A 4AB
T: +44(0)20 7583 6767

Client -

Project Proposed Replacement Data Centre

Title Historical aerial photographs of the Application Site

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	N/A	MAR 2021

Figure Number **7.10** Rev **-**

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Site Boundary

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

20 Farringdon Street, London EC4A 4AB
T: +44(0)20 7583 6767

Client -

Project Proposed Replacement Data Centre

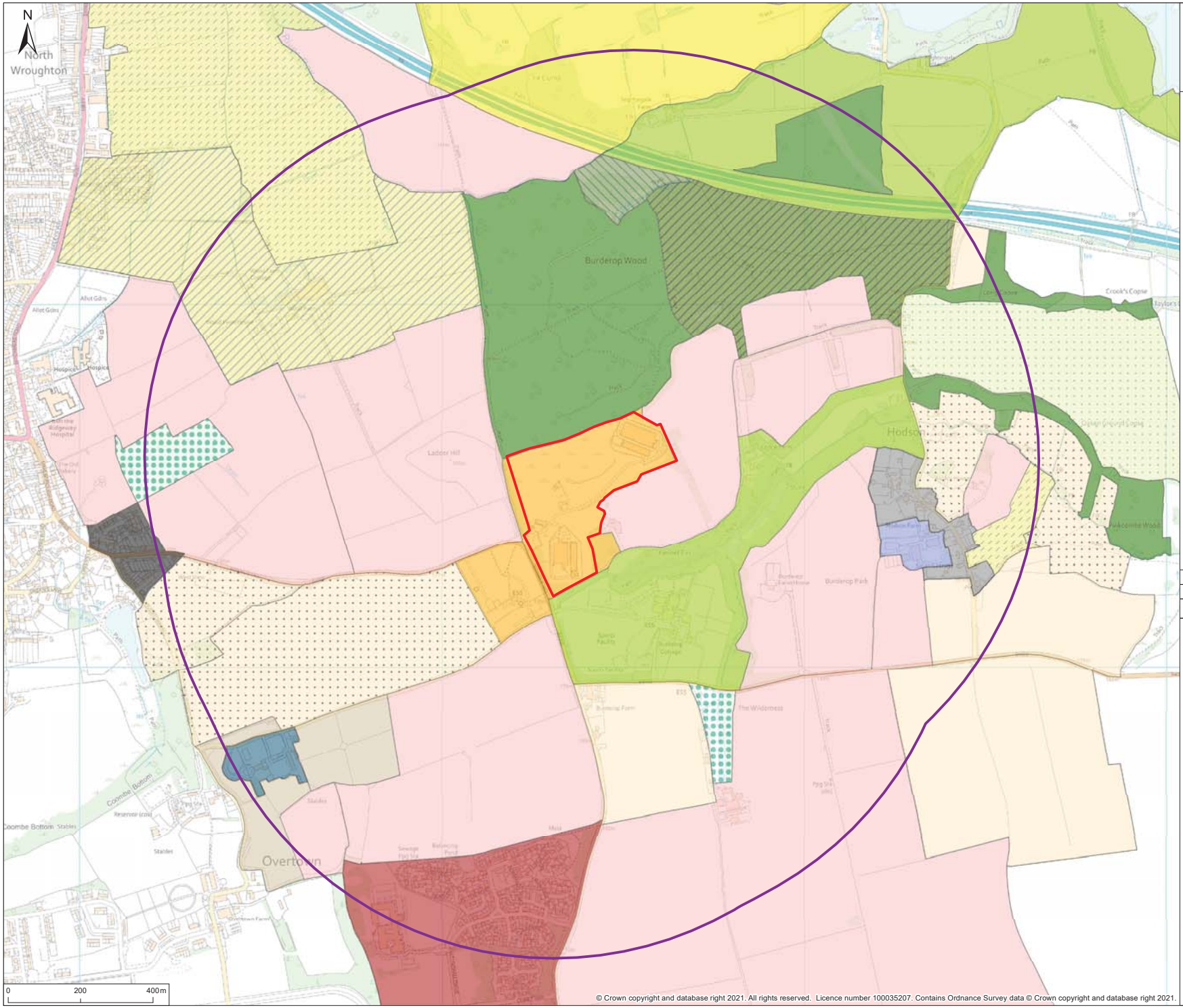
Title Existing services within the Application Site

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:2,000	MAR 2021

Figure Number **7.11** Rev **-**

rpsgroup.com

26675 / ES Figure 7-11



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Legend

- Site Boundary
- 1km search radius
- Amalgamated fields
- Ancient semi-natural woodland
- Paddocks
- Plantation
- Prairie fields (>15ha)
- Ancient semi-natural woodland replanted
- Country house
- Farmstead
- Golf course
- Hamlet
- Medical facility
- Military residence
- Parkland
- Parliamentary enclosure
- Piecemeal enclosure
- Planned enclosure
- Re-organised fields
- Secondary woodland
- Semi detached housing

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

20 Farringdon Street, London EC4A 4AB
T: +44(0)20 7583 6767

Client -

Project Proposed Replacement Data Centre

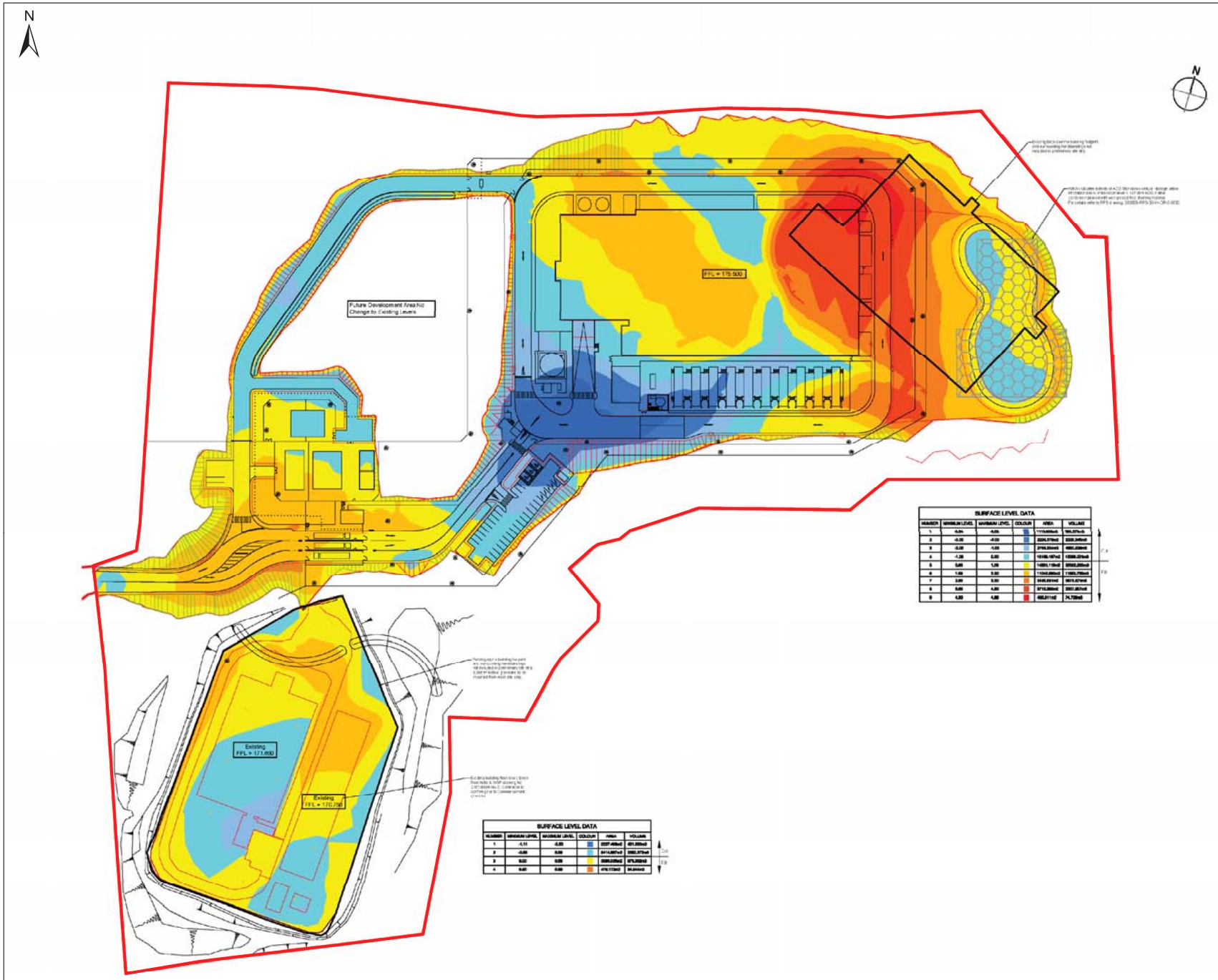
Title Historic Landscape Characterisation

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:10,000	MAR 2021

Figure Number **7.12** Rev **-**

rpsgroup.com

26675 / ES Figure 7.12



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Site Boundary

Rev	Description	By	CB	Date

20 Farringdon Street, London EC4A 4AB
T: +44(0)20 7583 6767

Client -

Project Proposed Replacement Data Centre

Title Cut and Fill Analysis

Status	Drawn By	PM/Checked By
FOR PLANNING	MP	MR
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:1,750	MAR 2021

Figure Number **7.13** Rev **-**

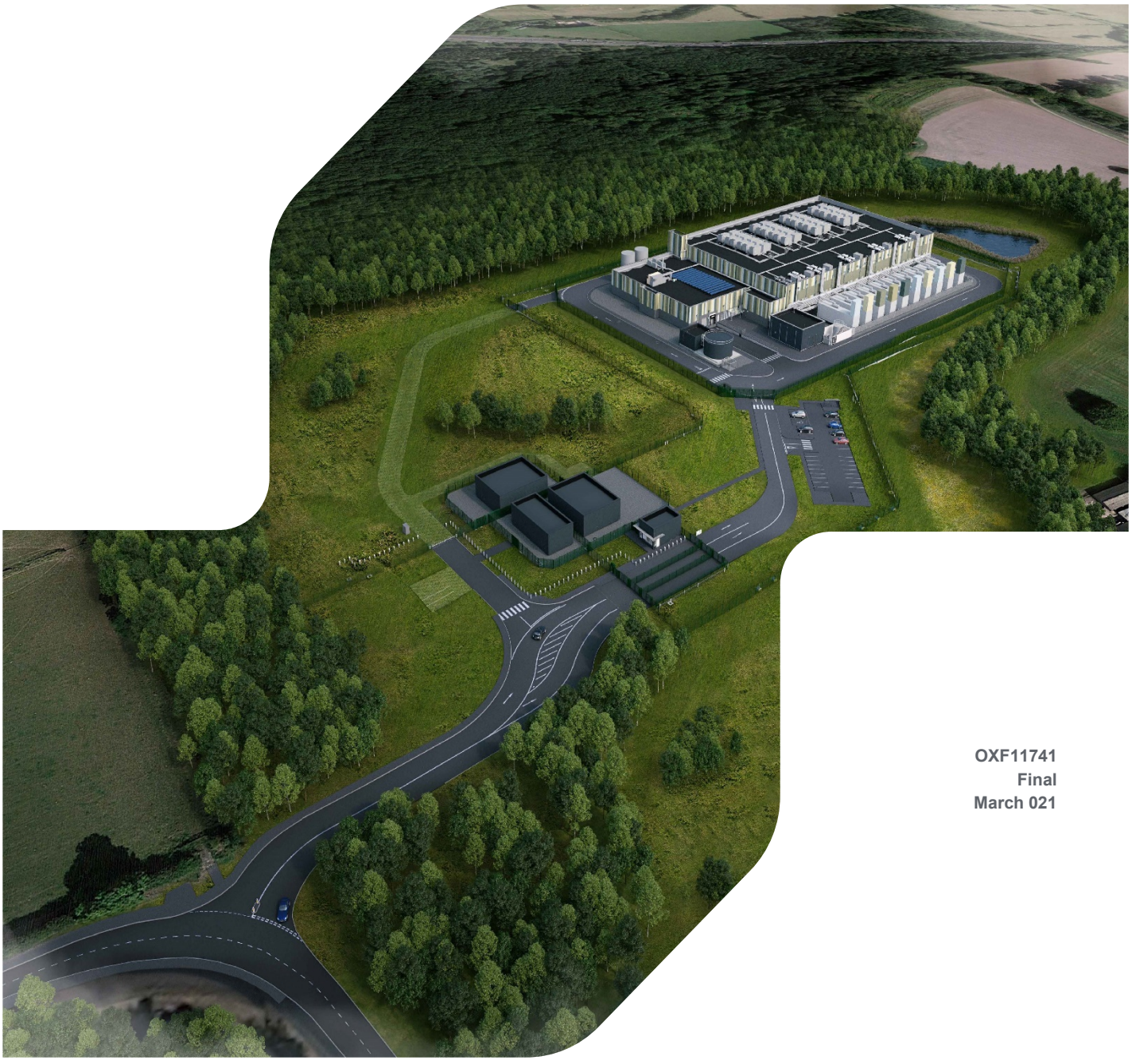
rpsgroup.com

PROPOSED REPLACEMENT DATA CENTRE

CODE OF CONSTRUCTION PRACTICE

National Data Centre, Old Burderop Hospital site, Brimble Hill, Wroughton, Swindon

Appendix 2.1
20305S-RPS-XX-XX-RP-P-9738



OXF11741
Final
March 021

rpsgroup.com

Approval for issue

Clare Russell	18 February 2021

Prepared by:

RPS

20 Western Avenue
Milton Park
Abingdon, Oxfordshire OX14 4SH

T +44 1235 821 888
E

Contents

Annexes

1 INTRODUCTION

1.1 General

1.1.1 This Code of Construction Practice (CoCP) supports the planning application for the redevelopment of land at the National Data Centre, Old Burderop Hospital site, Brimble Hill, Wroughton, Swindon (the Application Site). The report accompanies the Environmental Statement (ES) and a suite of technical reports forming part of the application for a replacement data centre and associated infrastructure (the proposed development).

1.1.2 The Application Site lies within the administrative area of Swindon Borough Council.

1.2 Purpose of the CoCP

1.2.1 This CoCP provides a management framework that will be implemented throughout the construction of this development. The framework comprises a series of strategies and control measures designed to mitigate the potential environmental impacts and limit the disturbance from the demolition and construction activities as far as reasonably practicable. It focuses on the environmental aspects of the construction phase that may affect the interests of nearby residents, businesses, the public and other environmental receptors near to the Application Site.

1.2.2 This CoCP has been prepared in conjunction with the ES and environmental reports prepared in support of the planning application with the aim of ensuring that best practice measures are followed during construction and that environmental impacts are mitigated.

1.2.3 Legislative requirements, standards and best practice measures current at the time of writing have been incorporated into this document where appropriate, to define the standards of construction practice that contractors will be required to adopt and implement. However, the list of legislation etc summarised in this document at (Annexx A) is not exhaustive and the Applicant and its Principal Contractor and sub-contractors will still be required to comply with all legislation and byelaws relating to their construction activities.

1.3 Implementation of the CoCP

Method Statements

1.3.1 The CoCP will be implemented through method statements for the key demolition and construction activities prepared by the Principal Contractor (once appointed). The method statements will set out how the demolition and construction activities will be undertaken (including methods and the types of plant required), appropriate risk assessments and the associated environmental, and health and safety issues. The method statement will also set out specific environmental control measures relevant to the demolition or construction activity, which will contain the appropriate measures within this CoCP.

1.3.2 For those activities which are not covered by method statements, the principles and measures of the CoCP will be implemented through general working practices as directed by the Principal Contractor.

1.3.3 All demolition and construction staff will be required to follow the CoCP and implement the measures to control the environmental impacts during construction. The requirement to comply with the procedures of the CoCP (as agreed with SBC) will be as included in the contract conditions for each element of the works, including the supply chain as appropriate.

Training

1.3.4 All demolition personnel will be required to have a demolition specific site induction and records shall be maintained of all personnel receiving induction.

1.3.5 The competency levels of persons working on site will be identified prior to the commencement of the work and persons provided with the appropriate training for the tasks to be undertaken. Where additional training is identified, this shall be carried out prior to the person concerned carrying out the relevant work on the site.

1.3.6 All construction staff employed on the proposed development will receive training on their responsibilities for minimising the risk to the environment and implementing the measures set out in the CoCP.

1.3.7 The Principal Contractor will ensure that the construction workforce is appropriately qualified and experienced. The Principal Contractor will also be responsible for identifying the training needs of their personnel to enable appropriate training to be provided. The training will include site briefings and toolbox talks to equip the workforce with the necessary knowledge on environmental control measures pertinent to the tasks being undertaken each day.

2 PROJECT DESCRIPTION

2.1 Site Location and Surrounding Land Uses

2.1.1 The Application Site is located at the Old Burderop Hospital site, Brimble Hill, Swindon at grid reference 416360 180509. The site is approximately 980m from Wroughton, 1.2km south of Swindon and 670m from the M4 motorway.

2.1.2 The Application Site is a Data Centre campus and located within a rural setting, surrounded predominantly by countryside/recreational land, with isolated residential and industrial businesses located to the south and west. Burderop Park is located directly south of the site. It is a private agricultural and sporting estate with a house and garden which are open to the public; limited commercial space and a converted barn used as an exhibition centre.

2.1.3 The proposed development site is located within the North Wessex Area of Outstanding Natural Beauty (AONB). Adjacent to the site is the Burderop Site of Special Scientific Interest (SSSI), including areas of Ancient Woodland, which is a priority habitat.

2.1.4 There are no designated heritage assets within the Application Site: the nearest Scheduled Monument is located approximately 800m south west and would not be affected by the proposed development. There are a number of listed buildings within 250m, the closest of which is 164m.

2.2 The Application Site

2.2.1 The Application Site extends to approximately 11.3 hectares (ha) although the development area is approximately 5.53ha. The site is currently used as a data centre campus comprising three buildings: two buildings in the north east (known as Gamma and Beta) and one in the south (known as Alpha). The western area of the site is currently undeveloped. The site as a whole supports an area of semi-improved calcareous grassland with scattered areas of trees, tall ruderal and ephemeral vegetation

2.2.2 The existing data centre buildings have been vacant since July 2020. Prior to the construction of these buildings, the site was formerly occupied by a military hospital, telephone exchange and office building. These buildings were demolished in the 1980s and early 1990s and replaced by the existing data centre buildings.

2.3 Proposed Works

2.3.1 The proposed development comprises a replacement Data Centre building (containing data halls, associated electrical and AHU Plant Rooms, loading bay, maintenance and storage space, office administration areas and screened plant at roof level), emergency backup generators and emission stacks, diesel tanks and filling area, electrical switchroom, a water sprinkler pump room and storage tank, a gate house / security building, site access, internal access roads, hard and soft landscaping and a rainwater infiltration pond.

2.3.2 The Application Site will also include a gate house / security building, site access from B4005 Brimble Hill and internal access roads, and hard and soft landscaping.

2.3.3 The Data Centre will be served by a direct Medium Voltage (MV) National Grid connection and distributed via the onshore MV Compound.

3 APPROACH TO CONSTRUCTION

3.1 Design

3.1.1 The proposed development follows the Building Research Establishment's Environmental Assessment (BREEAM) Method for data centres (BREEAM, 2010). BREEAM sets the standard for best practice in sustainable design and is used to describe a building's environmental performance. Credits in ten categories are used to describe its performance, which are added together to produce a single overall score on a scale of Pass, Good, Very Good, Excellent and Outstanding.

3.1.2 The target score for the proposed development is Excellent. The credits relating to construction are:

- To implement the Considerate Constructors Scheme (see below) and achieve a score of between 32 and 35.5; and
- To manage construction site impacts such as:

– setting targets and monitoring water consumption and energy use from site activities and transport to and from the site;

– implementing best practice policies in respect of dust and water (surface and ground) pollution;

– having an environmental materials policy for sourcing construction materials; and

– requiring the main contractor to operate an Environmental Management System.

3.2 Construction

3.2.1 The proposed development will be constructed in an environmentally sensitive manner retaining trees and grassland where possible and complying with all relevant legislation, codes of practice and standards to minimise adverse impacts on the local community and the environment as far as reasonably practicable.

3.2.2 In addition to meeting the commitments of this CoCP, the Principal Contractor will be required to sign up to and implement the Considerate Constructors' Scheme (CCS). The CCS is a national initiative established to raise standards in the construction industry. Its Code of Considerate Practice sets out the scheme's expectations of all registered sites, companies and suppliers. These expectations are summarised below:

- Care about Appearance: constructors should ensure sites appear professional and well-managed.
- Respect the Community: constructors should consider their impact on neighbours and the public;
- Protect the Environment: constructors should protect and enhance the environment;
- Secure everyone's Safety: constructors should attain the highest levels of safety performance;
- Value their Workforce: constructors should provide a supportive and caring working environment.

3.2.3 As part of the CCS, Scheme Monitors visit sites or individual projects to ensure the requirements of the Code of Considerate Practice are being implemented appropriately. Compliance is recorded using a scoring system.

3.3 Best Practice Guidance

3.3.1 Construction activities will be undertaken in accordance with the following best practice guidelines:

- British Standard BS 10175 (British Standards Institution (BSI), 2011 and amended 2017) (BSI 10175:2011+A2:2017);
- Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance (Department for Environment, Food and Rural Affairs (Defra), 2012);
- Groundwater Protection Position Statements (Environment Agency, 2017 and amended 2018);
- Land Contamination: Risk Management (Environment Agency, 2019);
- CIRIA C741 Environmental Good Practice on Site (2015);
- Institute of Air Quality Management (2014) Assessment of dust from demolition and construction.
- British Standards Institution (BSI) (2014) British Standard 5228: Code of practice for noise and vibration control on construction and open site. Part 1: Noise +A1:2014; and
- British Standards Institution (BSI) (2014) British Standard 5228: Code of practice for noise and vibration control on construction and open site. Part 2: Vibration.

4 GENERAL REQUIREMENTS

4.1 Construction Programme

4.1.1 The construction phase of is estimated to take 10 – 12 months to complete and will comprise external construction and civils activities. This is forecast to commence in early Q3 2021 (subject to the progress of the planning process). At the end of that period all external construction activities and civils work will be completed, including:

- demolition of buildings Beta/Gamma and Alpha;
- hard and soft landscaping;
- security and access areas;
- perimeter fencing;
- internal access roads and car parking areas;
- drainage and attenuation;
- the shell and core construction of the main data centre building and administration block.

4.1.2 The construction phase will be followed by the installation and testing of the IT equipment (data storage and data processing technology) and then the creation of the data networks and various cloud computing services that will operate from the facility. These are then tested prior to becoming available for Customer data. All the Electrical, Mechanical & IT across the entire facility will not be deployed all at one time. Instead, internal fit-out will occur in phases, the initial phase commencing within the site construction works in Q3 2021, with follow-on phased fit-out determined by Customer demand. The reason for this is that having unused data servers and associated mechanical and electrical support systems would unnecessarily consume energy and also require ongoing maintenance and servicing. Thus, they are deployed close to the anticipated Customer needs.

4.1.3 Fit-out works associated with these subsequent phases will primarily be carried out inside the completed building and be of circa 6 months duration. There will be limited external works involving the installation of generator sets and roof mounted mechanical equipment, associated with that phase. The principal foundations for each generator set will be built during the main construction period. The installation (and testing) of IT equipment and building of the data networks and computing services is not covered by the CoCP as all are post-construction activities.

4.1.4 This phase will not generate significant levels of noise and traffic over predicted operational levels and will have no ‘construction’ type impacts. All activities will be carried out inside the building and will be indistinguishable from the normal operating conditions of the Application Site. The exception to this will be installation of generator sets for the additional data rooms, which will be installed outside this construction period. However, the principal foundations for each generator set will be built during the main construction period as described above.

4.1.5 All materials and plant associated with the development process will be stored within the footprint of the Application Site. A loading and unloading area for plant and materials will be provided within the site boundary. It is anticipated that the majority of deliveries will be made via articulated low loader vehicles and rigid HGVs.

4.2 Working Hours

Normal working hours

4.2.1 During the construction period, it is proposed that the normal working hours for external works (e.g. earthworks, installation of utilities, erection of the building) will be 07:00 to 19:00 Monday to Friday and 07:00 to 14:30 on Saturdays. No working will be undertaken on Sundays or Bank

Holidays. Deliveries will also take place within the normal working hours but will potentially be scheduled to avoid peak periods.

4.2.2 Site working hours will be closely managed to avoid complaints from local residents and mitigation measures will be put in place where required. All operatives will be informed of the site working hours during site induction and sub-contractors will be informed during contract negotiations.

Activities outside normal working hours

4.2.3 It is possible that the appointed contractors may wish to carry out certain activities outside normal working hours i.e. evening hours during long summer days etc. or to address particular logistical or construction constraints.

4.2.4 In the case where 'out of hours' or unsociable working is required, agreement will be sought from the local Environmental Health Officer at SBC and local residents will be informed prior to the works commencing.

4.2.5 Non noisy activities such as the internal fit out of buildings may be undertaken outside of the normal working hours, where these activities will not cause disturbance off site.

4.3 Temporary Compound and Laydown Area

4.3.1 A temporary construction compound will be established on the Application Site providing a site office, adequate welfare facilities, parking for construction plant and equipment, and material laydown areas. The location will be within the Application Site sited away from the Burderop Woods SSSI to the immediate north of the site and away from the area of retained habitats in the north west of the site.

4.3.2 Aggregate materials such as sands and gravels, will be stored in clearly marked receptacles within a secure area in the construction compound to prevent contamination.

4.3.3 The temporary compound and laydown area will also include adequate vehicle parking for construction workers and visitors to ensure that no parking occurs on the public highway.

4.4 General Site Layout and Good Housekeeping

4.4.1 A good housekeeping policy will be applied to the construction site at all times. As far as reasonably practicable, the following principles will be applied:

- all working areas will be kept in a clean and tidy condition;
- adequate welfare facilities will be provided for construction staff;
- designated smoking areas will be provided at the site compound and will be equipped with containers for smoking wastes. These smoking areas will be located away from the site boundary;
- wheel washing facilities will be provided (see the Traffic section) and will be cleaned frequently;
- open fires on site will be prohibited at all times;
- all necessary measures will be taken to minimise the risk of fire and the Principal Contractor will comply with the requirements of the local fire authority;
- waste from the construction site will be stored securely to prevent wind blow; and
- waste (particularly food waste) will be removed from the welfare facilities on a weekly basis.

4.5 Site Induction

4.5.1 The construction of the proposed development requires that all personnel working on the Application Site to have a site induction that includes an environmental protection and good practice component. This should include the buffer zones to the Burderop Woods SSSI adjacent to the northern boundary, the protection of retained trees and grassland on site, waste management arrangements; the use of spill kits and emergency response reporting of incidents; and fuel, oil and chemical management. Demolition and construction personnel will be required to have received the site induction prior to commencing work at the site.

4.6 Site Security and Fencing

4.6.1 Wire mesh fencing currently surrounds the perimeter of the Application Site. The existing fencing will be maintained during the initial stages of the construction process to minimise the opportunity for unauthorised entry by the public. Prior to completion of construction, the existing fencing will be replaced with the permanent fencing as set out in the application document (document reference 20305S-RPS-00-XX-DR-A-9504).

4.6.2 Fencing will also be provided around the areas of the site to demarcate buildings and structures to be demolished.

4.6.3 During the construction process, all boundary fencing will be maintained in a tidy condition and fit for purpose.

4.6.4 Access to the Application Site will be limited to specified entry points and all personnel entries/exist will be recorded for security and health and safety purposes. Site gates will be manned to prevent unauthorised access.

4.6.5 Appropriate security will be provided including CCTV and onsite security personnel.

4.7 Construction Lighting

4.7.1 External lighting of the construction site will be designed and positions to manage emissions of artificial light in accordance with good practice whilst maintaining safety and security obligations.

4.7.2 Site lighting will be positioned and directed to minimise distractions to passing drivers on nearby public highways, in particular B4005 Brimble Hill, and to minimise skyglow as far as reasonably practicable. Measures will also be implemented to avoid or minimise light spillage impacts on ecological receptors, in particular the wooded area in the east of the site.

4.7.3 Construction lighting will take into account the requirements of BS EN 12464-2:2014 (British Standards Institution (BSI) 2014). Lighting units will be designed to avoid illumination outside the working area (i.e. they will be directional, task orientated and where possible, fully shielded).

4.8 Pest Control

4.8.1 The risk of pest/vermin infestation will be minimised by ensuring that any putrescible waste is stored appropriately and is collected daily from the site. Effective preventative pest control measures will be implemented through the use of a licensed pest control contractor. Any pest infestation will be dealt with promptly and notified to SBC as soon as practicable.

4.9 Clearance of Site

4.9.1 On completion of construction the temporary construction compound will be cleared from the Application Site with any remaining landscaping completed as per the submitted plans.

4.10 Emergency Planning and Procedures

4.10.1 The Principal Contractor will prepare emergency procedures for the proposed development taking into account the anticipated hazards and site-specific conditions.

4.10.2 The procedures will be documented in a Pollution Incident Response Plan (see Annex B) and will include emergency pollution control measures (based on Environment Agency guidelines where appropriate); fire and site evacuation; and spill prevention control measures. The Plan will include pro-active management measures to ensure that any pollution that may occur is controlled, remediated and reported to the relevant parties/personnel.

4.10.3 The Plan will also contain emergency phone numbers and the method for contacting the Environmental Health Officers at SBC and statutory authorities. Copies of the Plan will be kept on site and staff will be required to follow the procedures at all times.

4.10.4 Details will be posted on the entrance to the Application Site to advise members of the public who to contact in the case of an emergency.

4.11 Local Community Liaison

4.11.1 The Principal Contractor will adopt a proactive approach to community relations and provide a dedicated point of contact will be provided to manage communications with local residents, local businesses, emergency services and the local authority. The approach would include the following steps:

- A site notice board would be erected at the Application Site entrance setting out key facts about the construction programme, where further information could be found and the contact details for the proposed development.
- Information circulars informing people of the progress of works.
- Occupiers of nearby properties will be informed of particularly noisy construction activities or works undertaken outside the normal working hours, together with the time and expected duration of the activities.
- Local residents or businesses will be given advance notice of temporary disruption to services, where these will arise.
- A 24-hour help line will be set up to provide information on the proposed development and will be used to record complaints from members of the public. Details of the help line will be promoted on notice boards at the Application Site and press releases.

4.11.2 All complaints will be logged (see Annex C) and the action taken to resolve the complaints will be recorded. This information would be shared with SBC on request.

5 MANAGEMENT OF ENVIRONMENTAL ISSUES

5.1 Landscape and Visual Resources

5.1.1 Existing trees that will be retained in the Application Site will be protected during the construction process in accordance with the requirements of British Standard 5837:2012 'Trees in relation to design, demolition and construction.' The trees to be retained are shown on the Tree removal and retention Plan (20305S-RPS-00-XX-DR-A-9560).

5.1.2 Hoarding will be erected on the Application Site around the construction works in the north and east of the Application Site. The hoarding will remain in place during the construction process and will be maintained in a good condition and any damage will be repaired as necessary.

5.2 Ecology and Nature Conservation

5.2.1 Prior to the start of ecologically sensitive works, an Ecological Clerk of Works (ECoW) would deliver a toolbox talk to the site construction team, briefing them on all ecology and nature conservation requirements on site.

Habitats

5.2.2 The site layout has been designed to retain as much of the existing habitat as possible within the limitations of the security requirements of the operational data centre. Those requirements are for a minimum level of security lighting and the avoidance of planting close to the buildings or security fence.

5.2.3 Details of the retained habitats are shown in the Landscape Strategy (Figure 5.45) and the Tree Retention and Loss Plan in the Arboricultural Impact Assessment (Volume 3 Appendix 5.5)

5.2.4 The following habitats will be retained:

- mature plantation broad-leaved woodland on the site boundaries (approximately 1.5ha);
- semi-improved neutral grassland in the north western quarter of the site along the boundary of the SSSI woodland, in the south-eastern area adjoining plantation; and
- a large number of mature and semi mature trees.

5.2.5 The areas of retained grassland are not currently managed and are becoming rank. The grassland would be cut, scarified and over sown with a wildflower seed mix appropriate to the soil type. A cutting regime will be implemented to promote floristic diversity and prevent domination by grasses (see Grassland Management Plan Figure 6.5).

Habitat Protection

5.2.6 Construction fencing would be installed around the perimeter of the construction area to protect adjacent retained habitats. Fencing would prevent access to contractors, machinery and vehicles and the storage of vehicles, machinery, equipment and materials in areas outside of the fence line.

5.2.7 Measures would be adopted with reference to industry and regulatory pollution prevention guidelines and would protect the environment from potential construction related discharges to ensure negative effects on water and air quality are minimised during construction (see the sections below on protection of water resources and dust control measures).

5.2.8 Tree protection measures will also be implemented during construction to protect retained trees and trees within Burderop Wood SSSI as specified in the Arboricultural Impact Assessment (Appendix 5.5 document ref 20305S-RPS-XX-XX-RP-P-9712) and are in accordance with BS5837(2012) Tree in Relation to Design, Demolition and Construction. The measures will also be in accordance with Natural England guidance on the protection of ancient woodlands. A minimum 15m buffer zone to the ancient woodland will be established prior to the commencement of works:

no construction activity (including lighting or storage of equipment and materials) will be permitted within this zone. The existing fencing around the Application Site will be used to mark the buffer zone where it can be demonstrated that it is at the required distance from the woodland.

5.2.9 Prior to the start of ecologically sensitive works, an Ecological Clerk of Works (ECoW) would deliver a toolbox talk to the site construction team, briefing them on all ecology and nature conservation requirements on site, including the mitigation measures described below. The ECoW would oversee all works potentially affecting sensitive ecological features.

Landscaping

5.2.10 In addition to habitat retention and protection, the landscaping scheme would include the translocation of approximately 1ha of wildflower rich neutral grassland (the most ecologically valuable grassland within the Application Site).

5.2.11 The grassland will be translocated as turves from the centre of the site and placed in prepared receptor areas located on the eastern boundary and in the demolished footprint of the Alpha building in the south-western part of the site. The translocation will be undertaken following the Outline Grassland Translocation and Soil Management Method Statement in Volume 3 Appendix 6.6 (20305S-RPS-XX-XXRP-P-9740). The method statement defines the preparatory works to be implemented in the donor area and the receptor sites, the method to be employed including of the type of equipment and the aftercare commitments during the initial bedding down period. The method statement will be refined with information from discussions with specialist contractors and soil sampling prior to determination of the application. Natural England will be kept informed of updates to the method statement.

Protected Species

Bats

5.2.12 In accordance with best practice guidelines, a single dusk emergence survey will be undertaken of If the loss of one or more bat roosts is unavoidable, this will be addressed through species protection, mitigation and the provision of alternative roost features. The detailed measures would be agreed with Natural England and would be covered by an EPS mitigation licence.

5.2.13 The licence would be obtained prior to any works affecting any of the potential bat roosts in trees or buildings identified in the baseline surveys.

5.2.14 Based on the likely type of roosts three new bat roost boxes would be provided for each low status roost where loss is unavoidable. Installation of new boxes on new buildings impractical due to the minimum level of security lighting required and therefore, all the bat boxes would be installed on retained mature trees located on the northern and south-eastern boundaries.

5.2.15 Each box would be installed at least 3m above ground with a south-east or south west facing aspect in locations not exposed to any light spill from artificial lighting; and

5.2.16 Details of the mitigation will be presented in the Method Statement which will accompany the licence application the following measures would be undertaken:

- installation of replacement roosts would be installed in advance of roost closure to provide receptacles where relocated bats could be moved;
- bats would be excluded from roosts using devices fitted during suitable weather and in the active season and left in place for a suitable period to allow bats to leave.
- Confirmed and potential roost features in buildings would be subject to hand search, soft stripping of structures under direct ecological supervision and destructive closure in advance of full demolition;
- all works to be supervised by the Named Ecologist on the EPS mitigation licence or their agent.

5.2.17 In the absence of any bat roosts within the development, a minimum of six long lasting bat boxes constructed from woodcrete (or equivalent) would be installed in the boundary plantation woodland on the northern and western boundaries of the development to provide additional opportunities for roosting bats. Boxes would be installed two to a tree with two different box designs on each tree to provide a range of roosting micro-conditions.

Breeding Birds

5.2.18 As construction (involving tree clearance on the Application Site) is likely to commence in Q3 (July to September) 2021, it is likely to be outside of the optimal bird nesting season (mid-March to mid-June). The nesting season continues to potentially the end of August so if tree clearance operations have to take place during the period then an Ecological Clerk of Works (ECoW) shall check in advance that there are no birds nesting in the planned area of operation. . The checks would be undertaken no more than 48 hours prior to removal of the tree. Any active nests would be protected with an exclusion zone (minimum 5m radius) established around the nest within which no work would be permitted.

5.2.19 The exclusion zone would be demarcated with posts and barrier tape or similar materials. The nest would be monitored regular and no works would be undertaken within the exclusion zone until the ECoW has confirmed the young birds have fledged and the nest is no longer in use.

5.2.20 Ten long lasting bird boxes constructed from woodcrete (or equivalent) will be installed in the boundary plantation woodland on the eastern and south-eastern boundaries of the development to provide additional opportunities for breeding birds

Reptiles

5.2.21 A precautionary working method will be followed for the removal of suitable reptile habitat to ensure that any animals within the working area are displaced into the retained grassland around the edges of the Application Site.

5.2.22 The detailed working method is provided in Appendix 6.4. Following the working method, suitable reptile habitats will be cleared only during the time of year and during suitable weather conditions when reptiles will be active. Habitat will be systematically degraded with cutting in stages progressing to removal to ground level to allow animals to move out of the construction area. Habitats will be cleared moving from the centre of the Application Site working towards the Application Site boundaries where grassland habit will be retained. Retained grassland into which animals will be displaced will be protected with suitable fencing or other barrier fixed to the ground. Potential hibernation or shelter features will be dismantled and removed by hand and any reptiles placed in the retained grassland minimising animal handling time. A final destructive clearance will render the working area unsuitable for reptiles.

5.2.23 Systematic vegetation removal, dismantling of shelter features and destructive clearance will be carried under the guidance and supervision of an experienced ECoW.

Badger

5.2.24 To minimise the risk of mammals being harmed, a means of escape from any larger excavations (i.e. excavations over 0.5 m depth) left open overnight would be provided as necessary, such as the provision of a scaffold plank as a ramp (at no more than 45° angle), or the profiling of at least one wall of an excavation to provide a gentle slope (no more than 45°) that an individual could use to exit the excavation. Alternatively, where practicable the excavation would be covered.

5.2.25 Best practice measures implemented during construction would include hazardous material being safely stored in a locked container away from potential disturbance by animals.

Monitoring

5.2.26 New bat roosts provided under a Natural England EPS mitigation licence would be monitored in accordance with the details specified in the licence. Monitoring typically would comprise a physical

roost inspection and emergency / re-entry survey in the year following installation of replacement with further inspections biennially up to five years after installation depending on the conservation status of the roosts being replaced.

5.2.27 New habitat creation for biodiversity gain would normally be monitored in the first year after creation to assess initial establishment of new habitats. For the translocated, new and enhanced grassland areas, botanical surveys at the appropriate time of years (usually early and late summer) would record vegetation cover and species composition against the grassland specification. Further monitoring would typically be carried out in years two or three and year five.

5.2.28 The findings of monitoring would be used to inform management with management practices modified where necessary to ensure biodiversity objectives are being met. Where there is a significant short fall in the objectives being achieved, remedial measures would be recommended such as resowing.

5.2.29 Formal biodiversity objectives are defined in the Biodiversity Management and Monitoring Plan (BMP) (document reference Appendix 6.7 (Document ref 20305S-RPS-XX-XX-RP-P-9739) which includes a timetable for implementation and monitoring, defined roles and responsibilities for monitoring and management and formal management review after each monitoring round.

5.2.30 Removal of Montbretia would require a sterile working method to ensure that the removal is successful, and any contaminated material is not spread. Monitoring of the success of the removal would form part of the BMMP (Volume 3, Appendix 6.7), with the annual management review including on-going or new measures for control as appropriate.

5.2.31 Species protection measures implemented at the start of construction should be monitored to ensure they remain in place and effective for the duration of the period of risk. This would include:

- monitoring of bird nests (if active nests are found that need to be protected from disturbance);
- monitoring of measures to prevent injury to badgers; and
- monitoring and ongoing maintenance of the reptile exclusion fence to exclude reptiles from the construction site after displacement.

5.2.32 Monitoring during construction typically will be the responsibility of a nominated member of the site staff (usually the site manager) and is recorded in a log which is kept in the site office at all times and regularly updated.

5.3 Protection of Water Resources

Pollution Control Measures

5.3.1 Construction works will be undertaken in accordance with best practice guidance such as the measures set out in CIRIA (2001) ‘Control of Water Pollution from Construction Sites – Guidance for Contractors’ and CIRIA (2015) ‘Environmental Good practice on Site’.

5.3.2 All construction staff will be briefed on the location of the nearby watercourses and pollution prevention measures will be included within the site induction.

5.3.3 Areas with prevalent run-off will be identified and drainage will be actively managed, e.g. through bunding and/or temporary drainage.

5.3.4 Machinery will be routinely checked to ensure that it is in good working condition. Refuelling of machinery will only be undertaken within a designated area of the Application Site (i.e. the construction compound) where spillages can easily be contained. Any storage tanks and associated pipe work containing fuels will be double skinned or bunded, provided with leak detection equipment and inspected daily.

5.3.5 Where mobile bowsers are used the following measures will be implemented:

- any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
- all bowsers will carry a spill kit and operatives will be trained in their use; and

- portable generators or similar fuel containing equipment will be placed on suitable drip trays.

5.3.6 Storage areas of hazardous substances (including oils and chemicals) will be bunded to minimise the risk of hazardous substances entering the drainage system or the unnamed watercourse located approximately 90m south east. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. The bunding systems for oil/chemical storage will have a capacity of 110% of the oil/chemical volume stored and ideally will be covered to prevent ingress of rainwater. Oil/chemical storage areas will be visually inspected on a daily basis. Containers of potentially polluting substances will be fit for purpose, manufactured to a recognised standard and be clearly labelled so that appropriate remedial measures can be taken in the event of a spillage.

5.3.7 Designated areas for the unloading, storage and handling of materials (including the storage of oils/fuels/chemicals) will be sited away from surface watercourses. Storage containers will be appropriate for the materials being stored and will be clearly marked.

5.3.8 Any leaks or spillages of potentially polluting substances will be contained, collected and then removed from site in an appropriate manner, e.g. use of absorbent material or bunding. Spill kits will be provided at agreed locations on the site and all construction staff will be trained in their use.

5.3.9 Measures will be installed to manage the surface water runoff from the site to prevent silty water entering the watercourse to the south east. Silty water will be treated to allow suspended solids to settle out before disposal. Treatment is likely to include a combination of settlement measures (e.g. silt traps, silt sacks and settlement tanks/ponds) and hydrocarbon interceptors as required.

5.3.10 Washing out concrete will only take place in dedicated areas on the Application Site: the wash out areas will be bunded and the water removed for treatment.

5.3.11 Site wheel washing facilities will be located away from watercourses and any waste water will undergo settlement and reused where possible.

5.3.12 No direct discharges of liquids or materials into the nearby watercourses or into the ground will be permitted unless prior consent has been obtained from the Environment Agency.

5.4 Traffic

5.4.1 The site is currently served by one access point via a private road leading from Brimble Hill Road (B4005) which is adjacent to the part of the site's western boundary. The private road has entry barriers restricting access into the site. This vehicular access will remain unchanged.

5.4.2 A Construction Traffic Management Plan (CTMP) (reference 20305S-RPS-XX-XX-RP-P-9731) has been prepared to support of the application. It sets out the routes that construction traffic will be required to follow. It is envisaged that the majority of HGVs delivering materials to the Application Site will be from the M4, with the potential for some local contractors to route from Swindon.

5.4.3 All construction traffic routeing from the M4 will exit at junction 15, and route south on the A346 and along the B4005. This will be the primary route for all construction traffic, as it utilises a network of A and B classification roads between the M4 and the site. On this basis, a HGV Routing Map will be prepared and all contractors will be required to agree to use the map as a condition of their contract. Vehicles will only be able to deviate from the prescribed route in exceptional circumstances such as road closures for highway repairs or closure by the police as a result of an accident.

5.5 Air Quality

5.5.1 An Air Quality Assessment (reference 20305S-RPS-XX-XX-RP-P-9721) was undertaken to support the planning application). It recommended that the following measures (as taken from the Institute of Air Quality Management guidance 'Guidance on the assessment of dust from demolition and construction' IAQM, 2014) are implemented to manage dust impacts from the Application Site during construction. The measures will be implemented as the Dust Management Plan and comprise measures that will be implemented during normal conditions (i.e. routine measures) and measures required if trigger levels are exceeded (i.e. additional control measures).

Routine Measures

Demolition

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Appropriate manual or mechanical demolition methods will be used as an alernative to explosive blasting.
- Bag and remove any biological debris or damp down such material before demolition

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.

Site management

- Record all dust and air quality complaints (see Annex A), identify cause(s), take appropriate measures – where justified - to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the logbook.

Monitoring

- Carry out regular (approximately weekly) dust soiling checks of surfaces such as street furniture and cars within 100 metres of site boundary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Use screening intelligently where possible – e.g. locating site offices between potentially dusty activities and the receptors.
- Erect solid screens or barriers around the construction site area.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean.
- Provide enhanced screening or specific operations where there is a high potential for dust production and the site is active for an extended period.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.

- Depending on the duration that stockpiles will be present and their size - cover, seed, fence or water to prevent wind whipping.

Operating vehicle/machinery and sustainable transport

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- A Construction Traffic Management Plan has been prepared as part of the application (20305S-RPS-XX-XX-RP-P-9731) to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible.
- Use enclosed chutes, conveyors and covered skips, where practicable.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment where possible.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Construction waste management

- Burning of waste on site will not be permitted.

Measures specific to trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as practicable.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site).
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.

Additional Measures

5.5.2 Trigger levels have been defined to reduce construction dust effects at the nearest receptors during high-risk conditions. The trigger levels established for the site include any of the following:

- winds that are, or are forecast to be, above a moderate breeze (Beaufort scale 4 – described as conditions under which 'dust and loose paper are raised. Small branches begin to move and are, or are forecast to be, from the west or north on days when there has been no rainfall for the last 3 days or more);
- the chance of further daily rainfall is forecast to be, below 40% on five consecutive days according to the met office website;
- routine checks/inspections/surveys on site have identified evidence of dust off-site;
- a dust complaint is received; or
- a failure in equipment or control is identified, or an abnormal/unintentional situation occurs, eg. a spillage.

5.5.3 The additional controls to be employed if a trigger level is exceeded are set out below:

- increase frequency of use of the road sweeper, both on-site and on local roads;
- temporary cessation of the activities responsible for causing the dust impact until the trigger level is no longer exceeded;
- use of additional dust suppression measures such as dampening of specific surfaces; and/or
- relocation of activities so that the distance between the source of emissions and the receptors is increased.

5.6 Noise

5.6.1 All plant and equipment used on the site to carry out the demolition will be suitably attenuated in accordance with the manufacturer's recommendations and the advice given in BS 5228-1:2009.

5.6.2 All available techniques will be used, such as concrete cutting and crushing, in preference to percussive or balling methods so as to minimize noise and vibration during site works. The use of blasting will not be permitted.

5.6.3 Demolition and construction activities will be carried out in accordance with 'best practicable means' (BPM) of Section 72 of the CoPA to minimise noise effects. Measures would follow guidance provided in BS 5228:2009+A1:2014 Part 1 including:

- The use of quieter alternative methods, plant and equipment, where reasonably practicable;
- Siting the construction compound (plant, equipment, site offices and storage areas) away from existing noise sensitive receptors, where reasonably practicable;
- The use of hoardings or portable acoustic enclosures/screens, where necessary (e.g. along the north and eastern boundaries of the site); and
- Maintaining and operating all vehicles, plant and equipment in an appropriate manner, to ensure that extraneous noise from mechanical vibration, creaking and squeaking is kept to a minimum.

5.6.4 Noise complaints will be investigated, and actions will be implemented to ensure repetition of the issues are avoided. In the event of complaints about noise, a noise monitoring programme will be undertaken by suitably qualified specialists. Logs of all noise monitoring will be kept within the Application Site files and will be made readily available for inspection. The following will be noted at each identified sensitive receptor when noise monitoring is being undertaken:

- time;
- weather conditions and wind direction;

- location of monitoring;
- background noise level; and
- LAeq dB reading over the relevant time period

5.7 Management of Demolition and Construction Waste

5.7.1 Waste generated during the demolition and construction process will be managed in accordance with the principles of the waste hierarchy (i.e. avoid, reduce, reuse, recycle, recover, disposal). The Site Waste Management Plan (SWMP) in Annex D sets out the types and estimated quantities of waste that would be generated from demolition and construction. Prior to works commencing, the SWMP will be updated by the Principal Contractor to refine the waste estimates and during construction will be used to record the movement of wastes from the site and how it is managed.

5.7.2 A pre-demolition audit of the existing buildings on the site will be undertaken to identify and remove hazardous materials and those materials with the potential for reuse or recycling. Existing areas of concrete hardstanding will be crushed and used as granular base material as appropriate either on or off-site. The management of demolition wastes will follow the Demolition Method Statement which has been submitted as part of the application.

5.7.3 A dedicated area will be provided on the Application Site to manage and provide temporary storage for waste generated during the demolition and construction process. Waste materials will either be separated at source into key materials or off site via a waste contractor. All waste will be transported and managed by appropriately licenced contractors and subject to duty of care.

5.7.4 Materials would be delivered to the site on a 'just-in-time' basis to minimise waste from damaged materials. Opportunities to use recycled-content materials in the construction process will be investigated.

5.7.5 At least 90% (by tonnage) OR 80% by volume of the non-hazardous demolition waste will be diverted from landfill.

5.7.6 The amount of construction waste generated will be limited to a maximum of 6.5 tonnes/100m^2 OR 12.9m^3/100m^2 per GIFA. At least 75% (by tonnage) OR 65% by volume of the non-hazardous construction waste will be diverted from landfill.

ANNEXES

Annex A

Summary of Legislation

Ecology and Nature Conservation

Wildlife and Countryside Act (WCA) 1981 (as amended);

Conservation of Habitats and Species Regulations 2017 (referred to as The Habitat Regulations);

Countryside and Rights of Way Act (CRoW) Act 2000 (as amended);

Natural Environment and Rural Communities (NERC) Act 2006.

Water Resources and Flood Risk

Environment Act 1995;

Environmental Damage and Liability (Prevention and Remediation) Regulations 2015;

Environmental Protection (Duty of Care) Regulations 1991 (as amended 2003); ·

Floods and Water Management Act 2010;

Land Drainage Act 1991;

The Environmental Permitting (England and Wales) Regulations 2010 (as amended 2016);

The Groundwater (Water Framework Directive) (England) Direction 2016;

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017; and ·

Water Resources Act 1991;

Air Quality

Ambient Air Quality Directive (2008/50/EC)

Air Quality Standards (England) Regulations 2010

Waste Management

Waste (England and Wales) Regulations 2011

Waste (England and Wales) (Amendment) Regulation 2014

Annex B

Pollution Incident Response Plan

1 INTRODUCTION

General

1.1 This Pollution Incident Response Plan has been prepared to support a planning application for the redevelopment of land at the National Data Centre, Old Burderop Hospital site, Brimble Hill, Wroughton, Swindon.

Purpose of the Report

1.2 The purpose of the Pollution Incident Response Plan is to identify the main risks of pollution occurring on the Application Site, to identify and implement appropriate pollution prevention measures, and to reduce the effects of any pollution incidents that may occur. The Plan applies to the construction phase of the proposed development and should be read in conjunction with the Code of Construction Practice

2 RESPONSIBILITIES

2.1 The Applicant and Principal Contractor would have overall responsibility for the construction of the proposed data centre. An Environmental Co-ordinator will be appointed and their main responsibility will be managing the environmental issues during construction.

2.2 For the purpose of the Pollution Incident Response Plan, the key roles are set out in Table 2.1 below. Additional roles and responsibilities will be developed as the detailed design progresses.

Table 2.1: Key Responsibilities

Details	Responsibilities
Environmental Co-ordinator	Ensuring pollution controls are implemented and communicated effectively. Investigating any incidents. Communicate learning from incidents Liaise with regulatory bodies.
Construction Staff and Workforce	Responding to a pollution incident in line with this plan and the procedure included within. Front line responsibility to enact requirements of the plan.
Applicant/Principal Contractor	Responsible for ensuring procedures are followed.

3 POLLUTION RISK ASSESSMENT

3.1 A preliminary pollution risk assessment has been undertaken to identify the main risks from the construction process. During the detailed design stage, the risk assessment would be updated as required.

3.2 The risk assessment will consider:

- the materials stored or transported and the condition of storage containers;
- effects of accidents, flooding, vandalism and failure of containment;
- location and proximity to local watercourses;
- surface water drains that flow off the site;
- areas of unsurfaced ground; and
- construction activities.

3.3 The table below sets out the materials that would be handled on site and activities that may be a hazard.

Table 3.1: Pollution Risk Assessment

Materials	Activities
Fuels/chemicals	Spillage during refilling (overfilling or poor handling)
	Damaged or leaking storage containers
	Equipment and containment failure
Sediment	Failure of pre-earthworks drainage
	Failure of settlement measures
	Working too close to Moor Ditch
	Collapse of stockpiles
Cementitious dust	Inappropriate storage containers

4 SITE DESIGN

Location and Layout of Construction Compounds

4.1 The temporary construction compound (including construction worker vehicle parking) will be located away from Burderop Woods SSSI and the areas of grassland to be retained in the north west corner of the Application Site.

4.2 Measures to protect water resources (including the storage of fuels, oils, wheel wash facilities, drainage, and surface water run-off) are set out in in the CoCP and will be implemented before and during the construction process.

4.3 Wheel wash facilities will be established at designated site locations, away from water courses and drains. Cleaning will be carried out in a bunded area and wastewater will either be recycled or discharged to foul sewer (with consent from the sewerage undertaker).

4.4 Designated areas will be provided within the compound for fuel/oil/chemical storage, waste storage and vehicle and plant refuelling. The storage areas will be provided with secondary containment and a drainage system.

5 POLLUTION INCIDENT RESPONSE PLAN

Response Plan

5.1 The Pollution Incident Response Plan sets out actions to be taken in the event of a pollution incident; the contact details of the emergency services and organisations that may need to be involved during or after an incident; and the pollution control equipment and devices and where they are located.

5.2 The Plan has been completed where information is available with final details added on appointment of the Principal Contractor and during the enabling works.

5.3 The Plan will be reviewed at least every three months and following a pollution incident to ensure that measures reflect the ongoing construction activities and include lessons learnt from any incidents.

Emergency Contacts

5.4 The organisations that would be contacted in the event of a pollution incident are listed in the table below. Where contact details are not included, these would be confirmed on appointment of the Principal Contractor.

Table 5.1: Emergency Contact Details

Organisation	Contact Details
Principal Contractor	
Environmental Co-ordinator	
Emergency services – Fire Brigade	999
Environment Agency	Incident hotline (24 hours): 0800 80 70 60
Swindon Borough Council	Environmental Health Department (24 hour) 01793 466453

Chemical Inventory

5.5 An up-to-date record of all substances stored on the Application Site would be maintained together with an estimate of the likely quantities stored and product data sheets. The location of drums, containers or bulk storage vessels used for storing potentially polluting chemicals would be identified on the site plan. The inventory would be made accessible to emergency responders.

Pollution Prevention Equipment Inventory

5.6 An outline inventory of pollution control equipment that will be provided on the Application Site is listed in the table below. The list of equipment will be updated as appropriate and the contact details of the staff trained in the use of the equipment (where relevant) will be included on appointment of the Principal Contractor

Table 5.2: Outline Inventory of Pollution Control Equipment

Equipment	Staff Trained in its Use
Spill kits	All construction staff
Drain mats/covers	
Pipe blockers	
Absorbents – e.g. sand	

Site Plan

5.7 On appointment of the Principal Contractor, a site plan will be prepared showing access routes and meeting points for emergency services; areas or facilities used to store raw materials, products and wastes; watercourses located within or near the site; and site drainage.

Actions

5.8 In the event of an actual or suspected pollution incident involving:

- spillage of oils or chemicals;
- a discharge of silty water or other pollutant into a watercourse;
- fire (emissions to air); firewater runoff
- discovery of potentially contaminated land

5.9 The following actions should be undertaken by the first person to observe an environmental pollution incident:

- stop the works.
- contain the problem if possible and do it safely
- notify immediately to the Environmental Co-ordinator.

5.10 Staff will be trained in the procedures which to follow if there is a pollution incident, in particular:

where the personnel protective equipment and pollution control equipment is stored;

how to use the equipment; and

the location of pollution incident response plan.

6 FIRE PLAN

6.1 Action to be taken in the event of fire:

- raise the alarm;
- call the Fire Brigade;
- on hearing the alarm, the area must be evacuated immediately and staff to assemble at the Muster point;
- visitors, clients and contractors to be escorted to the same assembly point;
- turn off generators, compressors and other powered equipment;
- turn off heat producing equipment and shut cylinder valve;
- attack fire with the equipment if it is safe to do so;
- obey instructions from the Office Fire Marshall or supervisory staff;
- do not re-enter the working area until told it is safe to do so.

6.2 If necessary, inform others who may be affected by effects of the fire (smoke near hospitals, schools etc)

6.3 The capacity of the construction surface water management system will be sufficient to contain within the site boundaries the water rejected by a fire truck, avoiding direct spillage of potentially contaminated material into nearby watercourses.

7 POLLUTION CONTROL OPTIONS

Pollution Hierarchy

7.1 This section identifies the options that may be used to manage a pollution incident. The options are presented in the order of the preferred response.

Preferred response	1. Contain at Source
	2. Contain close to the Source
	3. Contain on the Surface
	4. Contain in the Drainage System
Least preferred response	5. Contain on or in the Watercourse

Spill Response Plan

7.2 The preliminary pollution risk assessment has identified that the most likely causes of a pollution incident would involve:

- spillage of oils or chemicals;
- a discharge of sediment-laden water or other pollutant into a watercourse; or
- firewater runoff.

7.3 Pollution control equipment would be appropriate for the location of the Application Site and the chemical/substance it is being used to contain. For example, absorbent materials such as sand, spill granules, absorbent pads and booms will be kept at the construction compound, at refuelling areas and where fuel or oil is stored.

7.4 Following a pollution incident, used pollution control equipment (for example, spill kits) will be disposed of appropriately and new/replacement equipment would be provided.

7.5 Some of the key actions that would be included in the action plans are as follows:

Priority action plan to be implemented when possible: Contain at source

- Stop at source or as close as possible from the source (especially prior to the drainage system).
- Stop pollutant spreading by using oil booms, terram wrapped barriers, hay bales as applicable.
- Trace impacts further downstream to establish extent of pollution.
- Review the activity that caused the pollution prior to restarting work.

Least action plan to be implemented when it is impossible to contain the spill at source: Contain on or in a watercourse:

- Stop the flow at point of discharge
- Stop the flow spreading
- Dam the flow with earth/sand/polythene/absorbent material;
- Divert the flow from drains/watercourses where possible;
- Block off drains with drain covers or sandbags
- Check the site drainage plan- where will spill end up?

7.2 Discovery of Contaminated Land

7.1 The following procedure will be adhered to in relation to encountering previously unidentified contaminated land (including asbestos) during construction works:

- ensure personnel involved in the earthworks are briefed on the likely nature and type of soils that could indicate the presence of contamination (e.g. asbestos, discolouration, oils, odours, ash and clinker materials);
- if contamination is suspected, work will stop in this area and the Environmental Co-ordinator will be immediately contacted to inspect the material;
- testing of the material will be undertaken and the material will not be reused or removed until the results of the tests have been reviewed; and
- any contaminated materials will be managed in line with best practice.

8 TRAINING

8.1 All personnel must attend a site induction before commencing work on the site. The induction will discuss the Pollution Control Incident Response Plan and also include key environmental issues of the proposed development (as set out in the Code of Construction Practice (document reference 20305S-RPS-XX-XX-RP-P-9738)). The briefing will emphasise the methods and working practices employed for protection, including emergency procedures for reporting and dealing with environmental incidents.

8.2 All staff will receive relevant training on environmental issues throughout the construction of the project.

8.3 All method statements will include an environmental section and any specific pollution control and prevention information.

8.4 Drills of the procedures within this Pollution Incident Response Plan will be carried out regularly to ensure understanding.

9 MONITORING, REVIEW AND REPORTING.

9.1 Best practice measures to prevent pollution as set out in the Code of Construction Practice (document reference 20305S-RPS-XX-XX-RP-P-9738) will be implemented during the construction of the proposed development. Should a situation arise where the measures are not adequate, this plan will be reviewed. It will also be reviewed quarterly by the Environmental Co-ordinator to ensure it is up to date and accurate.

9.2 Any instances of pollution or spill will be reported immediately to the Environmental Co-ordinator who will investigate and communicate the investigation's conclusions to the project team to aid continuous improvement and to prevent reoccurrence of the event.

Annex C

Complaint Form

Date:		Time:	
Name and address of complainant:			
Tel no. of complainant:			
Time and date of complaint:			
Date, time and duration of offending dust:			
Location of dust, if not at above address:			
Weather conditions (i.e., dry, rain, fog, snow):			
Wind strength (light, steady, strong, gusting) or use Beaufort scale:			
Wind direction:			
Complainant's description of dust (e.g. colour, particle size):			
Has complainant any other comments about the dust?			
Are there any other complaints relating to the installation, or to that location? (either previously or relating to the same exposure)			
Any other relevant information:			
On-site activities at time the dust occurred:			
Operating condition at time nuisance dust occurred/identified.			
Actions taken:			
Form completed by		Signed	

Annex D

Site Waste Management Plan

Key Waste Forecasts (unit 1)

Construction Element	Material	Type of Waste	EWC Code	Target for re-use/recycle %
Demolition	Concrete	Non-hazardous	17 01 01	70%
	Steel		17 04 05	100%
	Wood		17 02 01	70%
	Glass		17 02 02	70%
	Plastic		17 02 03	70%
	Mixed metals		17 04 02	100%
	Gypsum-based construction materials		17 08 02	70%
Earthworks	Soil and stones	Non-hazardous	17 05 04	100%
Construction	Concrete	Non-hazardous	17 01 01	70%
	Steel		17 04 05	100%
	Tiles and ceramics		17 01 03	70%
	Wood		17 02 01	70%
	Glass		17 02 02	70%
	Plastic		17 02 03	70%
	Copper, bronze, brass		17 04 01	100%
	Mixed metals		17 04 02	100%
	Insulation materials		17 06 04	70%
	Gypsum-based construction materials		17 08 02	70%
Landscaping	Biodegradable waste	Non-hazardous	20 02 01	100%
Road works	Bituminous mixtures containing coal tar	Hazardous	17 03 01*	50%
	Bituminous mixtures other than those mentioned in 17 03 01	Non-hazardous	17 03 02	70%

Indicative Waste Estimates Data Sheet Template (To be completed pre-construction)

Waste Category & Type	EWC Code	Source of waste	Re-used on site	Re-used off site	Recycled on site	Recycled off-site	Recovered on site - use off site	Sent to a Permit exempt site	Sent to landfill site for disposal
			(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
INERT									
Sub TOTAL			0.00	0.00	0.00	0.00	0.00	0.00	0.00
NON-HAZARDOUS									
Sub TOTAL			0.00	0.00	0.00	0.00	0.00	0.00	0.00
HAZARDOUS									
Sub TOTAL			0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL VOLUMES			0.00	0.00	0.00	0.00	0.00	0.00	0.00

Indicative Waste Estimates Data Sheet Template (To be completed each time waste is removed off site/re-used on site)

Waste Category & Type	EWC Code	Date	Waste Transfer Note Y/N	Name of person collecting waste	Waste carrier registration number	Name & location of waste site	Permitted or exempt site	Permit number	Re used on site	Re used off site	Recycled on site	Recycled off-site	Recovered on site - use off site	Landfill	Load cost	Cost per tonne
									(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	£	£
INERT																
Sub TOTAL									0.00	0.00	0.00	0.00	0.00	0.00		
NON-HAZARDOUS																
Sub TOTAL									0.00	0.00	0.00	0.00	0.00	0.00		
HAZARDOUS																
Sub TOTAL									0.00	0.00	0.00	0.00	0.00	0.00		
TOTAL VOLUMES									0.00	0.00	0.00	0.00	0.00	0.00		

Total Waste Landfilled	Weight (tonnes)
Inert	
Non-Hazardous	
Hazardous	
Total	0.00

Appendix 4.1
Scoping Report and Scoping Opinion

BURDEROP PARK DATA CENTRE, SWINDON

Environmental Statement Scoping Report

OXF11742
December 2020
Final

rpsgroup.com

Approval for issue

Camilla Fisher	4 December 2020

Prepared by:

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GLOSSARY

Term	Definition
AADT	Annual Average Daily Traffic
AOD	Above Ordnance Datum
AONB	Are of Outstanding Natural Beauty
AQMA	Air Quality Management Area
BGL	Below Ground Level
BGS	British Geological Survey
BH	Borehole
BRE	Building Research Establishment
CoCP	Code of Construction Practice
CTMP	Construction Traffic Management Plan
Defra	Department of Environment, Food and Rural Affairs
EIA	Environmental Impact Assessment
ES	Environmental Statement
FRA	Flood Risk Assessment
HER	Historic Environment record
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
MV	Medium Voltage
MW	Mega Watt
NE	Natural England
NSR	Noise Sensitive Receptor
NVC	National Vegetation Classification
PRoW	Public Right of Way
SLM	Sound Level Meter
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Drainage Systems
ZTV	Zone of Theoretical Visibility

Contents

Tables

Figures

No table of figures entries found.

Appendices

1 INTRODUCTION

Introduction

1.1 This report has been prepared on behalf of a confidential client (hereafter referred to as the 'Applicant'). The report sets out the proposed scope of the Environmental Impact Assessment (EIA) for the proposed data storage facility at Burderop Park (hereafter referred to as the 'Application Site') as shown on Figure 1: Site Location and Environmental Constraints.

1.2 The proposed Data Centre (hereafter referred to as the proposed development) will include a single storey data centre building that will include a:

- data hall;
- associated electrical and AHU Plant Room;
- loading bay;
- maintenance and storage space;
- office administration area; and
- plant at roof level.

1.3 The proposed development will also include emergency generators, emission stacks and associated infrastructure.

1.4 This Scoping Report sets out the proposed approach and key issues to be included in the EIA process. The purpose of this document is to provide to Swindon Borough Council to enable a Scoping Opinion to be made under Regulation 15 of the Town and Country (Environmental Impact Assessment) Regulations 2017, as amended (hereafter referred to as 'the EIA Regulations'). A letter to the Council requesting such an opinion accompanies this report. It is also intended that this report will support future consultation by the Applicant with statutory and non-statutory consultees and stakeholders, building on consultation undertaken to date.

Purpose of EIA

1.5 EIA is the process of identifying and assessing the significant effects likely to arise from a proposed development. This requires comparing the likely changes to the environment (where these changes arise as a consequence of the proposed development) with the existing baseline conditions and the predicted future baseline conditions in the absence of the proposed development.

1.6 The process of identifying and agreeing the issues to consider within the Environmental Statement (ES) (the report of the EIA process) is known as scoping. Scoping is not a mandatory requirement; however, it is recognised as a useful means of identifying the main effects of a proposed development on the environment.

1.7 The identification of the main effects of a proposed development through scoping is an important preliminary procedure which sets the context for the study. Through the scoping exercise, the key environmental issues are identified at an early stage of the EIA process. This allows subsequent work to focus on those environmental topics for which significant effects may arise as a result of a proposed development.

Purpose of this Report

1.8 This report sets out the proposed scope of the ES, which will be prepared in accordance with the EIA Regulations. The ES will support the planning application to be submitted to Swindon Borough Council.

1.9 The intention of the scoping exercise is to gain agreements from all key parties on the scope of the assessment and the proposed methodology for gathering baseline information and undertaking the assessment.

1.10 This Scoping Report has been informed by the following:

- desk-top studies site visits and surveys;
- review of relevant websites, such as those provided by statutory consultees;
- local planning policy;
- the Screening Opinion from Swindon Borough Council (30 November 2020);
- the EIA Regulations and EIA good practice guidance; and
- environmental assessment experience of other similar developments.

Public Consultation

1.11 The Applicant has engaged the services of a communications company to undertake appropriate public consultation in advance of an application submission. As part of the proposed engagement, a Briefing Note has been prepared which will be circulated to key stakeholders, providing details of the proposal and further engagement intentions. Implementation of these consultation measures will be undertaken in due course as preparation of the planning application progresses

2 THE SITE AND THE PROPOSED DEVELOPMENT

The Site and its Surroundings

2.1 The Application Site is located at Burderop Park, approximately 980m from Wroughton, 1.2km south east of Swindon and 670m from the M4 motorway. The site location is shown on Figure 1: Site Location and Constraints.

2.2 The Application Site extends to 11.3 hectares (ha) however, the development area is approximately 5.53 ha. The Application Site is currently used as a data centre comprising three buildings: two buildings in the north east (known as Gamma and Beta) and one in the south (known as Alpha). The western area of the Application Site is currently undeveloped. The site as a whole supports an area of semi-improved calcareous grassland with scattered areas of trees, tall ruderal and ephemeral vegetation

2.3 The existing data centre was formerly used by Hewlett Packard, but the buildings are understood to be currently unoccupied. Prior to the construction of these buildings, the Application Site was formerly occupied by a military hospital, telephone exchange and office building. These buildings were demolished in the 1980s and early 1990s and replaced by the existing data centre buildings.

2.4 The Application Site appears generally flat. Existing gradients vary across the site between 170m and 178mAOD, however in the north western area gradients are generally between +/-4% slope and locally up to +/-10% slope.

2.5 The Application Site is located within a rural setting, surrounded predominantly by countryside/recreational land, with some residential and industrial businesses located to the south and west. Burderop Park is located directly south of the Application Site. It is a private agricultural and sporting estate with a house and garden which are open to the public; limited commercial space and a converted barn used as an exhibition centre.

2.6 The Application Site is located within the North Wessex Downs Area of Outstanding Natural Beauty (AONB) and adjacent to the Burderop Woods Site of Special Scientific Interest (SSSI).

Project Description

Key Elements of the Proposal

2.7 This application seeks consent for a data centre containing:

- data hall, associated electrical and AHU Plant Room, loading bay, maintenance and storage space, office administration areas and plant at roof level,
- emergency backup generators and emission stacks, diesel tanks and filling area,
- associated infrastructure including:
  - electrical switchroom,
  - a water sprinkler pump room and storage tank,
  - a security gatehouse ,
  - site access and internal access roads;
  - hard and soft landscaping;
  - a rainwater infiltration pond;
  - cycle shelter;

- waste bin store;
- process water tank;
- MV Room; and
- Intermediate power supply.

2.8 The storage capacity requirement of the infiltration pond based on a 1 in 100-year event with 40% climate change allowance is approximately 2,100m^3 assuming no infiltration. However, the attenuation storage requirement is reduced to 1,000m^3 where infiltration is possible (based on a 1 in 10-year rainfall event). The infiltration capacity of the Application Site will be confirmed via testing in accordance with the Building Research Establishment (BRE) methodology set out in Digest 365: Soakaway Design (BRE, 2016).

2.9 Buildings Beta and Gamma will be demolished in order to accommodate the proposed development. Building Alpha falls within the application boundary and will be retained however, it will remain non-operational. Internal works are proposed to remove redundant equipment, furniture and fittings from the building. Works will also be undertaken to secure the external structure prior to the works on the rest of the site. A modification to the internal access road to building Alpha is also proposed. These activities are not included in the application for the proposed development.

Data Centre Building

2.10 The proposed Data Centre building will be single storey and the parameters are set out below.

Table 2.1: Data Centre Parameters

Data Centre Parameters	
Whole site area	11.3 hectares
Development area	5.53 hectares
Building area (GEA)	Data Centre accommodation consists of: • Technical spaces 6,671 m^2 • Office and personnel space 2,012 m^2 • TOTAL: 8,683m^2
Building dimensions	12 m height (including roof mounted equipment) 139.2 m length 67.3 m width

2.11 Internally, the Data Hall layout is primarily driven by the process of cooling internal equipment during operation. Free Cooling is used as the primary means of cooling for the Data Hall. External air is drawn via the sides of the Data Centre building before being distributed in the Data Hall. A high-level return plenum transfers the warmed air either to roof mounted plant to discard or recirculates the air to the cooling equipment depending on the seasonal cooling requirements of the building. During peak summer temperatures, the outside air cooling is supplemented by an evaporative cooling system.

Power Generation

2.12 The building will be served by a direct connection to the National Grid and will be distributed via the Medium Voltage (MV) intake building and transformers.

2.13 In the event of a power failure (i.e. the emergency scenario), back-up power will be provided by the emergency diesel generators. There will be 11 generators, each within an individual acoustic enclosure and an individual associated flue stack. Diesel will be stored on site and the compound will be served by a main top-up tank holding approximately 40,000 litres. Each generator will also have an associated belly tank with a capacity of approximately 16,000 litres. All tanks will be above ground and double skinned. The pipelines from the top-up tank to the belly tanks will also be above ground. The top-up tank will be contained within a concrete bund with a capacity of 110% of the storage capacity of the tank. Each belly tank is containerised and self-bunded to contain 110% of the storage capacity of the tank. All tanks will comply with the Oil Storage Regulations 2015 (as amended). Leak detection will be provided at key points as well as a fuel monitoring system.

2.14 The generators will also be used during periodic testing which would take place on the following frequency:

- each generator tested seperately at 25% load for a maximum of 0.5 hour every two weeks per year (i.e. 13 hours per generator per year);
- subject to maintenance needs, there will also be approximately one hour of testing each generator per quarter following preventative maintenance and replacement of some critical components (i.e. four hours per generator per year); and
- each generator tested seperately at 100% load for 1.5 hours twice a year (i.e. three hours per generator per year).

2.15 All testing will only occur between 8am and 5pm, Monday to Friday

2.16 The operation of these emergency back-up features will be regulated by an Environmental Permit under the separate consenting regime within the context of the Industrial Emissions Directive (IED) and Environmental Permitting Regulations.

Table 2.2: Power Generation Parameters

Power Generation Parameters	
MV Compound Building	5.8 m height 20.9 m length 18 m width
MV Room	6.9 m height 20.6 m length 12.5 m width
Temporary MV Compound	4.0 m height 10.0 m length 8.6 m width
Generators	10 of 2.4 MW capacity 1 of 1 MW capacity
Flue height	15 m
Surface water infiltration area	2,100 m^2 (approximate)
Sprinkler pumphouse	4.8 m height 8.8 m length 9.4 m width

Ancillary Facilities

2.17 The proposed development would be supported by a number of ancillary facilities

Table 2.3: Ancillary Facilities Parameters

Ancillary Facilities Parameters	
Surface water infiltration area	2,100 m^2 (approximate)
Sprinkler pumphouse	4.8 m height 8.8 m length 9.4 m width
Water tanks	6 m height
Security Gatehouse	4.2 m height 11.0 m length 6.9 m width

Site Access and Parking

2.18 The Application Site is currently served by one access point via a private road leading from Brimble Hill Road (B4005) which is adjacent to the part of the site's western boundary. The private road has entry barriers restricting access into the site.

2.19 The Application Site will include a controlled access enclosure involving a series of secure barriers, electronic bi-fold gates and an intercom system linked to the Security Gatehouse. The gated access is close to its junction with Brimble Hill Road.

2.20 Vehicles accepted on to the site will then pass via the gates and pass the Security Gatehouse. Those vehicles rejected from site will exit back onto Brimble Hill Road.

2.21 An area of surface car parking will be provided comprising up to 35 car parking spaces, including three accessible spaces. Electric vehicle charging points and covered cycle spaces will also be provided.

Landscaping

2.22 The proposed development will include an area of landscape planting, including a grassed area, trees and shrubs, together with drainage infrastructure. A landscape strategy will illustrate the areas of proposed planting and will support the application.

Construction

2.23 Demolition of the existing buildings in the north east of the site (i.e. Beta and Gamma) will be required prior to construction. The existing topography is around 175 to 177 m AOD in the proposed area of the data centre building, and some cut and fill will be required to develop a suitable development platform.

2.24 There are two key phases prior to first operation – the 'Construction' phase and the 'Installation and Commissioning' phase, which will start once construction is complete and is expected to run concurrently with the day to day use of the site over time, prior to and after first operation.

- Construction - The construction phase of the development will last for approximately 9 to 12 months. At the end of that period all external construction activities and civils work will have been completed, including:
  - hard and soft landscaping;
  - security and access areas;
  - perimeter fencing;
  - internal access roads and car parking areas;

  - drainage and attenuation; and
  - the shell and core construction of the main data centre building and administration block.
- Installation and Commissioning phase (post-construction) - Once all external construction activities and civils work are complete a further phase of commissioning work will continue. The commissioning phase will likely be carried out in a number of stages over time, as additional data rooms are brought online. Note the Applicant will not fully deploy all the IT and data storage equipment across the entire facility;instead the data servers are deployed on a phased-basis, determined by customer demand. The time-gaps between the phased deployment can be months.Each installation and commissioning stage involves:
  - internal installation of the IT equipment (data servers, network equipment, caballing etc) within the data hall rooms.
  - a process of verification and testing, to ensure the installed equipment meets the operators requirements;
  - validation of systems and processes, and system stress testing;
  - delivery and installation of the approved backup generator sets as subsequent data rooms are brought on line, on pre-installed concrete plinths; and
  - delivery and installation of cooling equipment (to ensure the data hall operates at an efficient and optimum ambient temperature).

2.25 This Installation and Commissioning phase will not generate significant levels of noise and traffic over predicted operational levels and will have no 'construction' type impacts. All activities will be carried out inside the building and will be indistinguishable from the normal operating conditions of the Application Site. The exception to this will be installation of generator sets for the additional data rooms, which will be installed outside this construction period. However, the principal foundations for each generator set will be built during the main construction period as described above.

Operation

2.26 The proposed development is expected to create a number of direct and indirect employment opportunities in addition to contributing induced employment to the local economy. The proposed development is provisionally estimated to have between 40 and 50 staff across a 24-hour period.

2.27 Whilst the proposed development will operate 24 hours a day, the majority of staff will be present during normal office hours. A team of key engineering staff and security team will be required 24 hours a day; this involves approximately 10 personnel on a shift basis.

2.28 Traffic relating to staff movements are described in Section 3 of this report.

Decommissioning

2.29 The lifespan of the proposed development is not defined but it is anticipated that it will be at least 10-20 years. It is likely that regular maintenance and periodic upgrading of the facility over time will enable it to continue to meet future demands.

2.30 Upon closure all buildings, plant, equipment, drainage networks etc at the Application Site will be decommissioned in accordance with prevailing best practice. Once rendered environmentally safe, the buildings will more than likely be retained and sold on for future use following closure.

3 GENERAL APPROACH TO EIA

Requirement for Environmental Impact Assessment

3.1 The legislative framework for EIA is set by European Directive 2011/92/EU, as amended by Directive 2014/52/EU (collectively referred to as the EIA Directive). Directive 2014/52/EU requires Member States to transpose its requirements into national law by 16 May 2017 and set out arrangements for a transitional period from the regime laid down by Directive 2011/92/EU.

3.2 The EIA Directive requires an EIA to be completed in support of an application for development consent for certain types of project. For projects of this type in England, the European legislative requirements are transposed into law by the EIA Regulations.

3.3 The process of identifying whether or not EIA is required for a development is known as screening. Projects of the type listed in Schedule 1 of the Regulations require EIA in all cases. Projects of the type listed in Schedule 2 may require EIA in certain circumstances.

3.4 The proposed development would fall under Schedule 2, Part 10 (a) – industrial estate development projects. The threshold for Part 10(a) development is:

- The area of the development exceeds 0.5 hectares.

3.5 The proposed development area extends to 5.53 hectares and therefore, exceeds the 0.5 hectare threshold. On this basis, the proposed development would be a Schedule 2 development.

3.6 A request for a Screening Opinion was submitted to Swindon Borough Council on 2 October 2020. The Screening Opinion was returned on 30 November 2020 and confirmed that '*the scale of the development is such that it is likely to have a significant impact upon the environment*.' The basis for this decision was due the potential likely significant effects on statutorily designated nature conservation sites and that further assessment is required. A response to the points raised in the Screening Opinion and how they will be addressed in the ES is set out in Section 4 of this report.

Information Required

3.7 Although there is no statutory provision as to the form of an ES, it must contain the information specified in Regulation 18(3), including any relevant information specified in Schedule 4 of the EIA Regulations, as set out below:

1. *A description of the development including in particular:*
    a. *A description of the location of the development;*
    b. *A description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;*
    c. *A description of the main characteristics and the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the minerals and natural resources (including water, land, soil and biodiversity) used;*
    d. *An estimate, by type and quantity, of expected residues and emissions (such as water, air, soils and sub soil pollution, noise, vibration, light, heat, radiation and quantities and types of waste) produced during the construction and operation phases.*
2. *A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the*

proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen opinion, including a comparison of the environmental effects;

3. *A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.*
4. *A description of the factors specified in regulation 4(2) likely to be significantly affected by the development; population, human health, biodiversity (for example fauna and flora), land, (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaption), material assets, cultural heritage, including archaeological aspects, and landscape.*
5. *A description of the likely significant effects of the development on the environment resulting from, inter alia:*
    a. *The construction and existence of the development, including, where relevant, demolition works;*
    b. *The use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;*
    c. *The emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;*
    d. *The risks to human health, cultural heritage or the environment (for example due to accidents or disasters);*
    e. *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;*
    f. *The impact of the project on climate (for example the nature and magnitude if greenhouse gas emissions) and the vulnerability of the project to climate change;*
    g. *The technologies and the substances used*.

The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project, including in particular those established under Council Directive 92/43/EEC(a) and Directive 2009/147/EC(b).

6. *A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.*
7. *A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.*

8. *A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU(c) of the European Parliament and of the Council or Council Directive 2009/71/Euratom(d) or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.*
9. *A non-technical summary of the information provided under paragraphs 1 to 8.*
10. *A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.*

3.8 The information supplied in the ES will provide a clear understanding of the likely significant effects of the proposed development upon the environment. The following sections outline the overall approach to EIA in order to meet these legal requirements.

Structure of the Environmental Statement

3.9 The ES will be structured logically, enabling all relevant environmental information to be found quickly and easily. The ES will describe the EIA process and its findings and will include the following sections.

- Non-Technical Summary (as a stand-alone document);
- Written Statement;
- Figures and
- Appendices.

EIA Methodology

Relevant EIA Guidance

3.10 The EIA process will take into account relevant government or institute guidance, including:

- Department for Communities and Local Government (2014) Planning Practice Guidance at http://planningguidance.planningportal.gov.uk;
- Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements. HMSO;
- Highways England et al. (2019) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 4. LA 104;
- Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment;
- Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report;
- Institute of Environmental Management and Assessment (2015a) Environmental Impact Assessment: Guide to Shaping Quality Development;
- Institute of Environmental Management and Assessment (2015b) Climate Change Resilience and Adaptation;

- Institute of Environmental Management and Assessment (2016) Environmental Impact Assessment: Guide to Delivering Quality Development;
- Institute of Environmental Management and Assessment (2017) Environmental Impact Assessment: Assessing Greenhouse Gas Emissions and Evaluating their Significance; and
- Institute of Environmental Management and Assessment (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach.

3.11 Other topic-specific specialist methodologies and good practice guidelines will be drawn on as necessary.

Key Elements of the General Approach

3.12 The assessment of each environmental topic will form a separate chapter of the ES. For each environmental topic, the following will be addressed:

- methodology and assessment criteria;
- description of the environmental baseline (existing conditions);
- identification of likely effects;
- evaluation and assessment of the significance of identified effects, taking into account any measures designed to reduce or avoid environmental effects which form part of the project and to which the developer is committed; and
- Identification of any further mitigation measures envisaged to avoid, reduce and, if possible, remedy adverse effects (in addition to those measures that form part of the project).

Methodology and Assessment Criteria

3.13 Each topic chapter will provide details of the methodology for baseline data collection and the approach to the assessment of effects. Details of the proposed approach for each topic are provided in Section 5 of this Scoping Report. Each identified environmental topic will be considered by a specialist in that area. The identification and evaluation of effects will take into account relevant topic-specific guidance where available.

Description of the Environmental Baseline

3.14 The existing and likely future environmental conditions in the absence of the proposed development are known as 'baseline conditions'. Each topic-based chapter will include a description of the current (baseline) environmental conditions. The baseline conditions at the Application Site and within the study area form the basis of the assessment, enabling the likely significant effects to be identified through a comparison with the baseline conditions.

3.15 The baseline for the assessment of environmental effects will primarily be drawn from existing conditions during the main period of the EIA work. Consideration will also be given to any likely changes between the time of survey and the future baseline for the construction and operation of the project. In some cases, these changes may include the construction or operation of other planned developments in the area. Where such developments are built and operational at the time of writing and data collection, these will be considered to form part of the baseline environment. Where sufficient and robust information is available, such as expected traffic growth figures, other future developments will be considered as part of the future baseline conditions. In all other cases, planned future developments will be considered within the assessment of cumulative effects.

3.16 The consideration of future baseline conditions will also take into account the likely effects of climate change, as far as these are known at the time of writing. This will be based on information available from the UK Climate Projections project (UKCP18), which provides information on plausible changes in climate for the UK (Environment Agency and Met Office, 2018) and on published documents such as the UK Climate Change Risk Assessment 2017 (Committee on Climate Change, 2016).

Assessment of Effects

3.17 The EIA Regulations require the identification of the likely significant environmental effects of the proposed development. Each topic chapter will take into account both the sensitivity of receptors affected and the magnitude of the likely impact in determining the significance of the effect.

Sensitivity or Importance of Receptors

3.18 Receptors are defined as the physical resource or user group that would be affected by a project. The baseline studies will identify potential environmental receptors for each topic and will evaluate their sensitivity to the proposed development. The sensitivity or importance of a receptor may depend, for example, on its frequency or extent of occurrence at an international, national, regional or local level.

Magnitude of Impact

3.19 Impacts are defined as the physical changes to the environment attributable to the project. For each topic, the likely environmental impacts will be identified. The magnitude of the impact will be described using defined criteria within each topic chapter.

3.20 The categorisation of the impact magnitude may take into account the following four factors:

- extent;
- duration;
- frequency; and
- reversibility.

3.21 Impacts will be defined as either adverse or beneficial. Depending on discipline, they may also be described as:

- direct, i.e., they arise from activities associated with the project. These tend to be either spatially or temporally concurrent; or
- indirect, i.e. impacts on the environment which are not a direct result of the project, often produced away from the project site or as a result of a complex pathway.

3.22 Impacts will be divided into those occurring during the construction phase, during operation and those occurring during decommissioning. Where appropriate, some chapters may refer to these as temporary and permanent impacts.

Significance of Effects

3.23 Effect is the term used to express the consequence of an impact (expressed as the 'significance of effect'), which is determined by correlating the magnitude of the impact to the sensitivity of the receptor or resource.

3.24 The magnitude of an impact does not directly translate into significance of effect. For example, a significant effect may arise as a result of a relatively modest impact on a resource of national

value, or a large impact on a resource of local value. In broad terms, therefore, the significance of the effect can depend on both the impact magnitude and the sensitivity or importance of the receptor.

3.25 Levels of significance that will be used in the assessment include, in descending order:

substantial;

- major;
- moderate;
- minor; and
- neutral.

3.26 Where an effect is described as 'neutral' this means that there is either no effect or that the significance of any effect is considered to be negligible. All other levels of significance will apply to both adverse and beneficial effects. These significance levels will be defined separately for each topic within the methodology sections. In all cases, the judgement made as to significance will be that of the author of the relevant chapter with reference to appropriate standards/guidelines where relevant.

Cumulative Effects

3.27 The cumulative effects of the proposed development in conjunction with other proposed schemes will be considered. The cumulative effects assessment will consider any developments that are formally in the planning system at the time of submission. Developments that are built and operational at the time of assessment will be considered as part of the baseline. A list of proposed developments and planning policy allocations to be included within the cumulative assessment is provided in Appendix A. Swindon Borough Council will be consulted on the development types that might have an effect in combination with the proposed development.

Mitigation Measures

3.28 The EIA Regulations require that where significant effects are identified 'a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce or, if possible, offset likely significant adverse effects on the environment' should be included in the ES.

3.29 The development of mitigation measures is part of an iterative EIA process. Therefore, measures will be developed throughout the EIA process in response to the findings of initial assessments. The project that forms the subject of the planning application will include a range of measures designed to reduce or prevent significant adverse environmental effects arising, where practicable. In some cases, these measures may result in the enhancement of environmental conditions. The assessment of effects will therefore, take into account all measures that form part of the proposed development and to which the Applicant is committed.

3.30 The topic chapters will, therefore, take into account all measures that form part of the proposed development, including:

- embedded measures included as part of the project design (sometimes referred to as primary mitigation);
- measures to be adopted during construction to avoid and minimise environmental effects, such as pollution control measures. These measures would be implemented through a Code of Construction Practice (CoCP) to be submitted in support of the application; and
- measures required as a result of legislative requirements.

3.31 Where required, further mitigation measures will be identified within topic chapters. These are measures that could further prevent, reduce and, where possible, offset any residual adverse effects on the environment.

3.32 In some cases, monitoring measures may be appropriate, for example, to ensure that proposed planting becomes established. Where appropriate, monitoring measures will be set out in the topic chapters.

Summary Tables

3.33 Summary tables will be used to summarise the effects of the project for each environmental topic. These will be presented at the end of each of the topic chapters.

4 SCOPE OF ASSESSMENT

Work Undertaken to Date

4.1 The following surveys have been undertaken in relation to the proposed development:

- Phase 1 Habitat Survey;
- reptiles survey;
- dormouse survey;
- bat activity survey;
- bat roost survey;
- National Vegetation Classification;
- badger survey
- tree survey;
- landscape photographic survey based on a Zone of Theorectical Visibility (ZTV);
- heritage site visit ;
- baseline noise survey;
- infiltration testing; and
- Phase II ground investigation.

4.2 Information on baseline conditions was also obtained from a due diligence report undertaken for the Applicant in July 2020, for the Application Site which included air dispersion modelling, Phase II ground investigation, flood risk modelling, sound and vibration modelling, topographic survey and existing utility survey.

4.3 The following studies have been undertaken or are currently ongoing to assess the potential impacts of the proposed development:

- Flood Risk Assessment;
- Outline Drainage Strategy;
- heritage assessment;
- aboricultural impact assessment;
- landscape and visual impact assessment;
- noise impact assessment;
- stack height determination assessment;
- construction dust assessment;
- transport assessment; and
- Phase 1 Risk assessment.

Response to Screening Opinion

4.4 The Screening Opinion has been used to inform the scope of the ES. The impacts of the proposed development where significant effects are considered likely or where it is unknown if significant

effects are likely to occur have been set out in the table below together with a response of how the points will be addressed.

Table 4.1: Response to Screening Opinion

Screening Opinion Potential Impacts	Is a Significant Effect Likely	How/Where will this be Addressed
Natural Resources – high quality or scarce resource that could be affected *'the proposal is on an already partly developed site which is outside the SSSI and would not extend into it. Only limited information has been provided with regard to the species within the site or the neighbouring woodland. Normal construction management methods may limit the impact. Natural England and the Council's consultant Ecologist is that there are potential likely significant effects on statutorily designated nature conservation sites or landscapes and further assessment is required*'.	Yes	Environmental Statement – Chapter 6 (Ecology and Nature Conservation) – the proposed scope of the chapter is set out in section 5 of this report.
Natural Resources – physical changes in the topography of the area *'Photomontages have been submitted which suggest that the building would be visible from some locations within the AONB. Whilst these are from a distance, they do not demonstrate that a significant effect on the appearance of the wider area would be avoided at certain times of the year*'.	Not known	Environmental Statement – Chapter 5 (Landscape and Visual Effects) - the proposed scope of the chapter is set out in section 5 of this report.
Pollution and Nuisances – release of pollutants or any hazardous toxic or noxious substances to air '*Air quality assessments would be required with regard to the potential of emissions. Whilst some evidence has been provided it does not definitively demonstrate that such emissions would not result in significant effects on sensitive receptors, particularly within the SSSI'*.	Not known	An Air Quality Assessment has been undertaken and would accompany the Environmental Statement. Potential air quality impacts on the SSSI would be assessed within Chapter 6 (Ecology and Nature Conservation) of the Environmental Statement - the proposed scope of the chapter is set out in section 5 of this report.
Pollution and Nuisances – release of heat from the project '*Heat will be generated by the building and this is likely to be significantly greater that the existing building given its greater scale. This is a concern and whilst there is the potential to prevent this heat effecting the SSSI and given its location and the existence of an existing building in the same use, this may not result in a significant effect but information to demonstrate this has not been provided.*'	Not known	Heat generated from the operation of the building is described in Section 4 of this report. Significant adverse effects are considered unlikely and it will be scoped out of the Environmental Statement.
Biodiversity (Species and Habitats) – protected ecological areas located on or around the site that could be affected	Not known	Environmental Statement – Chapter 6 (Ecology and Nature Conservation) - the

Screening Opinion Potential Impacts	Is a Significant Effect Likely	How/Where will this be Addressed
'*Given that the site is already in use, the operation of the new building may not have a greater effect on the surroundings. However, the building would be substantially larger and the impact on the SSSI has not been clearly set out*.'		proposed scope of this chapter is set out in section 5 of this report.
Biodiversity (Species and Habitats) – any protected, important or sensitive species that could be affected '*Potential ecological impacts of the proposed development are pollution during construction and operation, loss of habitat and disturbance of protected species. Given the containment of the site and with an appropriate construction management plan in place, the impact may not be sufficient to result in a significant effect. However, full assessments have not been completed so this is a matter that remains unresolved given the information submitted*.'	Not known	Environmental Statement – Chapter 6 (Ecology and Nature Conservation) - the proposed scope of this chapter is set out in section 5 of this report.
Landscape and Visual – areas or features on or around the site protected for their landscape and scenic value '*The building will be substantially larger than the existing and higher but set more centrally within the site. Photomontages suggest that it will be visible from sensitive sites within the AONB and whilst a significant distance away, although there may not be a significant effect on the wider landscape, this needs to be considered in the winter months. It would also require a sensitive lighting scheme. The applicants are preparing an LVIA to support the application but in advance of this being completed and fully assessed, it cannot be assumed that the proposal would not have a significant effect*.'	Not known	Environmental Statement – Chapter 5 (Landscape and Visual Effects) - the proposed scope of this chapter is set out in section 5 of this report.
Cultural Heritage/Archaeology – any areas or features protected for their cultural heritage or archaeological value or non-designated features of importance that could be affected by the project. '*Given the screening between the two sites* [Burderop Park] *and the approved residential development that would be located close to the listed properties, development may not have a direct effect on them. It would however fall within their close setting and forms part of their original surrounds and functional space. It would reduce the openness of the wider setting of the house, albeit that this will be undermined to some extent by the development already approved and the setting already contains existing smaller data centre buildings. It is not clear what the impact on the footpath* [the track to the side of the site which is a non-designated heritage asset] *will be given the size and position of the new building which will need to be considered during the winter months*'.	Not known	Environmental Statement – Chapter 7 (Historic Environment) - the proposed scope of this chapter is set out in section 5 of this report.

Topics Scoped out of the Assessment

4.5 Taking into account the findings of the above surveys, together with the knowledge of the Application Site and surrounding area, it is proposed that the following topics do not form part of the impact assessment scope of the ES. However, technical reports for noise and vibration, air quality, traffic and transport, hydrology and flood risk and ground conditions will append the ES setting out the work undertaken and the proposed mitigation measures.

- land use, agriculture and recreation;
- socioeconomics and community;
- noise and vibration;
- air quality;
- traffic and transport;
- hydrology and flood risk;
- geology and ground conditions;
- human health;
- climate change;
- daylight, sunlight and microclimate;
- material assets;
- major accidents and disasters;
- residues and emissions;
- waste; and
- radiation and heat.

4.6 Details on why these topic areas have been scoped out of the assessment are provided in the following sections.

Land Use, Agriculture and Recreation

4.7 The Application Site is entirely located within an area of 'Non-agricultural land: land predominantly in urban use', as defined by the Provisional Agricultural Land Classification by Natural England (2020). The Application Site currently comprises buildings, areas of hard standing, grassland and some scattered trees. On this basis, it is considered that there would be no significant effects in relation to land use and soils.

4.8 There are no Public Rights of Way (PRoW) or public access within or adjacent to the Application Site. The nearest PRoW is a bridleway (reference WR36) approximately 17m east.

4.9 The construction of the proposed development would not result in the loss of any agricultural land. The proposed development would not result in the loss or diversion of any recreation facilities. On this basis, further consideration of land use or recreation is considered unnecessary.

Socioeconomics and Community

4.10 The main employment opportunities will be provided during the construction phase: on average approximately 275 jobs will be available, and this may rise to 400 during the peak construction period. The type of construction jobs available will vary according to the phase of construction but a number of these are likely to be specialist in nature. There is likely to be temporary beneficial effects to the local economy both through direct employment and through local expenditure of the workforce.

4.11 During operation, the proposed development will directly generate approximately 40-50 new jobs, excluding external staff, maintenance contractors and visitors. The proposed development will operate 24 hours a day, however the majority of staff will be present during normal office hours. A team of key engineering staff and security team will be required 24 hours a day; this involves approximately 10 additional personnel working on a shift basis.

4.12 The proposed development will not result in any effects on recreational or community facilities in the local community.

4.13 Given the predicted levels of employment and absence of impacts on community facilities as a result of the proposed development, significant adverse effects are unlikely to occur.

Human Health

4.14 Effects on human health could include those associated with construction dust emissions, traffic and noise. The proposed development is not likely to generate significant construction traffic flows: construction traffic that is generated will be managed through measures such as restricting access for Heavy Good Vehicles (HGV). The effect of dust generated by proposed future demolition of the buildings in the north east would be controlled by standard control measures. Best practice measures will be implemented during the construction phase to manage noise and air quality impacts in accordance with a Code of Construction Practice (CoCP).

4.15 During operation, traffic levels are predicted to be lower than those during the construction process and therefore, significant adverse impacts are considered unlikely.

4.16 The main source of air emissions from the proposed development during operation is from the emergency generators. The design of the stacks has been informed by a stack height determination assessment to ensure effective mitigation for air quality. An environmental permit will be in place to manage the operation of the generators and the associated air emissions. The operation of the proposed data centre on nearby noise sensitive receptors has been assessed as not significant and appropriate measures will be put in place to ensure noise is within regulatory standards (see the noise and vibration section below).

4.17 Significant effects on human health impacts are considered unlikely and, on that basis, a human health appraisal is not considered to be necessary.

Noise and Vibration

4.1.1 There is an area of woodland adjacent to the north of the Application Site, the other neighbouring uses are agricultural. There are a few individual houses and small clusters of houses in the vicinity. There is also planning permission for a residential development located directly to the south occupying part of Burderop Park. Locations of the Noise Sensitive Receptors (NSRs) are listed below:

- Lodge Farm, approximately 240m to the east of the Application Site;
- Burderop Barns, approximately 28 m to the south of the Application Site;
- Burderop Farm House, approximately 450m to the south east of the Application Site; and

- consented residential development on Land at Burderop Park; located approximately 40m to the south of the Application Site.

4.18 An assessment of the noise from the facility has been carried out in accordance with BS 4142:2014+A1:2019 which is the nationally recognised standard and was agreed to be the appropriate methodology with Swindon Borough Council. A baseline acoustic survey was undertaken. Representative baseline sound levels have been determined through a combination of long-term monitoring on the Application Site and short-term monitoring at locations close to the nearest residential properties.

4.19 One long term monitor (LT1) was installed on the southern boundary of the Application Site at a similar distance from the B4005 Brimble Hill to the consented residential development on Land at Burderop Park. Measurements were recorded between 14:30 hrs on 14 October 2020 and 12:00 hrs on 21 October 2020.

4.20 A second long-term monitor (LT2) was installed on the eastern boundary of the Application Site, at the closest part of the site to Lodge Farm. Measurements were recorded between 15:00 hrs on 14 October 2020 and 12:15 hrs on 21 October 2020.

4.21 Sound level measurements were carried out using a 'Class 1' Rion NL-52 sound level meter (SLM) in accordance with BS 7445-2:1991(BS, 1991), with the microphone mounted on a pole at around 1.5 m above local ground level.

4.22 An acoustic model was built of the proposed facility for normal worst-case operations; testing of back-up generators and for the rare case of a major grid power failure with all generators running. Initial modelling results are presented below but further work is ongoing as the designs are refined.

4.23 During normal operation and generator testing, predicted operational noise levels at NSRs would be well below the prevailing background sound levels; would be well below the thresholds at which critical health effects would occur according to guidance published by the World Health Organisation; and would only result in a small increase to existing baseline ambient sound levels. Furthermore, noise from the proposed development would be similar in character to other operational facilities in the vicinity. On this basis, the noise impacts for general operation of the proposed development are anticipated to be negligible.

4.24 Noise from the generators has been mitigated and reduced to a minimum by locating the generators in enhanced acoustic enclosures. These enclosures are a higher-performance specification than the Applicant typically uses (reducing the sound emissions by over 33%). Notwithstanding this, in the event of a major grid failure, if all emergency generators are required, the noise impact would be greater during the night-time. Further acoustic modelling is being completed to assess this.

4.25 However, due to the rare likely occurrence of the emergency scenario, National Grid reliability (the overall reliability of supply for the National Grid Electricity Transmission (NGET) System during 2018 – 2019 was 99.999984%) and the in-built redundancy and infrastructure maintenance systems, this is unlikely to occur in practice and/or for any length of time and should therefore be considered acceptable. The Applicant also has a rigorous internal process for equipment inspection and preventative maintenance with the objective of avoiding the use of the emergency generators. The Applicant is also investigating the need for further mitigation to reduce sound emissions during the rare emergency scenario.

4.26 Traffic generation associated with construction is predicted to be relatively low. Working hours during the construction phase would be agreed with Swindon Borough Council and set out in the CoCP, and construction activities would be required to implement best practicable means (e.g. selection of quietest possible equipment during construction, switching off engines) to minimise noise levels.

4.27 On the basis of the above (and the ongoing acoustic modelling to refine the engineering design and mitigation), it is considered that the development complies with national planning policy in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE) and Planning Practice Guidance for Noise (PPGN); and policy ENV7 of the Swindon Borough Local Plan 2026. Therefore, it is considered unlikely for significant adverse effects to occur as a result of the proposed development with respect to noise. On this basis, noise and vibration is scoped out of the EIA but the technical report will be appended to the ES to demonstrate that no significant adverse effects will occur.

Air Quality

4.28 The Application Site is located within the administrative area of Swindon Borough Council. The council has designated an Air Quality Management Area (AQMA) for Kingshill Road, approximately 3.7 km to the north west of the Application Site. The AQMA is highly unlikely to be affected by emissions to air from the proposed development.

4.29 Potentially sensitive receptors in the vicinity of the proposed development include residential dwelling(s) (existing and proposed) at Burderop Park to the south and the adjacent Burderop Wood Ancient Woodland and SSSI.

4.30 The nearest monitoring stations are more than 2 km from the Application Site. Measured concentrations are therefore unlikely to be representative of baseline air quality at the Application Site.

4.31 In the absence of local monitoring, ambient annual-mean concentrations have been derived from the latest available Defra mapped background concentration estimates for the 1 km grid square of the Application Site. To ensure that the assessment presents conservative results, no reduction in the background traffic related NO_2 concentrations has been applied for future years.

4.32 This air quality assessment covers the:

- Construction phase - an evaluation of the temporary effects from fugitive construction dust; and
- Operational phase –an evaluation of the impacts of the key emission sources to air (i.e. the 11 diesel-powered generators) during testing and emergency use on the local area.

4.33 Whilst no detailed construction phase information is currently available, the type of activities that could cause fugitive dust emissions are: demolition; earthworks; handling and disposal of spoil; wind-blown particulate material from stockpiles; handling of loose construction materials; and movement of vehicles, both on and off site.

4.34 Impacts during construction are predicted to be of short duration and only relevant during the construction phase. The results of the risk assessment of construction dust impacts undertaken using the Institute of Air Quality Management (IAQM) dust guidance, indicates that before the implementation of mitigation and controls, the risk of dust impacts will be medium. Implementation of the highly recommended mitigation measures described in the IAQM construction dust guidance should reduce the residual dust effects to a level categorised as "*not significant*".

4.35 Regarding exhaust emissions from construction-related vehicles, these are unlikely to have a significant impact on local air quality except for large, long-term construction sites: Highways England's Design Manual for Roads and Bridges (HE, 2019) states that an air quality assessment of construction-related vehicle traffic need only be assessed where construction activities are programmed to last more than two years. The programme in this case is expected to be 18 months. Construction vehicle exhaust emissions have therefore not been assessed specifically.

4.36 Once operational, the key sources of emissions to air are the 11 diesel-powered emergency generators. The key pollutant emissions associated with the generators are oxides of nitrogen

(NO_x), PM_{10}, $PM_{2.5}$ (particles up to 2.5 µm in diameter, a subset of PM_{10}), SO_2, CO and hydrocarbons. Concentrations of NO_2, PM_{10}, SO_2, CO and benzene have been predicted at selected sensitive receptors using a detailed atmospheric dispersion model and compared with the relevant long and short-term Air Quality Strategy (AQS) objectives. The long-term operational impacts for all pollutants are predicted to be 'negligible', considering the changes in pollutant concentrations and absolute levels.

4.37 The short-term operational impacts for all pollutants have been screened-out as being insignificant at all receptors.

4.38 Using professional judgement, the resulting air quality effect is considered 'not significant'. On this basis, air quality is scoped out of the EIA but the technical report will be appended to the ES to demonstrate that no significant adverse effects will occur.

Traffic and Transport

4.39 The road network immediately surrounding the Application Site comprises local roads, with the principal access to the site extending from the B4005. The Application Site can also be accessed by pedestrians and cyclists from the same entrance via the unnamed access road off B4005 Brimble Hill. A footway exists along the eastbound carriageway leading into the site.

4.40 The full length of B4005 Brimble Hill is listed in the 'Swindon List of Adopted Roads and Streets' as being a public road maintained by the Local Highway Authority.

4.41 The status of the access road into the Application Site is not listed as a road in the 'Swindon List of Adopted Roads and Streets' and it would appear that the road would be under private ownership. This will be confirmed by obtaining Highway Boundary information from the Local Highway Authority.

4.42 Initial estimates of construction vehicle movements have been made using data derived from a similar data centre construction, from which the following numbers have been derived:

- an average of 275 construction staff on site per day; and
- an average of approximately 75 HGVs on site per day, equating to 150 two-way HGV movements per day.

4.43 Experience of similar developments elsewhere suggests that car sharing promotion by the contractor will reduce the number of cars. Based on previous construction sites, it is calculated that an average of 50% of staff will travel to the site as car drivers, with the remaining 50% car sharing and arriving by sustainable means of transport.

4.44 It is therefore, anticipated that the construction process would generate an average of 275 car movements per day (137/138 car arrivals plus 137/138 car departures) plus 150 HGV movements per day over an 18-month period.

4.45 There is potential for the construction of the proposed development to overlap with the construction of the adjacent proposed residential development at Burderop Park.

4.46 The vehicular trip generation associated with the construction of the proposed development and the proposed residential development Burderop Park is temporary, with construction staff arriving to and departing the site outside of the typical network commuter peak hours of 08:00-09:00 and 17:00-18:00. HGV movements will be spread across the day between 08:00 and 18:00, equating to a combined average of 19 HGV movements per hour if there were to be any overlap of the two construction processes

4.47 Burderop Wood SSSI is located to the north and west of the Application Site. From an analysis of the surrounding highway network, all construction HGVs and the majority of construction staff would route via Junction 15 of the M4 via the A346 and the B4005; therefore, the vast majority of

construction vehicles associated with the proposed development would not route along the B4005 adjacent to the SSSI.

4.48 Burderop Wood SSSI borders the southern boundary of the M4 within the vicinity of the Application Site. It is therefore appropriate to consider the potential impact of construction traffic travelling along the M4 within the vicinity of the Burderop Wood SSSI.

4.49 Annual Average Daily Traffic (AADT) data has been retrieved from the Department for Transport (DfT) for the M4 between junctions 15 and 16 (i.e. adjacent to the Burderop Wood SSSI). The data shows an AADT flow of 87934 two-way vehicle movements on the M4 within the vicinity of the Burderop Wood SSSI of which 9275 are HGVs.

4.50 The majority of construction traffic generated by the proposed development would travel via the M4 east and west of Junction 15; however, based on the construction vehicle movements set out above, it is clear that the impact of construction HGVs in the context of the existing HGV traffic within the vicinity of the Application Site is considered to be negligible.

4.51 Indeed, if it is assumed that 50% of all construction HGVs route to/from the west of the M4 Junction 15 with 50% routeing to/from the east of the M4 Junction 15, there would be 95 daily HGV movements per day travelling along the M4 past the Burderop Wood SSSI that are generated by the proposed development and the proposed residential development at Burderop Park. This would equate to approximately 1% of existing HGV traffic flows passing the SSSI.

4.52 Based upon the above, the combined construction vehicle movements generated by the proposed development and the proposed residential development at Burderop Park would not impact upon the Burderop Wood SSSI such that an Environmental Impact Assessment of the traffic flows should be necessary.

4.53 In accordance with good practice, a Construction Traffic Management Plan (CTMP) will be prepared and submitted with the planning application that will set out measures to manage and control the construction vehicle movements, as well seeking to reduce their numbers and organise their timings such that they are sympathetic to the local environs and to minimise any impact.

4.54 The management measures will be implemented for the duration of the construction period and the CTMP will be submitted in support of the planning application.

4.55 During operation, up to 50 staff will be employed across a 24-hour period and will be separated by day and night shifts. Up to 30 full time staff will be on site during a typical weekday with up to 7 full time staff on site during the night, including security staff. Up to 13 external staff / maintenance staff / visitors are also included as part of standard operation of the data centre. There will typically be six HGVs arriving and departing per day.

4.56 The resultant vehicle movements generated when the Application Site is operational will be far lower than the construction vehicle movements, therefore, on the same basis, are not expected to result in any significant adverse environmental effects. On this basis, traffic and transport is scoped out of the EIA but the technical report will be appended to the ES to demonstrate that no significant adverse effects will occur..

Hydrology and Flood Risk

4.57 There are no surface watercourses on the Application Site, however there is a surface water drain to the south of the site that connects to a stream approximately 90m from the south east boundary and then into a series of ponds.

4.58 The entire Application Site is located in Flood Zone 1, land designated by the Environment Agency as having a less than 1 in 1,000 (0.1%) annual probability of flooding from rivers or the sea (i.e. very low risk).

4.59 The majority of the Application Site has a very low risk of surface water flooding, equivalent to an annual chance less than 1 in 1,000 (0.1%). Small, isolated areas of the site are shown to experience minor flooding in a low likelihood surface water flood event, with an annual chance of 1 in 1,000 (0.1%). Flooding is restricted to a few small isolated areas and is generally shown to be shallow (<0.3m). It is not indicative of a wider drainage issue.

4.60 The British Geological Survey Susceptibility to Groundwater Flooding map identifies the Application Site with a limited potential for groundwater flooding.

4.61 The Application Site is outside of the maximum extent of reservoir flood risk and is located remote from canals or other artificial water sources.

4.62 Any changes in the amount of hardstanding at the Application Site will be taken into account within the design solution, in order to ensure that the proposed development would not result in an increase in flood risk.

4.63 The proposed development will include an outline drainage strategy (in accordance with the Sustainable Drainage System (SuDS) hierarchy) that aims to ensure that the flood risk remains very low on site and is not increased elsewhere, taking into account climate change. Drainage on the Application Site is currently via soakaways and given that infiltration is likely to be viable for the proposed development, an infiltration pond has been included in the design. Soakaway testing has been undertaken in the location of the infiltration pond as part of the October 2020 ground investigation (see below). The results indicated that infiltration rates would not be adequate for a shallow-based infiltration drainage solution. However, a deeper borehole infiltration test was undertaken which indicated higher infiltration rates could be achieved below 3m bgl.

4.64 The drainage system will enable all off site discharges to be shut off in the event of a fire. This will enable the safe storage of fire-water runoff that may be contaminated. The storage required for this will be incorporated within the design. Any features that form part of the fire water storage system would be lined to prevent any infiltration to groundwater.

4.65 A site-specific flood risk assessment (FRA) has been undertaken and demonstrates that the risk of flooding will not increase as a result of the proposed development. As such, it is not likely that a flooding event would significantly affect the proposed development. The FRA and the outline drainage strategy will append the ES.

4.66 Given the absence of surface watercourses or on adjacent to the Application Site, and the predominantly very low risk of flooding, significant adverse effects are considered unlikely to occur. On this basis, hydrology and flood risk is scoped out of the EIA but the flood risk assessment will be appended to the ES to demonstrate that no significant adverse effects will occur..

Geology and Ground Conditions

4.67 The British Geological Survey (BGS) maps indicate that the ground conditions underlying the Application Site comprise Made Ground deposits of variable thickness and composition. There is no evidence of superficial deposits; the Made Ground is directly underlain by bedrock of the West Melbury Marly Chalk Formation, which is described as grey/off-white, soft, marly chalk and hard grey limestone. This is underlain at depth by the Upper Greensand Formation, described as sand and sandstone, fine-grained silt, glauconitic and shelly. Both the Chalk and the Greensand comprise important groundwater resources and are classified as Principal Aquifers. There are no Source Protection Zones within 2km of the site.

4.68 The groundwater depth beneath the Application Site is unknown. Based on historical borehole logs, groundwater is present in the Upper Greensand Formation and was historically abstracted locally from this aquifer for farming/dairy use 380m west and 730m south east of the Application Site.

4.69 Groundwater flow has historically been recorded in a north east direction however may be influenced locally by the aforementioned abstractions. There is no recorded evidence available that indicates groundwater rests in the West Melbury Marly Chalk Formation (i.e. <15 depth) however this cannot be ruled out as this stage.

4.70 A Phase 2 investigation was undertaken in July 2020 comprising six percussive/rotary boreholes drilled to between 10 and 15m below ground level (bgl). The ground conditions were confirmed as grass over topsoil or Made Ground, overlying the West Melbury Marly Chalk (generally structureless at the Made Ground / chalk interface becoming more competent with depth) overlying strata of the Upper Greensand Formation. The Greensand Formation was encountered in only two of the boreholes at depths of between 4.90m and 7.90m bgl. Three of the boreholes were installed for groundwater monitoring, however no groundwater was detected in any of the boreholes.

4.71 None of the contaminant concentrations in the soil samples analysed exceeded the Generic Assessment Criteria derived for the protection of human health receptors.

4.72 Widespread, gross or potential mobile contamination impacts were not identified at the Application Site. Based on the measured contaminant concentrations, the site soils do not present a significant risk to human health under a commercial development scenario. The risk to controlled waters is also not indicated to be significant. Elevated Polycyclic Aromatic Hydrocarbons (PAH) were recorded within four shallow soil samples (i.e. exceeding the GACs protective of controlled waters (groundwater and surface water)), however these are not anticipated to leach into the underlying aquifer. Therefore, no contaminants were identified that would require remediation.

4.73 Further ground investigation was undertaken at the Application Site in October 2020 comprising 15 trial pits, two hand dug pits and three soakaway tests. Gas and groundwater level monitoring was undertaken on three occasions. Groundwater was not encountered and is deemed to the present at a depth greater than 10m bgl, and therefore, samples could not be collected and analysed. Installations were monitored for concentrations of methane, carbon dioxide and oxygen. The flow rate and barometric pressure were also recorded.

4.74 Methane was recorded at levels below the machine detection limit in all boreholes. Carbon dioxide was recorded at a maximum concentration of 3.9% v/v within monitoring well BH05, screened within the West Melbury Marly Chalk Formation and Upper Greensand Formation on 21st October 2020.

4.75 The CIRIA Report C665 ‘Assessing risks posed by hazardous ground gases to buildings’ outlines indicative guideline concentrations for carbon dioxide and methane in association with gas flow rates for which gas protection measures may be required in new residential or commercial developments. The methodology is based on the Modified Wilson and Card approach that characterises the gas regime into a series of Characteristic Situations (1 to 5), with corresponding indicative gas protection measures. Using this methodology, the ground gas regime at the Application Site corresponds to Characteristic Situation 1, whereby no specific gas protection measures are required.

4.76 Asbestos samples were found in eight samples of the Made Ground collected across the Application Site.

4.77 In areas of the Application Site proposed to be covered by buildings and hardstanding, the risks to future site users from these contaminants of concern via the pathways of dermal contact and ingestion will be mitigated. In areas of the Application Site that are not covered by buildings or concrete/asphalt hardstanding, these pathways could still be active. Appropriate mitigation will be implemented to mitigate potential risks to human health.

4.78 A CoCP will be implemented during construction that will include measures relating to the storage and use of oils and chemicals; spillage control measures and require a procedure to be in place should unexpected contamination be encountered.

4.79 During operation, the Application Site will be under extensive hardstanding limiting infiltration and reducing the likelihood of contaminants leaching into the aquifer. Any areas of proposed soakaways should be placed beneath the level of the Made Ground or have the made ground removed to mitigate the risks of the contaminants of concern leaching into the groundwater.

4.80 Based on the above, the risk to controlled waters from the site soils is considered low.

4.81 Given the results of the investigations, an EIA chapter is not considered necessary. On this basis, geology and ground conditions is scoped out of the EIA but the October 2020 investigation report will be appended to the ES to demonstrate that no significant adverse effects will occur.

Climate Change

4.82 The EIA Regulations require consideration of climate change. Although a separate climate change chapter is not proposed, climate change would be considered throughout the ES. The proposed approach is set out below.

Climate Change Resilience

4.83 Resilience to future climate change will be considered during the design process. The design of the proposed redevelopment will take into account potential future climate change scenarios, for example, future flood risk and resilience to extreme weather events. The conceptual surface water drainage strategy for the proposed development will be designed to take flood risk into account, with an allowance for climate change. The ES would set out details of the proposed development's resilience to climate change in Chapter 2 (Project Description) and the Flood Risk Assessment accompanying the planning application.

Climate Change: Changes to Future Environmental Conditions

4.84 Consideration of predicted changes in baseline environmental conditions, including changes resulting from climate change, will be set out within each ES topic chapter (Chapters 5 to 11), where robust information is available at the time of writing.

4.85 This will be based on the information available from the UK Climate Projections project (UKCP18), which provides information on plausible changes in the climate for the UK (Environment Agency and Met Office, 2018) and on published documents such as the UK Climate Change Risk Assessment 2017 (Committee on Climate Change, 2016).

4.86 Climate data from the UKCP18 database will be compiled for a 25 km^2 grid square containing the site, based on a medium emissions scenario. Mean air temperature and annual average precipitation data for the period 2020 to 2079 will be used to inform the consideration of how environmental conditions may change at the Application Site and in future.

4.87 The assessment of effects for each topic will take into account identified trends or changes predicted to arise as a result of climate change.

Effects of the Project on Climate Change

4.88 Greenhouse gas emissions can occur throughout the lifecycle of a development, including during construction and operation of a proposed development. This can be affected by factors such as material use and energy demand.

4.89 The design of the proposed development would give consideration to measures to minimise and mitigate greenhouse gas emissions, where possible, such as measures to control energy demand

and improve energy efficiency. Such measures would be set out in the Design and Access Statement and summarised in the Project Description chapter (Chapter 2) of the ES.

4.90 No further assessment of greenhouse gas emissions is considered necessary or appropriate at this stage.

4.91 Taking into account the above approach, it is not considered that a separate chapter on climate change is required to form part of the ES.

Daylight, Sunlight and Microclimate

4.92 All the proposed works for the proposed development will be undertaken within the boundaries of the Application Site. Due to the location of the proposed works and the nature of the surrounding land use it is not considered likely that the proposed development will have significant effects in relation to daylight and sunlight. In addition, the nature of the proposed development is not likely to result in microclimate changes and therefore this topic is also scoped out of the assessment.

Material Assets

4.93 The EIA Regulations refer to 'material assets', including architectural and archaeological heritage. The phrase 'material assets' has a broad scope, which may include assets of human or natural origin, valued for socio-economic or heritage reasons. Material assets are in practice considered across a range of topic areas within an ES, in particular the socio-economic and historic environment chapters. These topics are proposed to be scoped out of the assessment as significant effects are not considered likely (outlined above), therefore a separate chapter on material assets is proposed to be scoped out of the assessment.

Major Accidents and/or Disasters.

4.94 The EIA Regulations require consideration of vulnerability to major accidents and/or disasters. The risk of major accidents and disasters will be considered in the project description chapter of the ES. Furthermore, each topic chapter will assess the likely environmental effects related to a major accident or disaster which could occur from that particular discipline. As part of the Environmental Permit, an Accident Management Plan (AMP) will be prepared prior to operations commencing at the site. The AMP will set out the actions required in the event of an emergency or accident/incident. This will include small incidents such as minor spills and leaks and complaints as well as major incidents such as fire and major spills. A system for recording and allocating appropriate follow-up for accidents, incidents and non-conformances will be established prior to operation. Therefore, a separate chapter assessing the risk of major accidents and disasters is not considered necessary

Fire

4.95 A 'fire engineered solution' would be adopted as part of the design for the proposed development, with reference to relevant Fire Standards and Building Regulations. The proposed development will be equipped with a number of active fire protection measures as well as fire detection and alarm systems.

Security

4.96 Security measures will be incorporated into the design of the proposed development. The proposed development is located on a campus with a private access with established security measures in place. A security gatehouse with associated barrier entry system will be located at the main entrance to the site. The site will be manned by security personnel 24 hours a day. The

site will be surrounded by fencing and CCTV equipment will also be provided as a part of the proposed development.

Site Operations

4.97 All operations will be accompanied by emergency evacuation plans, based on best practice guidance.

Demolition-related Accidents

4.98 Demolition activity in the north east of the Application Site will be controlled by standard construction practice and safety procedures. As such, the risk of major accidents and/or disasters associated with future demolition would not be significant. It is therefore not considered that future demolition activity would present a significant risk of accident or disaster.

Residues and Emissions

4.99 Construction of the proposed development has the potential to lead to contamination of water and soil resources, as well as impacts on sensitive receptors from noise and dust. However, a Code of Construction Practice (CoCP) will be prepared and agreed with Swindon Borough Council prior to construction which will set out measures to control construction impacts and provide a procedure for recording and resolving complaints.

4.100 During typical operation, there will be no process water discharges to sewer or surface water. Discharges to surface water will be restricted to run-off from the roof hardstanding and paved areas etc. and water would flow through the below ground surface water drainage system passing through a silt catch pit and outfall into the proposed infiltration pond before discharge to the ground and the underlying aquifer subject to on site permeability testing and detailed design. Runoff from car parking areas and the fuel storage area would pass through appropriate separators before outfall into the infiltration pond.

4.101 There will be times of the year when water is needed for cooling and this would generate small quantities of process wastewater. The final method of disposal is being investigated and would be agreed with the relevant authority prior to submission of the planning application.

4.102 An Environmental Permit will be in place for the operation of the diesel-fired emergency generators.

Waste

4.103 Prior to the commencement of construction works, a Site Waste Management Plan would be prepared. This would predict the likely waste streams and volumes to be generated during construction and identify the waste management action proposed for each different waste type. The overall objective would be to reduce the amount of waste generated during construction and to sustainably manage any waste that is generated using waste management facilities in closest proximity to the site, where possible. Waste targets would be set to divert key wastes from landfill and to include recycled content materials.

4.104 The demolition of the Beta/Gamma buildings in the north east of the Application Site would result in wastes, such as plasterboard, concrete, ceramics, timber and glass. Audits of the buildings and structures would be undertaken prior to demolition to identify salvageable/recyclable materials and to inform the demolition process so that the maximum amount of materials can be recovered. The proposed development would generate some operational waste in the form of normal office and visitor waste. This would include packaging, printer toners and cartridges, paper, plastic and food waste. Other wastes would include:

- waste electrical and electronic equipment (WEEE) such as end of life server equipment;

- damaged or redundant racks;
- waste from the maintenance and testing of the cooling system and emergency backup generators; and
- waste from the maintenance of landscaping and the infiltration pond.

4.105 Waste would be reused or recycled where possible. Where recycling is not possible, waste would be disposed of at a permitted facility via an appropriately licensed waste carrier.

4.106 All waste arising from the operation of the facility would be handled and managed in according with relevant legislation and duty of care requirements.

Radiation and Heat

4.107 Radioactive materials will not be used in the construction or operation of the proposed development and therefore, are scoped out of the assessment.

4.108 Heat is generated from the data servers and other IT equipment in the Data Hall. Where required, excessive heat from the Data Hall is extracted to ensure the servers and computer processing equipment are maintained at an optimum efficiency. A series of central air shafts transfer the warmed air to roof-mounted plant either to discard or recirculate the air depending on the seasonal space heating and cooling requirements of the building. Modelling undertaken by the Applicant has shown that any heat from the facility has dispersed and dissipated by the time is passes the north façade of the building.

Content of the Environmental Statement

4.109 Table 4.2 identifies the chapters that are proposed for inclusion in the ES. Further details of the approach to the assessment and its scope are provided in Section 5 of this Scoping Report.

Table 4.2: Structure of the ES

Structure of ES	
Non-Technical Summary	Summary of the ES using non-technical terminology
Volume 1: Text	
	Glossary
Chapter 1	Introduction
Chapter 2	Project Description
Chapter 3	Need and Alternatives Considered
Chapter 4	Environmental Assessment Methodology
Chapter 5	Landscape and Visual Effects
Chapter 6	Ecology and Nature Conservation
Chapter 7	Historic Environment
Chapter 8	Other Environmental Effects
Volume 2: Figures	
Including all figures and drawings to accompany the text.	
Volume 3: Appendices	
Including specialist reports forming technical appendices to the main text.	

5 TECHNICAL ASSESSMENTS

Chapter 1: Introduction

5.1 This chapter will provide the introduction to the ES, including details of the application, need for EIA and the structure of the ES.

Chapter 2: Project Description

5.2 The ES will include a description of the project, which will form the basis of the assessment of effects. The EIA Regulations require an ES to include:

'A description of the development comprising information on the site, design and size and other relevant features of the development.'

5.3 This project description chapter will include details of the site, together with a description of the key components of the proposed development. The description will include the following information, as far as practicable at the time of writing:

- Construction phase - a description of the key works, activities and processes that would be required during the construction phase;
- Operational phase - a description of the completed development and its use;
- Decommissioning phase - a description of the key works, activities and processes that would be required during the decommissioning phase.

5.4 Where options remain at the time of the assessment (with regard to construction techniques, for example), the ES will provide a clear explanation of the assumptions made. Where appropriate, the realistic worst-case scenario will be assessed.

5.5 Where mitigation measures have been identified and developed through the EIA process and have been incorporated as part of the project, details of these measures will be set out within the project description chapter.

Chapter 3: Need and Alternatives Considered

5.6 This chapter will briefly set out the need for the proposed development. In addition, the EIA Regulations require the alternatives considered by the applicant to be set out in the ES:

'A description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment.'

5.7 This chapter will summarise the reasons for the selection of the site and provide an outline of the alternatives considered during the EIA process, including a description of the alternative design and layout options that have been considered.

Chapter 4: Environmental Assessment Methodology

5.8 Details of the overall approach to EIA will be set out in this chapter, together with details of the scoping process, consultation undertaken and the overall approach to the assessment of significance. Topic specific methodologies, such as survey methods, will be provided in each topic chapter.

Chapter 5: Landscape and Visual Effects

Baseline Information

5.9 The Application Site is located within the North Wessex Downs AONB and is therefore, a protected landscape. The AONB Management plan objectives are focussed on maintaining and enhancing the distinctive character of the AONB, encouraging sustainable land management and practice, protecting habitats and species, protection of the historic environment, and retaining the special qualities of the AONB. The AONB Management plan also contains policies relating to avoiding and reducing light pollution, including control of lighting schemes or other developments that threaten the integrity of dark night skies within the North Wessex Downs.

5.10 The planning history shows that the Application Site has been occupied by buildings since the mid-1950s: consent for the existing buildings was granted after the AONB had been designated and no covenants were attached to the consent limiting the height of the buildings. The Application Site has been occupied by the existing buildings since the early 1990s and is an established site in operation with B8 use with data centres on site.

5.11 Whilst the proposed development does not specifically align with the management objectives for the AONB, the Application Site has been in this use for some time.

Work Undertaken to Date

5.12 The application will include a Zone of Theoretical Visibility and a Landscape and Visual Impact Assessment to advise on the changes to the views from sensitive receptors/key views and demonstrate that the proposed development does not harm the special qualities of the AONB.

5.13 The Landscape and Visual Impact Assessment (LVIA) has assessed the effects of the proposed data centre and ancillary buildings on both the character of the landscape and landscape receptors (the landscape features, elements and characteristics that make up character) and on visual receptors (people who have views towards the site as they travel through the landscape). The assessment consider the direct and indirect effects on landscape receptors and resources and the direct effects experienced by visual receptors.

5.14 Desk-based research and fieldwork has been undertaken to establish and understand the existing character of the Application Site and that of the surrounding landscape. While the Application Site lies within the North Wessex Downs AONB the whole site has been developed in the past as a Second World War Hospital, a psychiatric hospital and currently has three data centre and ancillary buildings within its boundaries. The most southerly data centre building (Alpha building), that closest to Burderop Park, will be retained. The data centre buildings in the north east (Beta and Gamma) will be replaced. Given its past and current use, the proposed development of the Application Site as a data centre would not have a likely significant effect on landscape character or the Special Qualities of the North Wessex Downs AONB.

5.15 In order to further determine the geographical extent of potential visibility, a computer-generated Zone of Theoretical Visibility (ZTV) model was generated. The ZTV broadly defines the study area for both the landscape character and visual assessment. Using the ZTV, candidate viewpoints at publicly accessible locations were selected, all within or on the boundary of the North Wessex Downs AONB. Representative photographs have been taken from the proposed viewpoints: viewpoints used in the assessment have been agreed with Swindon Borough Council. Further investigation has found that the building was not visible from all the selected viewpoints.

Assessment of Effects

5.16 The Landscape and Visual Impact Assessment (LVIA) has been undertaken as part of the Landscape and Visual Resources chapter, will identify and assess the likely significant effects that

would arise as a result of the proposed development on the landscape and townscape resources (fabric, character and resource) and the visual impact experienced by receptors (people) in the context of the current baseline.

5.17 The LVIA is based on the current published guidelines for landscape and visual assessment provided in:

- Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA) (Landscape Institute and Institute of Environmental Management & Assessment, 2013);
- Landscape Character Assessment Guidance for England and Scotland (The Countryside Agency and Scottish Natural Heritage, 2002);
- An Approach to Landscape Character Assessment (Natural England, 2014); and
- Technical Guidance Note 06/19, Visual Representation of Development Proposals (Landscape Institute, September 2019).

5.18 The LVIA considers the sensitivity of landscape and visual receptors together with the predicted magnitude of impact on that receptor (through identification of the proposed development's size/scale, geographical extent and the duration and reversibility of effect). Combining sensitivity with magnitude of impact, a judgement will be made as to the significance of effect experienced by landscape resources and visual receptors during the construction phase, the operational and maintenance phase, as well as the decommissioning phase of the proposed development. A cumulative impact assessment will be undertaken of the developments within the Landscape and Visual Resources study area.

5.19 The overarching assessment is that due to the enclosed nature of the Application Site, surrounded as it is by mature woodland or tree belts, from the most open views (high points to the south and east of the Application Site) only the upper parts of the proposed data centre building would be visible. Directly adjacent to the western boundary of the Application Site there would be filtered views of the ancillary buildings and part of the data centre. However, there are currently views of the existing ancillary buildings from this location. The existing views towards Swindon from the high points within the AONB, include large buildings. The potential visibility of the upper parts of the data centre building would not introduce a new element into such views and given the distance, would not have a likely significant effect on views from the AONB. The photomontages will be included in the LVIA to demonstrate this point.

5.20 A site lighting plan will be provided as part of the application and the potential visual effects will be considered in the landscape assessment.

5.21 As part of the design, the Applicant is reviewing options for various roof treatments noting the importance of the roof space appearance in more distant views. The use of shading in the external cladding, together with the use of colour banding, will also be considered to help break up the massing of the building.

Issues Proposed to be Scoped Out

5.22 No issues are proposed to be scoped out.

Chapter 6: Ecology and Nature Conservation

Baseline Information

5.1.1 Ecological records within a 2 km radius of the site were requested from Wiltshire and Swindon Biological Records Centre (WSBRC). Data requests were limited to records for protected species recorded within the last ten years and sites of nature conservation interest within 5 km of the Application Site.

5.1.2 Locations of statutory designated sites were accessed via the government 'MAGIC' website (MagicMap, 2016). A 1:25,000 OS map was used to identify nearby features such as ponds or green corridors that could provide habitat or connectivity to other areas.

5.23 There are a number of designated sites within 5km of the Application Site, the closest of which is Burderop Wood SSSI and is located adjacent to the site's northern boundary. Burderop Wood SSSI is an example of a wet ash-maple and pedunculate oak-hazel woodland, with a rich associated ground flora. There are large areas of mature oak and areas of permanently saturated ground which add to the interest of the area. Burderop Wood is also designated as ancient woodland, which is cited in UK planning policy as an 'irreplaceable habitat'.

5.24 Phase 1 habitat surveys were undertaken of the site in June 2020 and August 2020 in accordance with standard methodology (JNCC, 2010), and as described in the Guidelines for Preliminary Ecological Assessment (IEEM, 2012). The surveys identified that the site includes semi-improved calcareous grassland, woodland, scattered trees, tall ruderal and ephemeral habitat, scrub, buildings and hard standing, whilst the immediate surrounding habitat comprises predominantly woodland and arable land. The later survey confirmed that the grassland on site was a combination of calcareous and poor semi-improved calcareous grassland.

5.25 A protected species scoping survey was carried out in conjunction with the Phase 1 Habitat survey. The site was assessed for its suitability to support protected species, in particular great crested newts *Triturus cristatus*, reptiles, birds, badgers *Meles meles*, bats, and other species of conservation importance that could pose a planning constraint.

5.26 A programme of ecological surveys has been undertaken on the Application Site: these surveys are listed below along with the preliminary results. All of the surveys were undertaken in accordance with the standard industry methodologies.

Table 5.1: Protected Species Surveys undertaken at the Application Site

Survey undertaken	Results
Reptiles	Low numbers of slow worm present along the northern boundary.
Dormouse	No evidence during surveys, assumed absent from Application Site.
Bat Activity	Surveys undertaken between August and October inclusive. Low levels of activity recorded (one horseshoe bat commuting through the Application Site). Further surveys proposed for April to July.
Bat Roost	An initial assessment of buildings and trees has been undertaken. No confirmed bat roosts have been identified on the Application Site. Further survey work proposed on a number of trees/buildings with bat roost potential.
National Vegetation Classification	NVC survey completed. All grassland identified on the Application site identified as variants of MG1 Arrhenatherum elatius grassland Festuca rubra subcommunity.
Badger	Survey completed. No badger setts were identified on the Application Site, however a dung pit was found suggesting that the site may be used by a transient badger.
Invertebrates	Surveys undertaken in September and October. The Application Site includes grassland and deadwood habitats. Further surveys proposed between April and June.

5.27 The results of the surveys will be used to confirm the mitigation required to minimise impacts on habitats and protected species.

5.28 A telecon was held with Natural England on 13 November 2020 to discuss the mitigation of construction impacts on ecological receptors. As discussed, construction will be undertaken in accordance with a CoCP which will establish a framework of measures for reducing environmental

impacts. The ecological measures will be agreed with Natural England and are likely to include creating works-free buffer zones around the habitats to be retained onsite and those adjacent to site; appropriate siting of construction compounds; limited night-time working outside buildings; and clearance of nesting habitat outside of bird breeding season. The landscape design will include areas of suitable habitat to mitigate losses of any trees/shrubs and opportunities will be considered to create new habitats e.g.an infiltration pond.

5.29 Opportunities for biodiversity mitigation enhancement will be investigated (as informed by the results of the NVC and other surveys) and a biodiversity management plan will be prepared for the construction and operation of the proposed development. Mitigation will include native tree planting along the north and eastern boundaries of the Application Site adjacent to Burderop SSSI together with further areas of tree planting within the site boundary. An infiltration pond will be provided in the east of the site with associated wildflower and marginal planting. Any existing grassland on site that is being retained is to be enhanced and an area of unimproved neutral grassland will be translocated from within the proposed building footprint into the former building footprint, which is not being developed for this application

5.30 In addition, a tree survey has been undertaken to identify the composition, age and health of the trees. An Arboricultural Impact Assessment has been undertaken to establish the root zone of trees to be retained and appropriate measures (e.g. a construction exclusion zone and tree fencing) have been identified.

Assessment of Effects

5.31 The assessment of ecological and ornithological effects will be undertaken in accordance with the ecological impact assessment guidelines published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

5.32 The ecological assessment will include evaluation of Important Ecological Features (IEFs) present at the site and surrounding area (with the proposed development's Zone of Influence), which may include protected sites, protected species, Priority Habitats and Priority Species. The evaluation will identify features on a geographical scale, based on that provided in the CIEEM guidance, as follows: International > National > County > District > Local > Site > Negligible.

5.33 In accordance with the CIEEM guidance, the purpose of the ecological assessment is to focus on those features that are most likely to be affected and are either protected or are of sufficient value to merit consideration of the EIA process, rather than consider the effects upon every feature that may be present, many of which may be common, widespread or robust. Accordingly, those features that are likely to be affected and which are statutorily protected or are deemed to be of at least local nature conservation value, or are deemed worthy of consideration by consultees will be taken forward for detailed assessment.

5.34 The likely impacts of the proposed development will be identified, including the likely positive and negative impacts on IEFs present. Such impacts may include changes in habitat quality or disturbance, for example through changes in lighting or noise.

5.35 The likely magnitude of the impacts will be assessed during the construction, operational and decommission phases of the proposed development. The assessment will take into account any mitigation measures that form part of the proposed development and to which the applicant is committed.

5.36 Where necessary, any further mitigation measures will be identified to ensure that the proposed development meets national and local planning policy (by avoiding 'significant harm to biodiversity' and delivering a proportionate net biodiversity gain).

5.37 Potential ecological impacts of the proposed development are pollution during construction and operation, loss of habitat and disturbance of protected species. However, the proposed

development will not incur the loss of habitat from the Burderop Wood SSSI and losses of trees within the Application Site will be kept to a minimum where possible. An appropriate buffer has been incorporated in the design between the proposed development and the SSSI in line with the national guidelines for ancient woodland: the proposed layout has been specifically designed to include appropriately distanced off-sets from the existing tree canopies and in particular from the ancient woodland to the north bordering the Application Site boundary.

5.38 The results from the surveys will be used to identify the appropriate mitigation to reduce the potential impacts on habitats and protected species.

5.39 Construction will be undertaken in accordance with a Code of Construction Practice (CoCP) which will establish a framework of measures for reducing environmental impacts of construction. This is likely to include creating works-free buffer zones around the habitats to be retained onsite and those adjacent to site; appropriate siting of construction compounds; limited night-time working outside buildings; and clearance of nesting habitat outside of bird breeding season. The landscape design will include areas of suitable habitat to mitigate losses of any trees/shrubs and opportunities will be considered to create new habitats e.g.an infiltration pond.

5.40 Opportunities for biodiversity mitigation enhancement will be investigated (as informed by the results of the NVC and other surveys) and a biodiversity management plan will be prepared for the construction and operation of the proposed development.

Issues Proposed to be Scoped Out

5.41 All permanent land take will be within the red line boundary with no construction activity within the SSSI immediately north of the Application Site. As such, further consideration of the following ecological receptors have been scoped out of the Ecology and Biodiversity chapter:

- Otters;
- Water Voles; and
- Amphibians.

Chapter 7 – Historic Environment

Baseline Information

5.42 Data regarding known heritage assets (designated and undesignated) have been sought from a number of sources, including the Wiltshire and Swindon Historic Environment Record (HER) maintained by Wiltshire Council, and the National Heritage List for England (maintained by Historic England). The Environment Agency LiDAR dataset (1 m DSM) was also consulted. It was not possible to visit the Wiltshire and Swindon History Centre (Chippenham) due to COVID-19 restrictions.

5.43 A site visit was undertaken in October 2020 in order to check for the presence of heritage assets within the Application Site that have not been previously recorded and to examine the settings of heritage assets.

5.1.1 There are no designated heritage assets within the Application Site: the nearest Scheduled Monument is located approximately 800m south west. This comprises the earthwork remains of medieval settlement to the south of Overtown House and Overtown Manor. This Scheduled Monument would not be affected by the proposed development.

5.44 To the south of the Application Site and within the historic estate of Burderop Park is a group of listed buildings. The principal house – Burderop Park – is listed at Grade II* and comprises a building of early-mid 17th century date. Whilst the assets are unlikely to be directly affected by the

proposed development (as they are located outside the Application Site) there is the potential for impacts to their setting.

5.45 The majority of the Application Site has previously been developed and therefore, the potential for buried archaeological deposits is considered to be low and restricted to areas of the site which have not been developed.

Assessment of Effects

5.46 The chapter would include an assessment of the likely effects of the proposed development on heritage assets and would take into account the significance of each asset and the magnitude of impact on that asset.

5.47 The assessment of the likely effects on cultural heritage would include the following activities:

- identification of all heritage assets that could be affected by the proposed development,
- provision of a description of the significance (importance) of those assets including the contribution made by their setting;
- identification of the likely effects of the proposed development on heritage assets within the site and a 1 km radius study area centred on it; and
- assessment of significance of effects, taking into account measures proposed to avoid, reduce or remedy adverse effects.

Issues Proposed to be Scoped Out

5.48 No issues are proposed to be scoped out.

Chapter 8: Other Environmental Effects

5.49 This chapter would set out details of the reasons why significant effects on other environmental topic areas are unlikely and would direct the reader to any supporting technical appendices.

Cumulative Effects

5.50 As set out in Section 3 of this report, each topic chapter would consider the potential for significant cumulative effects with other major proposed developments. Other developments considered within the cumulative assessment include those that are:

- under construction;
- permitted, but not yet implemented;
- submitted, but not yet determined; and
- identified in the Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals would be limited.

5.51 An indicative list of other proposed developments and allocations to be considered within the EIA process would be agreed with Swindon Borough Council. Each topic author would review the overall list of developments and allocations and identify those relevant to their topic. The chapter would include an assessment of the potential for significant cumulative effects with the relevant developments.

6 REFERENCES

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Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017

Countryside Agency and Scottish Natural Heritage (2002) Landscape Character Assessment: Guidance for England and Scotland

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Institute of Environmental Management and Assessment (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach.

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FIGURES

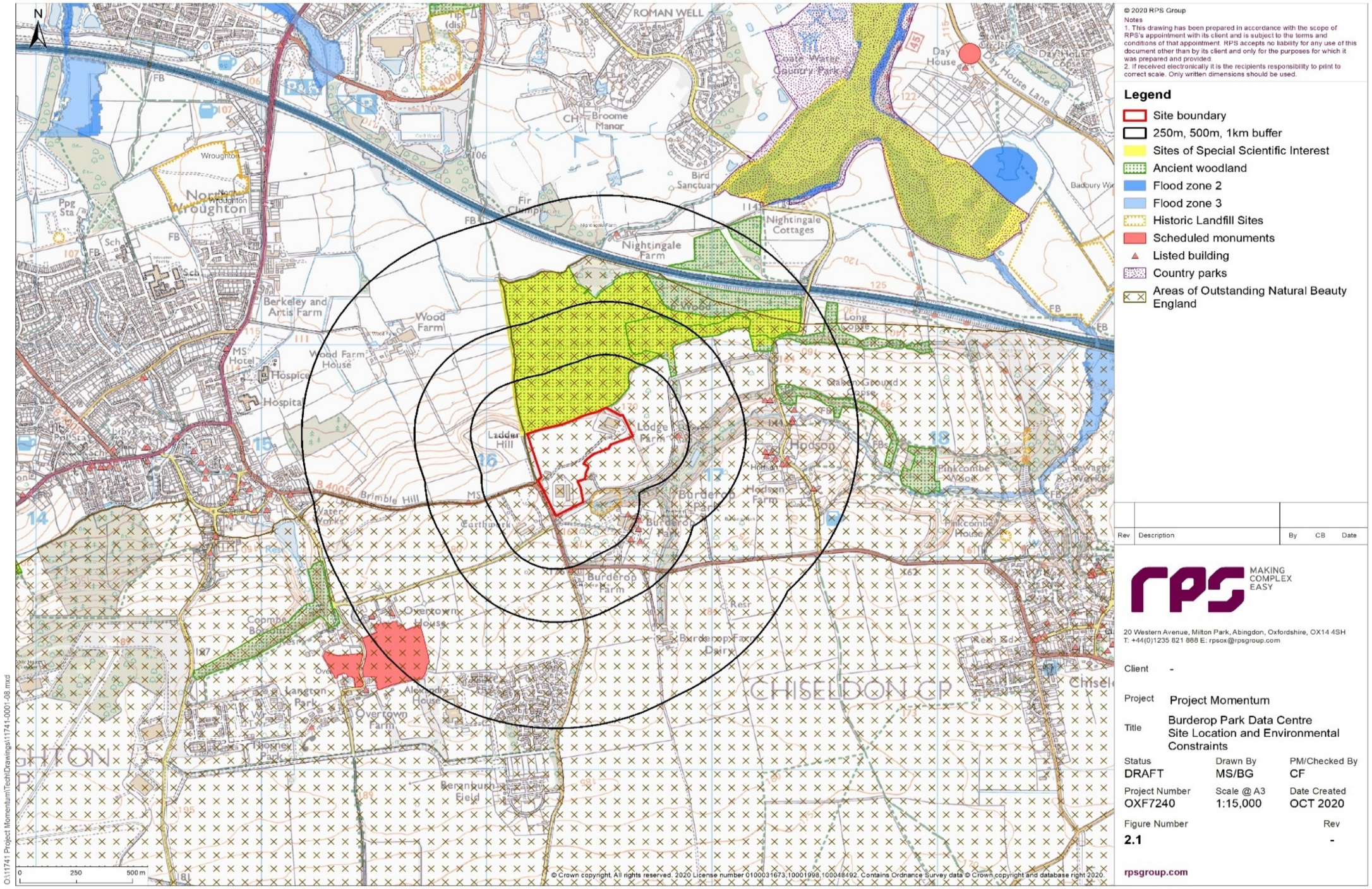

Figure 1: Site Location and Environmental Constraints

APPENDICES

Appendix A

Cumulative Development Tables

Ref	Name	Application Ref	Description	Distance from Site	Planning Status
1	Burderop Park Wroughton Swindon	S/17/0128 S/19/0441 S/19/1765 S/20/0926 S/20/1234	Demolition of the pavilions, change of use of offices and ancillary buildings to 25no. apartments/dwellings, erection of 52no. dwellings, construction of new access and associated works	10m	Approved Approved Approved Pending Pending
2	Burderop Park Wroughton Swindon	S/19/1892 S/20/0924	Erection of 6no. additional dwellings	10m	Approved Pending
3	Land East Of Marlborough Road Wroughton Swindon	S/OUT/15/0912 S/RES/19/1852	Erection of 103no. dwellings and associated works	1km	Allowed on appeal Approved
4	Broome Manor Golf Complex	S/17/2075	Installation of new surface car park with photo-voltaic canopies and associated landscaping, including a pedestrian and power supply cable link to Nationwide House.	1.1km	Pending
5	Berkeley Farm Swindon Road Wroughton Swindon	S/18/1774	Erection of 44 dwellings and associated works.	1.2km	Approved

Ref	Name	Application Ref	Description	Distance from Site	Planning Status
6	Land at Berkeley Farm Swindon Road Wroughton Swindon	S/OUT/14/1005 S/RES/17/0635 S/18/1403	Erection of 100 residential dwellings, with open space, landscaping, internal roads & footpaths, parking including garages and other associated infrastructure.	1.2km	Allowed on appeal Approved Approved
7	The Ivy Hotel Moormead Road Wroughton Swindon SN4 9BY	S/16/0487	Demolition of buildings on site and the construction of 38 no. residential units of Retirement Living accommodation including communal facilities, guest suite, landscaping and car parking.	1.35km	Approved
8	Artis Farm Swindon Road Wroughton Swindon	S/17/2097	Erection of 13no. dwellings and associated works	1.4km	Approved
9	Carite Car Sales 1,3 And 5 Moormead Road Wroughton	S/OUT/17/2080	Outline application for the erection of 12no dwellings, and associated works - All Matters reserved.	1.4km	Pending
10	Land East Of Marlborough Road Wroughton Swindon	S/RES/19/1852	Erection of 103no. dwellings and associated works – reserved matters pursuant to planning permission S/OUT/15/0912	1.5km	Approved

Ref	Name	Application Ref	Description	Distance from Site	Planning Status
11	Land To The Rear Of Woodland View Wroughton Swindon	S/15/1750 S/OUT/20/0556	Erection of 104no. dwellings, traffic roundabout, roads and associated works - Means of Access, Layout and Scale not reserved	1.6km	Approved Pending
12	Land At Langton Park Wroughton Swindon	S/18/1033	Erection of 18no. dwellings with associated access, parking and landscaping.	1.7km	Approved
13	Land To The West Of Former Electricity Sub Station Langton Park Wroughton Swindon	S/20/0120	Erection of 30no. dwellings with associated access, parking and landscaping	1.75km	Approved
14	Former Haskins Garage High Street Wroughton Swindon	S/15/1190 S/17/0286	Erection of 13no. dwellings and associated works.	1.8km	Approved Approved
15	Land At Clevedon House Woodland View Wroughton Swindon SN4 9BD	S/OUT/15/1338 S/RES/19/0446	Erection of 10no. dwellings and associated works	1.9km	Approved Approved

Ref	Name	Application Ref	Description	Distance from Site	Planning Status
16	Land at Marlborough Park, Pipers Way, Old Town	S/18/0181	Erection of 70no. dwellings and associated access, open space and infrastructure (phased development).	2km	Approved
17	Land At Marlborough Park Swindon	S/OUT/15/2051 S/AMEND/18/1327 S/AMEND/18/1481	A Hybrid application for a mix of residential development to include - full details of the erection of 91no. dwellings & 74no. age-restricted retirement dwellings and associated works and an outline proposal for up to 313no. dwellings, public open space and play area (Means of Access not reserved)	2km	Approved Approved Approved
18	Wakefield House Pipers Way Old Town	S/14/2137	Demolition of existing energy centre and erection of a mixed use four storey building with a convenience retail store (Class A1) on the ground floor with 18no. apartments above and 16no. houses and associated works.	2km	Approved

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RPS - **Clare Russell**
20 Western Avenue
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OX14 4SH

Please ask for: Peter Eggleton

Direct Dial No:
Email: EggletonP@Swindon.gov.uk
Our Ref: S/EIA/20/1600
Date: 10 January 2021

Dear Clare,

Town and Country Planning Act 1990
Town and Country Planning (Environmental Impact Assessment) Regulation 2017

Re: Request for Environmental Impact Assessment (EIA) Scoping Opinion for a proposed development.
At: National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton

I refer to the submission dated 4 December 2020 seeking a Scoping Opinion pursuant to Section 15 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

This Scoping application is further to the submission of a Screening Opinion Request (S/EIA/20/1286), whereby the Local Planning Authority (LPA) concluded that the proposed scheme would be EIA development and therefore that an EIA would be required.

We have received comments from the statutory consultees, Highways England, Historic England, Natural England and the Environment Agency which we endorse and have included as text at the end of this letter. Full details are on the Council's web site under the above reference. Comments from other consultees are also attached and should be fully taken into account. Responses to previous consultations are included where considered beneficial.

This letter sets out our final scoping opinion. Please note that our comments are arranged to reflect the structure of your scoping report.

Matters to be scoped out

You have set out what you propose to be scoped out. Whether this approach is accepted is indicated for each topic. Any notes are attached below each heading.

Land use, agriculture and recreation - Agreed

Note: the Public footpath should be considered with regard to visual impact and as a non-designated heritage asset.

Socio-economics and community - Agreed

Human health - Agreed

Note: Mitigation such as traffic management measures, Heavy Good Vehicles restrictions; dust suppression; noise suppression and avoidance of changes to air quality will need to be identified in the application documents.

Noise and vibration – Although agreed with regard to human impact, noise should not be scoped out of the assessment with regard to the effect on species present within Burderop Wood Site of Special Scientific Interest (SSSI), especially with regard to birds.

Note: Mitigation of noise from generators would need to be fully identified in the planning application. The technical report will need to be appended to the ES to demonstrate that no significant adverse effects will occur.

Air quality – Although agreed with regard to human impact, air quality should not be scoped out of the assessment with regard to the effect on species present within Burderop Wood SSSI.

Note: Should include mitigation measures within the IAQM construction dust guidance and the technical report should be appended to the ES to demonstrate that no significant adverse effects will occur. An Environmental Construction Management Strategy would also be necessary.

Traffic and transport – Agreed

Note: The application should include provision for the promotion of car sharing and the submission of a Construction Traffic Management Plan (CTMP) with the planning application setting out measures to manage and control the construction vehicle movements, including travel routes, as well as seeking to reduce their numbers and organise their timings to minimise any impact. A Travel Plan will also be required. Full consideration of the advice set out in the comments of Highways England and Swindon Highway Authority should be included within supporting documentation to any application and similarly consider cumulative impacts.

Hydrology and flood risk – Agreed

Note: The flood risk assessment should be appended to the ES to demonstrate that no significant adverse effects will occur.

Geology and ground conditions – Agreed

Note: Appropriate mitigation will be required to mitigate potential risks to human health and the investigation report should be appended to the ES

Climate change – Agreed

Note: Policy requirements include that development must be designed to be water efficient and reduce water consumption; non-domestic development achieves BREEAM water-efficiency credits; and supports the provision of renewable, decentralised or low carbon energy supply.

Daylight, sunlight and microclimate – Agreed that a separate chapter is not required, but any changes to the microclimate should be considered with regard to the impact on the SSSI in the Ecology and Nature Conservation chapter.

Material assets – Agreed

Note: The effect on heritage assets will be covered under a separate chapter.

Major accidents and disasters - Agreed

Residues and emissions – Although agreed that a separate chapter is not required, any changes with regard to residues and emissions should be considered with regard to the impact on the SSSI in the Ecology and Nature Conservation chapter.

Note: The provisions for the disposal of process wastewater should also be included in the application documents.

Waste – Agreed

Note: A Site Waste Management Plan would be required with the application to predict the likely waste streams and volumes to be generated during construction and identify the waste management action proposed for each different waste type.

Radiation and heat – Although agreed that a separate chapter is not required, any changes with regard to heat from the building should be considered with regard to the impact on the SSSI in the Ecology and Nature Conservation chapter.

Content of Environmental Statement

The structure and content of the Environmental Statement is considered acceptable.

The scope of the **Project Description** is agreed.
Note: The ES should provide full details of the proposed demolition works and it should be clear at what point in the construction programme the demolition activities would occur, their extent and duration.

The scope of **Alternatives Considered** should also consider potential development sites outside the AONB and within the urban area; and different design/scale/position of the building, following the completion of the heritage assessment.

Given the clear national policy conflicts it will be necessary to demonstrate that the development is in the public interest; and the ES can inform the planning statement which should include an assessment of:
a) the need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy;
b) the cost of, and scope for, developing outside the designated area, or meeting the need for it in some other way; and
c) any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated."

Landscape and Visual Effects
Comment –

- The statement 'no covenants were attached to the consent limiting the height of the buildings' appears to be irrelevant.

- It is not clear from the planning history that the entire site was included as part of the data centre use. Permission was granted at the same time for office use of the majority of the site outside the area of the data centre buildings. Unless there is evidence to the contrary, it is not accepted that the entire site has a single lawful use and it would appear more likely that the office site now has a nil use having gone from hospital use to no current use – despite having had permission for office use. Alternatively, the site may have a sui generis use. This would only be determined conclusively by the submission and determination of a lawfulness application.

- The statement in para 5.14 'Given its past and current use, the proposed development of the Application Site as a data centre would not have a likely significant effect on landscape character or the Special Qualities of the North Wessex Downs AONB' cannot be agreed based on the information currently available.

- In 5.15 the statement 'viewpoints used in the assessment have been agreed with Swindon Borough Council' should include the additional view point to the east of Burderop House. If the ZTV and subsequent assessment shows that there is increased visibility over the perimeter vegetation, then we would want to see this included in the LVIA.

- Any emerging proposals should include for a scheme of tree planting to compensate adequately for any that are lost.

- Given the evident conflict with national policy with regard to major development in the AONB, any application would need to take opportunities to enhance and conserve. With regard to the development plan, Policy EN5 sets out that unacceptable impacts upon the landscape will be avoided. Part c of the policy specifically requires that proposals within the AONB must accord with relevant criteria set out in the AONB Management Plan and paragraph

115 and 116 of the NPPF (2012) (Paragraphs 115 and 116 of the NPPF 2012 have since been replaced by Paragraph 172, and footnote 55 of the NPPF 2019.) These matters should be fully addressed in the Planning Statement.

Ecology and Nature Conservation

Comment -

- It is evident that both bat roost and invertebrate surveys are outstanding and will not be available prior to the submission of an application – This is a matter that needs to be fully addressed.

- A Discretionary Advice Service request to Natural England prior to application should be submitted to determine whether Natural England would consider this site suitable for the proposed development; and this should be included with any planning application.

- The Defra Biodiversity Metric should be submitted with a planning application as a working Excel spreadsheet. Biodiversity net gain will be required, in accordance with the NPPF and Local Plan Policy EN4, and as prescribed by legislation in force at that time. If this cannot be achieved on site, then a biodiversity offsetting arrangement should be made.

- It is welcomed that the assessment will address the impacts from changes in habitat quality or disturbance, through changes in lighting or noise. This should also include changes resulting from heat loss/changes in humidity and the use of the generators.

- The scoping out of ecological receptors, namely Otters; Water Voles; and Amphibians, is based on existing survey data which is not available as part of this scoping report.

Historic Environment

Comment –

- It is not accepted that the potential for buried archaeological deposits is likely to be restricted to areas of the site which have not been developed. The extent of archaeological survival is currently unknown as it has not been previously evaluated or assessed. A phased programme of archaeological evaluation will need to be undertaken and reported on prior to determination of any planning application. This will need to take the form of a desk assessment, geophysical survey and trial trenching. The results of the evaluation will need to inform the assessment of the impact of development on the archaeological resource. It is not considered that this needs to be part of the ES subject to the evaluation being completed prior to the submission of any application.

- This chapter should fully utilise accepted guidance in its assessment and analysis of the historic environment including, but not exclusive to, ‘The Setting of Heritage Assets Historic Environment Good Practice Advice in Planning Note 3’ (Historic England, Second Edition, 2017) and ‘Statements of Heritage Significance: Analysing Significance in Heritage Assets’ (Historic

England, 2019) sufficient to satisfy the requirements indicated in the NPPF (NPPF, para 189).

- An assessment of alternatives should only be undertaken following the conclusions of the Historic Environment assessment.

Cumulative Effects

Comment – Development associated with the adjoining Burderop House should be given full consideration.

Summary

In reference to the chapters proposed for the Environmental Statement, the Council broadly agree with recommendations outlined within the EIA – Scoping Report. As such, the Council expect any submitted Environmental Statement to include the following matters: Landscape and Visual Impact; Ecology and Nature Conservation; and Historic Environment (Heritage and Archaeology).

The Environmental Statement should demonstrate how the consultee comments outlined below, particularly relating to the methodology of assessments, have been included; unless appropriate justification and evidence is submitted outlining the reasons as to why an alternative approach has been taken.

Yours sincerely,

Peter Eggleton

Peter Eggleton
Senior Planner

APPENDIX 1

Consultee Comments

Statutory Consultee Comments

Highways England

The comments relate specifically to matters arising from our responsibilities to manage and maintain the strategic road network (SRN) in England, in this case comprising the A419 and M4.

General aspects to be addressed

▪ An assessment of transport related impacts of the proposal should be carried out and reported as described in the current Ministry of Housing, Communities and Local Government guidance.

▪ Environmental impacts arising from any disruption during construction, traffic volume, composition or routing change and transport infrastructure modification should be fully assessed and reported, along with the environmental impact of the road network upon the development itself.

▪ Adverse changes to noise and air quality should be considered, including in relation to compliance with the European air quality Limit Values and/or Local Authority designated Air Quality Management Areas (AQMAs) and World Health Organisation (WHO) criteria.
Location specific considerations

▪ The transport assessment should consider the operation of the strategic road network in line with national planning practice guidance and DfT Circular 02/2013 The Strategic Road Network and the Delivery of Sustainable Development. Where surveys are undertaken to inform the baseline for assessment, it should be noted that given current pandemic restrictions, these may not be considered representative and are therefore undertaken at the developer's risk. Where the proposals would result in a severe congestion or unacceptable safety impact, mitigation will be required in line with current policy.

• The effects of the proposed development should be assessed cumulatively with other schemes and we would expect the applicants to agree an appropriate list of schemes, including committed development in the area, with the local planning authority.
These comments are only advisory, as the responsibility for determining whether the proposals constitute EIA development, and the final scope and form of any EIA Report, rests with the Local Planning Authority.

Historic England

1.1 This development could, potentially, have an impact upon a number of designated heritage assets and their settings in the area around the site. In

line with the advice in the National Planning Policy Framework (NPPF), we would expect the Environmental Statement to contain a thorough assessment of the likely effects which the proposed development might have upon those elements which contribute to the significance of these assets.

1.2 Our initial assessment shows the attached list of designated heritage assets within 2.5km of the proposed development. We would draw your attention, in particular, to the following:

Scheduled Ancient Monuments:
- Medieval Remains at Overtown

Grade II* Listed Buildings:
- Burderop Park
- Overton House

Conservation Areas:
- Hodson
- Wroughton

1.3 We would also expect the Environmental Statement to consider the potential impacts on non-designated features of historic, architectural, archaeological or artistic interest, since these can also be of national importance and make an important contribution to the character and local distinctiveness of an area and its sense of place. This information is available via the local authority Historic Environment Record (www.heritagegateway.org.uk) and relevant local authority staff.

1.4 We would strongly recommend that you involve the Conservation Officer and archaeological staff at Swindon Borough Council in the development of this assessment. They are best placed to advise on: local historic environment issues and priorities; how the proposal can be tailored to avoid and minimise potential adverse impacts on the historic environment; the nature and design of any required mitigation measures; and opportunities for securing wider benefits for the future conservation and management of heritage assets.
It is important that the assessment is designed to ensure that all impacts are fully understood. Section drawings and techniques such as photomontages are a useful part of any assessment.

1.5 The assessment should also take account of the potential impact which associated activities (such as construction, servicing and maintenance, and associated traffic) might have upon perceptions, understanding and appreciation of the heritage assets in the area. The assessment should also consider, where appropriate, the likelihood of alterations to drainage patterns that might lead to in situ decomposition or destruction of below ground archaeological remains and deposits, and can also lead to subsidence of buildings and monuments.

1.6 The following comments made with regard to the screening request remain relevant:

1.7 We would expect the EIA to contain an examination of the potential impacts upon all heritage assets likely to be affected, including designated heritage assets and their settings together with potential impacts on non-designated features of historic, architectural, archaeological or artistic interest, since these can also be of national importance and make an important contribution to the character and local distinctiveness of an area and its sense of place. This covers buildings, historic open spaces, historic features and the wider historic landscape including below-ground archaeology.

1.8 We welcome the recommendation to undertake archaeological evaluation work. This will help better define the significant areas of archaeology.

Natural England

1.9 The Case law and guidance has stressed the need for a full set of environmental information to be available for consideration prior to a decision being taken on whether or not to grant planning permission. Annex A to this letter provides Natural England's advice on the scope of the Environmental Impact Assessment (EIA) for this development.

1.10 Should the proposal be amended in a way which significantly affects its impact on the natural environment then, in accordance with Section 4 of the Natural Environment and Rural Communities Act 2006, Natural England should be consulted again.

Annex A – Advice related to EIA Scoping Requirements

1. General Principles

Schedule 4 of the Town & Country Planning (Environmental Impact Assessment) Regulations 2017, sets out the necessary information to assess impacts on the natural environment to be included in an ES, specifically:

- A description of the development – including physical characteristics and the full land use requirements of the site during construction and operational phases.
- Expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development.
- An assessment of alternatives and clear reasoning as to why the preferred option has been chosen.
- A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the interrelationship between the above factors.
- A description of the likely significant effects of the development on the environment – this should cover direct effects but also any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects. Effects should relate to the existence of the development, the use of natural resources and the emissions from pollutants. This should also include a description of the forecasting methods to predict the likely effects on the environment.

 A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.
 A non-technical summary of the information.
 An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.

It will be important for any assessment to consider the potential cumulative effects of this proposal, including all supporting infrastructure, with other similar proposals and a thorough assessment of the 'in combination' effects of the proposed development with any existing developments and current applications. A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment.

2. Biodiversity and Geology

2.1 Ecological Aspects of an Environmental Statement

Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters. Guidelines for Ecological Impact Assessment (EcIA) have been developed by the Chartered Institute of Ecology and Environmental Management (CIEEM) and are available on their website.

EcIA is the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components. EcIA may be carried out as part of the EIA process or to support other forms of environmental assessment or appraisal.

The National Planning Policy Framework sets out guidance in S.174-177 on how to take account of biodiversity interests in planning decisions and the framework that local authorities should provide to assist developers.

2.2 Internationally and Nationally Designated Sites

The ES should thoroughly assess the potential for the proposal to affect designated sites. European sites (e.g. designated Special Areas of Conservation and Special Protection Areas) fall within the scope of the Conservation of Habitats and Species Regulations 2017 (as amended). In addition paragraph 176 of the National Planning Policy Framework requires that potential Special Protection Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites.

Under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site.

Should a Likely Significant Effect on a European/Internationally designated site be identified or be uncertain, the competent authority (in this case the Local Planning Authority) may need to prepare an Appropriate Assessment, in addition to consideration of impacts through the EIA process.

Sites of Special Scientific Interest (SSSIs) and sites of European or international importance (Special Areas of Conservation, Special Protection Areas and Ramsar sites)
The development site is adjacent to the following designated nature conservation site(s):
 Burderop wood SSSI
 Further information on the SSSI and its special interest features can be found at www.magic.gov . The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within Click here to enter text. and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects.
 - European site conservation objectives are available on our internet site http://publications.naturalengland.org.uk/category/6490068894089216

2.3 Regionally and Locally Important Sites
The EIA will need to consider any impacts upon local wildlife and geological sites. Local Sites are identified by the local wildlife trust, geoconservation group or a local forum established for the purposes of identifying and selecting local sites. They are of county importance for wildlife or geodiversity. The Environmental Statement should therefore include an assessment of the likely impacts on the wildlife and geodiversity interests of such sites. The assessment should include proposals for mitigation of any impacts and if appropriate, compensation measures. Contact the local wildlife trust, geoconservation group or local sites body in this area for further information.

2.4 Protected Species
Species protected by the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2017 (as amended)

The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats). Natural England does not hold comprehensive information regarding the locations of species protected by law, but advises on the procedures and legislation relevant to such species. Records of protected species should be sought from appropriate local biological record centres, nature conservation organisations, groups and individuals; and consideration should be given to the wider context of the site for example in terms of habitat linkages and protected species populations in the wider area, to assist in the impact assessment.

The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System. The area likely to be affected by the proposal should be thoroughly

surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES.

In order to provide this information there may be a requirement for a survey at a particular time of year. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and where necessary, licensed, consultants. Natural England has adopted standing advice for protected species which includes links to guidance on survey and mitigation.

2.5 Habitats and Species of Principal Importance

The ES should thoroughly assess the impact of the proposals on habitats and/or species listed as 'Habitats and Species of Principal Importance' within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act 2006 places a general duty on all public authorities, including local planning authorities, to conserve and enhance biodiversity. Further information on this duty is available here https://www.gov.uk/guidance/biodiversity-duty-public-authority-duty-to-have-regard-to-conserving-biodiversity.

Government Circular 06/2005 states that Biodiversity Action Plan (BAP) species and habitats, 'are capable of being a material consideration…in the making of planning decisions'. Natural England therefore advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. Consideration should also be given to those species and habitats included in the relevant Local BAP.

Natural England advises that a habitat survey (equivalent to Phase 2) is carried out on the site, in order to identify any important habitats present. In addition, ornithological, botanical and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present. The Environmental Statement should include details of:

- Any historical data for the site affected by the proposal (e.g. from previous surveys);
- Additional surveys carried out as part of this proposal;
- The habitats and species present;
- The status of these habitats and species (e.g. whether priority species or habitat);
- The direct and indirect effects of the development upon those habitats and species;
- Full details of any mitigation or compensation that might be required.

The development should seek if possible to avoid adverse impact on sensitive areas for wildlife within the site, and if possible provide opportunities for overall wildlife gain.

The record centre for the relevant Local Authorities should be able to provide the relevant information on the location and type of priority habitat for the area under consideration.

2.6 Contacts for Local Records
Natural England does not hold local information on local sites, local landscape character and local or national biodiversity priority habitats and species. We recommend that you seek further information from the appropriate bodies (which may include the local records centre, the local wildlife trust, local geoconservation group or other recording society and a local landscape characterisation document).

3. Designated Landscapes and Landscape Character
Nationally Designated Landscapes
As the development site is within North Wessex downs AONB, consideration should be given to the direct and indirect effects upon this designated landscape and in particular the effect upon its purpose for designation within the environmental impact assessment, as well as the content of the relevant management plan for North Wessex Downs.

Landscape and visual impacts
Natural England would wish to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. The EIA should include assessments of visual effects on the surrounding area and landscape together with any physical effects of the development, such as changes in topography.

The EIA should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.

Natural England supports the publication Guidelines for Landscape and Visual Impact Assessment, produced by the Landscape Institute and the Institute of Environmental Assessment and Management in 2013 (3rd edition). The methodology set out is almost universally used for landscape and visual impact assessment.

In order to foster high quality development that respects, maintains, or enhances, local landscape character and distinctiveness, Natural England encourages all new development to consider the character and distinctiveness of the area, with the siting and design of the proposed development reflecting local design characteristics and, wherever possible, using local materials. The Environmental Impact Assessment process should detail the measures to be taken to ensure the building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit.

The assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. In this context Natural England advises that the cumulative impact assessment should include other proposals currently at Scoping stage. Due to the overlapping timescale of their progress through the planning system, cumulative impact of the proposed development with those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application.

The assessment should refer to the relevant National Character Areas which can be found on our website. Links for Landscape Character Assessment at a local level are also available on the same page.

Heritage Landscapes
You should consider whether there is land in the area affected by the development which qualifies for conditional exemption from capital taxes on the grounds of outstanding scenic, scientific or historic interest. An up-to-date list may be obtained at www.hmrc.gov.uk/heritage/lbsearch.htm.

4. Climate Change Adaptation
The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment 'by establishing coherent ecological networks that are more resilient to current and future pressures' (NPPF Para 174), which should be demonstrated through the ES.

5. Cumulative and in-combination effects
A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment.

The ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment, (subject to available information):
a. existing completed projects;
b. approved but uncompleted projects;
c. ongoing activities;
d. plans or projects for which an application has been made and which are under consideration by the consenting authorities; and
e. plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.

Ancient Woodland – addition to the S41 NERC Act paragraph
The S41 list includes six priority woodland habitats, which will often be ancient woodland, with all ancient semi-natural woodland in the South East falling into one or more of the six types.

Information about ancient woodland can be found in Natural England's standing advice http://www.naturalengland.org.uk/Images/standing-advice-ancient-woodland_tcm6-32633.pdf.

Ancient woodland is an irreplaceable resource of great importance for its wildlife, its history and the contribution it makes to our diverse landscapes. Local authorities have a vital role in ensuring its conservation, in particular through the planning system. The ES should have regard to the requirements under the NPPF (Para. 175)2 which states:

When determining planning applications, local planning authorities should apply the following principles:
a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts);
c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists.

<u>Environment Agency</u>

1.11 We have reviewed the submitted scoping report. We note in Section 4.1 that a Phase II ground investigation has already been undertaken, and that a flood risk assessment (FRA) and Outline Drainage strategy are proposed.

1.12 We are satisfied that geology and ground conditions can be scoped out of the EIA. Oil storage for the back-up generators will need to be properly designed but this should be feasible if proper pollution prevention methods are employed such as double skinned tanks with 110% bunded capacity and leak detection mechanism are included in the final design, as mentioned in section 2.13 of the report.

1.13 Foul drainage - Government guidance contained within the National Planning Practice Guidance (Water supply, wastewater and water quality – considerations for planning applications, paragraph 020) sets out a hierarchy of drainage options that must be considered and discounted in the following order:
1. Connection to the public sewer
2. Package sewage treatment plant (adopted in due course by the sewerage company or owned and operated under a new appointment or variation)
3. Septic Tank

1.14 Foul drainage should be connected to the main sewer. Where this is not possible, under the Environmental Permitting Regulations 2010 any discharge of sewage or trade effluent made to either surface water or groundwater will

need to be registered as an exempt discharge activity or hold a permit issued by the Environment Agency, addition to planning permission. This applies to any discharge to inland freshwaters, coastal waters or relevant territorial waters.

1.15 Please note that the granting of planning permission does not guarantee the granting of an Environmental Permit. Upon receipt of a correctly filled in application form we will carry out an assessment. It can take up to 4 months before we are in a position to decide whether to grant a permit or not.

1.16 Domestic effluent discharged from a treatment plant/septic tank at 2 cubic metres or less to ground or 5 cubic metres or less to surface water in any 24 hour period must comply with General Binding Rules provided that no public foul sewer is available to serve the development and that the site is not within a Groundwater Source Protection Zone.

1.17 A soakaway used to serve a non-mains drainage system must be sited no less than 10 metres from the nearest watercourse, not less than 10 metres from any other foul soakaway and not less than 50 metres from the nearest potable water supply, spring or borehole.

1.18 Where the proposed development involves the connection of foul drainage to an existing non-mains drainage system, the applicant should ensure that it is in a good state of repair, regularly de-sludged and of sufficient capacity to deal with any potential increase in flow and loading which may occur as a result of the development.

1.19 Where the existing non-mains drainage system is covered by a permit to discharge then an application to vary the permit will need to be made to reflect the increase in volume being discharged. It can take up to 13 weeks before we decide whether to vary a permit.

Lead Local Flood Authority (LLFA)

1.20 The LLFA agree with the applicant's assessment that an EIA is not required for the impact on hydrology as the applicant has undertaken an FRA.

Thames Water

1.21 Thames Water are satisfied that the report has considered the Water and sewerage needs of the development as set out in The EIA Regulations 2017 Schedule 4

North Wessex Downs Area of Outstanding Natural Beauty Planning Officer

1.22 No response

Arboriculture

1.23 Scoping comments awaited. Details below previously received.

1.24 It is also important that any emerging proposals include for a scheme of tree planting to compensate adequately for any that are lost. The current (apparent) lack of visibility is largely based on the extent and density of perimeter vegetation. It is important therefore that appropriate protection and ongoing management measures are put in place to ensure the longevity of this important feature..

Archaeology

1.25 Scoping comments awaited. Details below previously received.

1.26 This is clearly an area of archaeological interest and potential. There has been some prior development across the proposed development area, but the extent of archaeological survival is currently unknown as it has not been previously evaluated or assessed. I advise that a phased programme of archaeological evaluation is undertaken and reported on prior to determination of any planning application. This will need to take the form of a desk assessment, geophysical survey and trial trenching.

1.27 I am not convinced that an EIA chapter on archaeology is required in relation to the proposed development, especially if the above advised programme of evaluation is undertaken. If an EIA is deemed necessary, the results of the evaluation will need to inform the assessment of the impact of development on the archaeological resource.

Conservation

1.28 Scoping comments awaited. Details below previously received.

1.29 The site is situated in a sensitive rural context, within the North Wessex Downs AONB. It is within the setting of Burderop Park, a grade II* listed mansion house and other associated listed buildings, features and parkland. There are other heritage assets as identified via Historic England (HE) advice in respect of application S/EIA/20/1286, including conservation areas and scheduled monuments. In addition to the more obvious heritage assets within the overall historic landscape context, worthy of mention is Ladder Lane (aka Jacobs Ladder – Bridleway WR36). This is to the immediate west of the site and its significance and experience as a historic route within the wider historic landscape and with potential historic association to ‘Jefferies Land’ - referring to the author Richard Jefferies (1848-1887).

1.30 The effect upon heritage assets and their setting are the main heritage considerations. Irrespective of any need for an Environmental Statement (ES) as part of an EIA requirement a Heritage Statement/Heritage Assessment (HS/HA) should be undertaken. It should fully utilise accepted guidance in its assessment and analysis of the historic environment including, but not exclusive to, ‘The Setting of Heritage Assets Historic Environment Good Practice Advice in Planning Note 3’ (Historic England, Second Edition, 2017) and ‘Statements of Heritage Significance: Analysing Significance in Heritage Assets’ (Historic England, 2019) sufficient to satisfy the requirements indicated in the NPPF (NPPF, para 189).

1.31 Reviewing the proposed development documentation submitted I have some significant concerns relating to proposed siting, scale and massing of the development upon the historic environment. I am conscious that a HS is not yet been drafted; I would have anticipated that would have been beneficial to assist in informing development potential and proposals, rather than being a wholly retrospective task.

1.32 Overall I recommend without the necessary assessment and analysis it is premature to conclude that there is no effect upon the historic built environment and its setting.

Ecology

1.33 None of the documents referred to in the Environmental Statement Scoping Report (RPS, December 2020) have been submitted with the application. I am not aware of advice received from statutory agencies (Natural England, in particular) e.g. referred to at para 5.28. Therefore, I cannot offer a fully informed or settled opinion.

1.34 I recommend that 'noise and vibration' is scoped into the assessment, as noise may affect some of the species present within Burderop Wood Site of Special Scientific Interest (SSSI), especially birds. Studies such as Reijnen et al (1997) Biodiversity and Conservation 6, 567-581 found "evidence of strongly reduced densities of many [bird] species of woodland and open habitat in broad zones adjacent to busy roads". I appreciate that the noise from a data centre will be different, however the paper illustrates that noise has impacts on birds, so I recommend that impacts are assessed.

1.35 I also recommend that 'air quality' and 'residues and emissions' (para 4.5) are scoped in to the assessment, not least as emissions from diesel generators will blow downwind towards the SSSI and may have an impact on species in the woodland such as lichens. 'Radiation and heat' (para 4.5) and 'microclimate' (para 4.92) appear be important to address so I recommend that these are also scoped back in. Heat emissions and changes in humidity from the data centre may adversely affect the SSSI. The SSSI lies downwind (in the direction of the prevailing wind) of the proposed data centre. I raised this in my response to the Pre-App (S/PM1/20/1340).

1.36 Regarding security, I am assuming security lighting will be required. The EIA should consider the impact of lighting on species and habitats.).

Local Highway Authority (LHA)

1.37 With The site is located in a rural environ, therefore careful consideration of the accessibility of the site will need to be undertaken to demonstrate that the site is an appropriate location. Mitigation measures will be secured where necessary. The gradient of the hill, as well as distance from the nearest residential settlements (as a staff source) will also need to be considered.

1.38 A Transport Statement will be required, as the Agent indicates in the Covering Letter. The LHA welcomes early engagement with the Transport Consultant, on condition that the planning officer and planning agent are also included within the conversations. The Applicant should be aware that the validity of any traffic surveys undertaken during restrictions imposed as a result of the pandemic, may be questioned. TRICS have suspended all surveys until March 2021 at the earliest. The Transport Consultant should make early contact to agree a way forward.

1.39 It is noted that Brimble Hill is also a B road, however, the Council has received a number of complaints from increases in traffic using this route. Care is required when determining the existing and proposed trip generation for all modes along this route.

1.40 Parking provision will need to be provided in accordance with the emerging Parking Standards, or other robust evidence base. EVCPs will be required.

1.41 The site access will need to be assessed for its suitability to accommodate the proposed use. The location of barriers will be a consideration of the LHA, any resulting queuing on the public highway will not be accepted.

1.42 A Travel Plan will also be required.

1.43 The submitted information does not refer to the recent planning consent at Burderop Park for residential dwellings.

1.44 The initial details of construction movements within the EIA Scoping Note are high and likely to attract objections. Any application will need to demonstrate that the expected level of construction vehicles can be safely accommodated on the construction routes to the site. Car sharing is a normal means of reducing the quantity of construction worker traffic, however, alternatives will need to be considered in the event that construction is undertaken while Covid restrictions against car sharing remain.

1.45 A Construction Management Plan will be required, which could be covered by pre-commencement condition and will need to detail the following:
i. specify the type and number of vehicles;
ii. specify the point of construction access and access route to the site;
iii. set out details of the parking of vehicles of site operatives and visitors;
iv. set out arrangements for the loading and unloading of plant and materials;
v. set out arrangements for the storage of plant and materials used in constructing the development;
vi. set out arrangements for wheel washing facilities;
vii. specify the intended hours of construction operations.

Appendix 4.2

Key Points from Scoping Opinion

Table 1: Stakeholder Concerns and ES Responses

Name of Stakeholder	Point Raised	Where Addressed in the ES
Landscape		
Swindon Borough Council	The statement in para 5.14 [of the Scoping Report] '*Given its past and current use, the proposed development of the Application Site as a data centre would not have a likely significant effect on landscape character or the Special Qualities of the North Wessex Downs AONB'* cannot be agreed based on the information currently available.	The effects on the character and special qualities of the North Wessex Downs AONB during the construction phase are assessed at paragraphs 5.4.10 to 5.4.14. The effects on the character and special qualities of the North Wessex Downs AONB during the operation of the proposed development are assessed at paragraphs 5.5.9 to 5.5.13.
Swindon Borough Council	In 5.15 the statement '*viewpoints used in the assessment have been agreed with Swindon Borough Council'* should include the additional viewpoint to the east of Burderop House. If the ZTV and subsequent assessment shows that there is increased visibility over the perimeter vegetation, then we would want to see this included in the LVIA	The location of the agreed representative viewpoints, including the additional viewpoint requested by SBC are illustrated on Figure 5.26 and described in Table 5.8. The panoramic photography is at Figure 5.27 to 5.32. The additional viewpoint (12) does not lie within the ZTV (see Figure 5.26).
Swindon Borough Council	Any emerging proposals should include for a scheme of tree planting to compensate adequately for any that are lost	The landscape proposals are described at paragraphs 5.3.7 to 5.3.13 and illustrated on Figure 5.45. A detailed landscape strategy is at Appendix 5B to this chapter.
Swindon Borough Council	Given the evident conflict with national policy with regard to major development in the AONB, any application would need to take opportunities to enhance and conserve. With regard to the development plan, Policy EN5 sets out that unacceptable impacts upon the landscape will be avoided. Part c of the policy specifically requires that proposals within the AONB must accord with relevant criteria set out in the AONB Management Plan and paragraph 115 and 116 of the NPPF (2012) (Paragraphs 115 and 116 of the NPPF 2012 have since been replaced by Paragraph 172, and footnote 55 of the NPPF 2019.) These matters should be fully addressed in the Planning Statement.	See Planning Statement 20305S-RPS-XX-XX-RP-T-9701
Natural England	As the development site is within North Wessex downs AONB, consideration should be given to the direct and indirect effects upon this designated landscape and in particular the effect upon its purpose for designation within the environmental impact assessment, as well as the content of the relevant management plan for North Wessex Downs.	Both direct and indirect effects on the character and special qualities of the North Wessex Downs AONB - during the construction phase at paragraphs 5.4.10 to 5.4.14 and during the

Name of Stakeholder	Point Raised	Where Addressed in the ES
		operation of the proposed development are assessed at paragraphs 5.5.9 to 5.5.13
Natural England	Natural England would wish to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. The EIA should include assessments of visual effects on the surrounding area and landscape together with any physical effects of the development, such as changes in topography.	These details are provided on Figures 5.1 to 5.6, as well as Figure 5.26. Paragraphs 5.2.2 to 5.2.42 provide details of the planning policies and management plans relevant to landscape and visual resources.
Natural England	The EIA should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.	The landscape and visual baseline of the Application Site and the surrounding area are described in paragraphs 5.2.70 to 5.2.149 as well as Table 5.8. The proposed development including the lighting and landscape proposals are summarised paragraphs 5.3.1 to 5.3.13.
Natural England	Natural England supports the publication Guidelines for Landscape and Visual Impact Assessment, produced by the Landscape Institute and the Institute of Environmental Assessment and Management in 2013 (3rd edition). The methodology set out is almost universally used for landscape and visual impact assessment.	The LVIA within this chapter is based on the Guidelines for Landscape and Visual Impact Assessment: Third Edition
Natural England	In order to foster high quality development that respects, maintains, or enhances, local landscape character and distinctiveness, Natural England encourages all new development to consider the character and distinctiveness of the area, with the siting and design of the proposed development reflecting local design characteristics and, wherever possible, using local materials. The Environmental Impact Assessment process should detail the measures to be taken to ensure the building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit.	The landscape proposals using locally native species and mixes are set out at paragraphs 5.3.7 to 5.3.13. Details are found within Appendix 5B to this chapter.
Natural England	The assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. In this context Natural England advises that the cumulative impact assessment should include other proposals currently at Scoping stage. Due to the overlapping timescale of their progress through the planning system, cumulative impact of the proposed development with	A cumulative effects assessment is set out at paragraphs 5.6.1 to 5.6.3 and Table 5.9 of this chapter. For the location of the cumulative development see Appendix 4.3.

Name of Stakeholder	Point Raised	Where Addressed in the ES
	those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application.	
Natural England	The assessment should refer to the relevant National Character Areas which can be found on our website. Links for Landscape Character Assessment at a local level are also available on the same page.	Heritage and historic landscapes are considered in ES, Chapter 7: Historic Environment.
Ecology		
Swindon Borough Council	It is evident that both bat roost and invertebrate surveys are outstanding and will not be available prior to the submission of an application – This is a matter that needs to be fully addressed	The required surveys will be completed in spring prior to planning determination
Swindon Borough Council	A Discretionary Advice Service request to Natural England prior to application should be submitted to determine whether Natural England would consider this site suitable for the proposed development; and this should be included with any planning application.	There is direct engagement with NE and the outcomes of the discussions are being addressed within the planning application.
Swindon Borough Council	The Defra Biodiversity Metric should be submitted with a planning application as a working Excel spreadsheet. Biodiversity net gain will be required, in accordance with the NPPF and Local Plan Policy EN4, and as prescribed by legislation in force at that time. If this cannot be achieved on site, then a biodiversity offsetting arrangement should be made.	A summary of the BNG and the Biodiversity Metric are to be submitted with the final ES chapter.
Swindon Borough Council	It is welcomed that the assessment will address the impacts from changes in habitat quality or disturbance, through changes in lighting or noise. This should also include changes resulting from heat loss/changes in humidity and the use of the generators.	The impact of changes in lighting, noise and heat on the SSSI are discussed in Chapter 6 Ecology and Biodiversity.
Swindon Borough Council	The scoping out of ecological receptors, namely Otters; Water Voles; and Amphibians, is based on existing survey data which is not available as part of this scoping report	These species have been scoped out as ecological receptors due to nature and context of the site
Natural England	**2.1 Ecological Aspects of an Environmental Statement** Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters. Guidelines for Ecological Impact Assessment (EcIA) have been developed by the	Chapter 6: Ecology and Biodiversity identifies and assesses the effects on ecology and biodiversity which would result from the proposed development. This is supported by a suite of technical reports which includes: • Ecological Appraisal Report; • Biodiversity Net Gain Assessment;

Name of Stakeholder	Point Raised	Where Addressed in the ES
	Chartered Institute of Ecology and Environmental Management (CIEEM) and are available on their website. EcIA is the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components. EcIA may be carried out as part of the EIA process or to support other forms of environmental assessment or appraisal. The National Planning Policy Framework sets out guidance in S.174-177 on how to take account of biodiversity interests in planning decisions and the framework that local authorities should provide to assist developers.	• Reptiles Working Methodology; • Outline Grassland Translocation and Soil Management Method Statement; and • Biodiversity Management and Monitoring Plan.
Natural England	**2.2 Internationally and Nationally Designated Sites** The ES should thoroughly assess the potential for the proposal to affect designated sites. European sites (e.g. designated Special Areas of Conservation and Special Protection Areas) fall within the scope of the Conservation of Habitats and Species Regulations 2017 (as amended). In addition paragraph 176 of the National Planning Policy Framework requires that potential Special Protection Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites. Under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site. Should a Likely Significant Effect on a European/Internationally designated site be identified or be uncertain, the competent authority (in this case the Local Planning Authority) may need to prepare an Appropriate Assessment, in addition to consideration of impacts through the EIA process.	A list of designated sites is provided within the baseline environment section of Chapter 6 alongside a description of the key sites. In addition, an assessment of construction, operation and cumulative effects upon designated sites is provided within Chapter 6.
Natural England	**Sites of Special Scientific Interest (SSSIs) and sites of European or international importance (Special Areas of Conservation, Special Protection Areas and Ramsar sites)**	N/A

Name of Stakeholder	Point Raised	Where Addressed in the ES
	The development site is adjacent to the following designated nature conservation site(s): • Burderop wood SSSI • Further information on the SSSI and its special interest features can be found at www.magic.gov . The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within Click here to enter text. and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects. • - European site conservation objectives are available on our internet site http://publications.naturalengland.org.uk/category/6490068894089216	
Natural England	**2.3 Regionally and Locally Important Sites** The EIA will need to consider any impacts upon local wildlife and geological sites. Local Sites are identified by the local wildlife trust, geoconservation group or a local forum established for the purposes of identifying and selecting local sites. They are of county importance for wildlife or geodiversity. The Environmental Statement should therefore include an assessment of the likely impacts on the wildlife and geodiversity interests of such sites. The assessment should include proposals for mitigation of any impacts and if appropriate, compensation measures. Contact the local wildlife trust, geoconservation group or local sites body in this area for further information.	A list of regionally and locally and important sites is provided within the baseline environment section of Chapter 6 In addition, an assessment of construction, operation and cumulative effects upon key regionally and locally and important sites is provided within Chapter 6.
Natural England	**2.4 Protected Species** Species protected by the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2017 (as amended) The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats). Natural England does not hold comprehensive information regarding the locations of species protected by law, but advises on the procedures and legislation relevant to such species. Records of protected species should be sought from appropriate local biological record centres, nature conservation organisations, groups and individuals; and consideration should be given to the wider context of	A list of protected species is provided within the baseline environment section of Chapter 6 In addition, an assessment of construction, operation and cumulative effects upon protected species is provided within Chapter 6. An Ecological Appraisal Report has been produced and covers the survey process in detail.

Name of Stakeholder	Point Raised	Where Addressed in the ES
	the site for example in terms of habitat linkages and protected species populations in the wider area, to assist in the impact assessment. The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System. The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES. In order to provide this information there may be a requirement for a survey at a particular time of year. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and where necessary, licensed, consultants. Natural England has adopted standing advice for protected species which includes links to guidance on survey and mitigation.	
Natural England	**2.5 Habitats and Species of Principal Importance** The ES should thoroughly assess the impact of the proposals on habitats and/or species listed as 'Habitats and Species of Principal Importance' within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act 2006 places a general duty on all public authorities, including local planning authorities, to conserve and enhance biodiversity. Further information on this duty is available here https://www.gov.uk/guidance/biodiversity-duty-public-authority-duty-to-have-regard-to-conserving-biodiversity. Government Circular 06/2005 states that Biodiversity Action Plan (BAP) species and habitats, 'are capable of being a material consideration…in the making of planning decisions'. Natural England therefore advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. Consideration should also be given to those species and habitats included in the relevant Local BAP. Natural England advises that a habitat survey (equivalent to Phase 2) is carried out on the site, in order to identify any important habitats present. In addition, ornithological, botanical and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any	A list of species of principal importance is provided within the baseline environment section of Chapter 6 alongside the protected species. In addition, an assessment of construction, operation and cumulative effects species of principal importance is provided within Chapter 6 where relevant. Mitigation measures to be adopted as part of the project are included within Chapter 6 with sections focusing in habitats and species protection. An Ecological Appraisal Report has been produced.

Name of Stakeholder	Point Raised	Where Addressed in the ES
	scarce or priority species are present. The Environmental Statement should include details of: • Any historical data for the site affected by the proposal (e.g. from previous surveys); • Additional surveys carried out as part of this proposal; The habitats and species present; • The status of these habitats and species (e.g. whether priority species or habitat); • The direct and indirect effects of the development upon those habitats and species; • Full details of any mitigation or compensation that might be required. The development should seek if possible to avoid adverse impact on sensitive areas for wildlife within the site, and if possible provide opportunities for overall wildlife gain. The record centre for the relevant Local Authorities should be able to provide the relevant information on the location and type of priority habitat for the area under consideration.	
Natural England	**2.6 Contacts for Local Records** Natural England does not hold local information on local sites, local landscape character and local or national biodiversity priority habitats and species. We recommend that you seek further information from the appropriate bodies (which may include the local records centre, the local wildlife trust, local geoconservation group or other recording society and a local landscape characterisation document).	Records of protected species have been obtained from local groups
Historic Environment		
Swindon Borough Council	It is not accepted that the potential for buried archaeological deposits is likely to be restricted to areas of the site which have not been developed. The extent of archaeological survival is currently unknown as it has not been previously evaluated or assessed. A phased programme of archaeological evaluation will need to be undertaken and reported on prior to determination of any planning application. This will need to take the form of a desk assessment, geophysical survey and trial trenching. The results of the evaluation will need to inform the assessment of the impact of development on the archaeological resource. It is not	The extent and depth of the 'made ground' means that geophysical survey and trial trenching are not appropriate methodologies for establishing the potential for the presence of features or deposits of archaeological interest. This issue was discussed with the Archaeology Advisor to Swindon Borough Council in a telephone call on 19 January 2021 and in a second call on 04 March 2021.

Name of Stakeholder	Point Raised	Where Addressed in the ES
	considered that this needs to be part of the ES subject to the evaluation being completed prior to the submission of any application.	
Swindon Borough Council	This chapter should fully utilise accepted guidance in its assessment and analysis of the historic environment including, but not exclusive to, 'The Setting of Heritage Assets Historic Environment Good Practice Advice in Planning Note 3' (Historic England, Second Edition, 2017) and 'Statements of Heritage Significance: Analysing Significance in Heritage Assets' (Historic National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton England, 2019) sufficient to satisfy the requirements indicated in the NPPF (NPPF, para 189).	The guidance utilised is summarised in Section 7.2 with Appendix 7.1 providing Legislation and Policy Context.
Swindon Borough Council	An assessment of alternatives should only be undertaken following the conclusions of the Historic Environment assessment	The Historic Environment assessment conclusions are set out in Chapter 7 of the ES.
Historic England	This development could, potentially, have an impact upon a number of designated heritage assets and their settings in the area around the site. In line with the advice in the National Planning Policy Framework (NPPF), we would expect the Environmental Statement to contain a thorough assessment of the likely effects which the proposed development might have upon those elements which contribute to the significance of these assets.	The potential impacts on designated heritage assets as a result of change within their settings is presented in section 7.6 of this chapter
Historic England	Our initial assessment shows the attached list of designated heritage assets within 2.5km of the proposed development. We would draw your attention, in particular, to the following: Scheduled Ancient Monuments: • Medieval Remains at Overtown Grade II* Listed Buildings: • Burderop Park • Overton House Conservation Areas: • Hodson • Wroughton	The assessment of potential impacts on designated heritage assets as a result of change within their settings is presented in section 7.6 of this chapter.
Historic England	We would also expect the Environmental Statement to consider the potential impacts on non-designated features of historic, architectural, archaeological or artistic interest, since these can also be of national importance and make an important contribution to the character and local	The assessment of potential impacts on non-designated heritage assets is presented in section 7.6 of this chapter.

Name of Stakeholder	Point Raised	Where Addressed in the ES
	distinctiveness of an area and its sense of place. This information is available via the local authority Historic Environment Record (www.heritagegateway.org.uk) and relevant local authority staff.	The local authority Historic Environment Record has been consulted.
Historic England	We would strongly recommend that you involve the Conservation Officer and archaeological staff at Swindon Borough Council in the development of this assessment. They are best placed to advise on: local historic environment issues and priorities; how the proposal can be tailored to avoid and minimise potential adverse impacts on the historic environment; the nature and design of any required mitigation measures; and opportunities for securing wider benefits for the future conservation and management of heritage assets. It is important that the assessment is designed to ensure that all impacts are fully understood. Section drawings and techniques such as photomontages are a useful part of any assessment.	The relevant advisors at Swindon Borough Council have been consulted, either directly or through the process of consultation at pre-application and scoping stages.
Historic England	The assessment should also take account of the potential impact which associated activities (such as construction, servicing and maintenance, and associated traffic) might have upon perceptions, understanding and appreciation of the heritage assets in the area. The assessment should also consider, where appropriate, the likelihood of alterations to drainage patterns that might lead to in situ decomposition or destruction of below ground archaeological remains and deposits, and can also lead to subsidence of buildings and monuments.	Construction activities have been included within the assessment of impacts and effects presented in this chapter of the ES.
Historic England	The following comments made with regard to the screening request remain relevant: We would expect the EIA to contain an examination of the potential impacts upon all heritage assets likely to be affected, including designated heritage assets and their settings together with potential impacts on non-designated features of historic, architectural, archaeological or artistic interest, since these can also be of national importance and make an important contribution to the character and local distinctiveness of an area and its sense of place. This covers buildings, historic open spaces, historic features and the wider historic landscape including below-ground archaeology. We welcome the recommendation to undertake archaeological evaluation work. This will help better define the significant areas of archaeology.	This is covered in Chapter 7: Historic Environment.
Natural England	You should consider whether there is land in the area affected by the development which qualifies for conditional exemption from capital taxes	Noted

Name of Stakeholder	Point Raised	Where Addressed in the ES
	on the grounds of outstanding scenic, scientific or historic interest. An up-to-date list may be obtained at www.hmrc.gov.uk/heritage/lbsearch.htm.	
Transport		
Highways England	An assessment of transport related impacts of the proposal should be carried out and reported as described in the current Ministry of Housing, Communities and Local Government guidance.	The assessment of transport related impacts is undertaken in Section 6 of the Transport Assessment.
Highways England	Environmental impacts arising from any disruption during construction, traffic volume, composition or routing change and transport infrastructure modification should be fully assessed and reported, along with the environmental impact of the road network upon the development itself.	Assessed is Section 6 of the Transport Assessment and the management of construction traffic will be implemented through the CTMP
Highways England	The transport assessment should consider the operation of the strategic road network in line with national planning practice guidance and DfT Circular 02/2013 The Strategic Road Network and the Delivery of Sustainable Development. Where surveys are undertaken to inform the baseline for assessment, it should be noted that given current pandemic restrictions, these may not be considered representative and are therefore undertaken at the developer's risk. Where the proposals would result in a severe congestion or unacceptable safety impact, mitigation will be required in line with current policy.	Circular 02/2013 The Strategic Road Network and the Delivery of Sustainable Development is listed in Section 1.3: Scope of the Assessment and set out in Section 4.2 of the Transport Assessment.
Local Highway Authority	With The site is located in a rural environ, therefore careful consideration of the accessibility of the site will need to be undertaken to demonstrate that the site is an appropriate location. Mitigation measures will be secured where necessary. The gradient of the hill, as well as distance from the nearest residential settlements (as a staff source) will also need to be considered.	Access has been considered in Section 3.3 of the Transport Assessment. In addition, construction access is considered in Section 4 of the CTMP (Annex D of the Transport Assessment).
Local Highway Authority	A Transport Statement will be required, as the Agent indicates in the Covering Letter. The LHA welcomes early engagement with the Transport Consultant, on condition that the planning officer and planning agent are also included within the conversations. The Applicant should be aware that the validity of any traffic surveys undertaken during restrictions imposed as a result of the pandemic, may be questioned. TRICS have suspended all surveys until March 2021 at the earliest. The Transport Consultant should make early contact to agree a way forward.	A Transport Assessment is provided at Appendix 8.3 of the Environmental Statement.
Local Highway Authority	It is noted that Brimble Hill is also a B road, however, the Council has received a number of complaints from increases in traffic using this route. Care is required when determining the existing and proposed trip generation for all modes along this route.	Trip Generation for both the construction and operational phase has been undertaken and is presented in Section 5 of the Transport Assessment.

Name of Stakeholder	Point Raised	Where Addressed in the ES
Local Highway Authority	Parking provision will need to be provided in accordance with the emerging Parking Standards, or other robust evidence base. EVCPs will be required.	
Local Highway Authority	The site access will need to be assessed for its suitability to accommodate the proposed use. The location of barriers will be a consideration of the LHA, any resulting queuing on the public highway will not be accepted	The Access Arrangements for the site are discussed in Section 3.3 of the Transport Assessment.
Local Highway Authority	A Travel Plan will also be required	Submitted as part of the Transport Assessment
Local Highway Authority	The submitted information does not refer to the recent planning consent at Burderop Park for residential dwellings.	Section 6 of the Transport Assessment discusses the cumulative transport effects with the construction of the Burderop Park residential development (original Planning Reference: S/17/0128).
Local Highway Authority	The initial details of construction movements within the EIA Scoping Note are high and likely to attract objections. Any application will need to demonstrate that the expected level of construction vehicles can be safely accommodated on the construction routes to the site. Car sharing is a normal means of reducing the quantity of construction worker traffic, however, alternatives will need to be considered in the event that construction is undertaken while Covid restrictions against car sharing remain.	Section 3.6 of the Transport Assessment addresses construction vehicle movements as well as CTMP setting out the management of this.
Local Highway Authority	A Construction Management Plan will be required, which could be covered by pre-commencement condition and will need to detail the following: i. specify the type and number of vehicles; ii. specify the point of construction access and access route to the site; iii. set out details of the parking of vehicles of site operatives and visitors; iv. set out arrangements for the loading and unloading of plant and materials; v. set out arrangements for the storage of plant and materials used in constructing the development; vi. set out arrangements for wheel washing facilities; vii. specify the intended hours of construction operations.	A Construction Transport Management Plan has been provided at Annex D of the Transport Assessment.
Noise		

Name of Stakeholder	Point Raised	Where Addressed in the ES
Highways England	Adverse changes to noise and air quality should be considered, including in relation to compliance with the European air quality Limit Values and/or Local Authority designated Air Quality Management Areas (AQMAs) and World Health Organisation (WHO) criteria. Location specific considerations.	Noise impacts are addressed Appendix 8.1: Noise Impact Assessment of the ES.
Air Quality		
Highways England	Adverse changes to noise and air quality should be considered, including in relation to compliance with the European air quality Limit Values and/or Local Authority designated Air Quality Management Areas (AQMAs) and World Health Organisation (WHO) criteria. Location specific considerations	Air Quality impacts are addressed in Appendix 8.2: Air Quality Assessment of the ES.
Cumulative Effects		
Highways England	The effects of the proposed development should be assessed cumulatively with other schemes and we would expect the applicants to agree an appropriate list of schemes, including committed development in the area, with the local planning authority.	Cumulative impacts are addressed with regard to each environmental impact respectively throughout the ES.
Natural England	A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment.	Cumulative Effects are considered in each chapter of the Environmental Statement and supporting technical appendices.
Natural England	The ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment, (subject to available information): a. existing completed projects; b. approved but uncompleted projects; c. ongoing activities; d. plans or projects for which an application has been made and which are under consideration by the consenting authorities; and e. plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.	Each topic chapter considers the cumulative effects of the proposed development with developments listed within appendix 4.3. These assessments are clearly titled within each relevant chapter.

Name of Stakeholder	Point Raised	Where Addressed in the ES
Natural England	**Ancient Woodland – addition to the S41 NERC Act paragraph** The S41 list includes six priority woodland habitats, which will often be ancient woodland, with all ancient semi-natural woodland in the South East falling into one or more of the six types. Information about ancient woodland can be found in Natural England's standing advice http://www.naturalengland.org.uk/Images/standing-advice-ancient-woodland_tcm6-32633.pdf. Ancient woodland is an irreplaceable resource of great importance for its wildlife, its history and the contribution it makes to our diverse landscapes. Local authorities have a vital role in ensuring its conservation, in particular through the planning system. The ES should have regard to the requirements under the NPPF (Para. 175)2 which states: When determining planning applications, local planning authorities should apply the following principles: a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts); c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists.	-Alternative layouts are considered in chapter 3 of the Environmental Statement – Needs and Alternatives. The design of the proposed development has incorporated a minimum 15m standoff from the Ancient Woodland in accordance with Natural England guidance.
Climate Change		
Natural England	The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment 'by establishing coherent ecological networks that are more resilient to current and future pressures' (NPPF Para 174), which should be demonstrated through the ES.	The development has been designed with an impetus on sustainability as a means to limit impacts on climate change wherever possible. These issues are addressed specifically in the Sustainability Statement and Energy Statement.
Hydrology and Flood Risk		

Name of Stakeholder	Point Raised	Where Addressed in the ES
Environment Agency	We are satisfied that geology and ground conditions can be scoped out of the EIA. Oil storage for the back-up generators will need to be properly designed but this should be feasible if proper pollution prevention methods are employed such as double skinned tanks with 110% bunded capacity and leak detection mechanism are included in the final design, as mentioned in section 2.13 of the report.	Flood risk and hydrology impacts have been addressed in Appendix 8.4 of the ES.
Foul Drainage		
Environment Agency	Foul drainage - Government guidance contained within the National Planning Practice Guidance (Water supply, wastewater and water quality – considerations for planning applications, paragraph 020) sets out a hierarchy of drainage options that must be considered and discounted in the following order: 1. Connection to the public sewer 2. Package sewage treatment plant (adopted in due course by the sewerage company or owned and operated under a new appointment or variation) 3. Septic Tank Foul drainage should be connected to the main sewer. Where this is not possible, under the Environmental Permitting Regulations 2010 any discharge of sewage or trade effluent made to either surface water or groundwater will need to be registered as an exempt discharge activity or hold a permit issued by the Environment Agency, addition to planning permission. This applies to any discharge to inland freshwaters, coastal waters or relevant territorial waters. Please note that the granting of planning permission does not guarantee the granting of an Environmental Permit. Upon receipt of a correctly filled in application form we will carry out an assessment. It can take up to 4 months before we are in a position to decide whether to grant a permit or not.	Drainage design and philosophy has been addressed in Appendix 8.4 of the ES and in the RPS Drainage Design Philosophy, reference 20305S-RPS-00-XX-RP-D-9605 and the Proposed Surface Water Drainage Strategy drawing reference 20305S-RPS-00-XX-DR-D-9630
Environment Agency	Domestic effluent discharged from a treatment plant/septic tank at 2 cubic metres or less to ground or 5 cubic metres or less to surface water in any 24 hour period must comply with General Binding Rules provided that no public foul sewer is available to serve the development and that the site is not within a Groundwater Source Protection Zone.	Drainage design and philosophy has been addressed in Appendix 8.4 of the ES and in the RPS Drainage Design Philosophy, reference 20305S-RPS-00-XX-RP-D-9605 and the Proposed Surface Water Drainage Strategy drawing reference 20305S-RPS-00-XX-DR-D-9630

Name of Stakeholder	Point Raised	Where Addressed in the ES
Environment Agency	A soakaway used to serve a non-mains drainage system must be sited no less than 10 metres from the nearest watercourse, not less than 10 metres from any other foul soakaway and not less than 50 metres from the nearest potable water supply, spring or borehole.	Drainage design and philosophy has been addressed in Appendix 8.4 of the ES and in the RPS Drainage Design Philosophy, reference 20305S-RPS-00-XX-RP-D-9605 and the Proposed Surface Water Drainage Strategy drawing reference 20305S-RPS-00-XX-DR-D-9630
Environment Agency	Where the proposed development involves the connection of foul drainage to an existing non-mains drainage system, the applicant should ensure that it is in a good state of repair, regularly de-sludged and of sufficient capacity to deal with any potential increase in flow and loading which may occur as a result of the development.	Noted
Environment Agency	Where the existing non-mains drainage system is covered by a permit to discharge then an application to vary the permit will need to be made to reflect the increase in volume being discharged. It can take up to 13 weeks before we decide whether to vary a permit.	Noted
Lead Local Flood Authority (LLFA)	The LLFA agree with the applicant's assessment that an EIA is not required for the impact on hydrology as the applicant has undertaken an FRA.	FRA is provided at Appendix 8.4.
Thames Water	Thames Water are satisfied that the report has considered the Water and sewerage needs of the development as set out in The EIA Regulations 2017 Schedule 4	Noted

Table Note

Appendix 4.3

List of Cumulative Developments

Ref	Name	Application Ref	Description	Distance from Site	Planning Status
1	Burderop Park Wroughton Swindon	S/17/0128 S/19/0441 S/19/1765 S/20/0926 S/20/1234	Demolition of the pavilions, change of use of offices and ancillary buildings to 25no. apartments/dwellings, erection of 52no. dwellings, construction of new access and associated works	10m	Approved Approved Approved Pending Pending
2	Burderop Park Wroughton Swindon	S/19/1892 S/20/0924	Erection of 6no. additional dwellings	10m	Approved Pending
3	Land East Of Marlborough Road Wroughton Swindon	S/OUT/15/0912 S/RES/19/1852	Erection of 103no. dwellings and associated works	1.1km	Allowed on appeal Approved
4	Broome Manor Golf Complex	S/17/2075	Installation of new surface car park with photo-voltaic canopies and associated landscaping, including a pedestrian and power supply cable link to Nationwide House.	1.2km	Pending
5	Berkeley Farm Swindon Road Wroughton Swindon	S/18/1774	Erection of 44 dwellings and associated works.	1.2km	Approved

Ref	Name	Application Ref	Description	Distance from Site	Planning Status
6	Land at Berkeley Farm Swindon Road Wroughton Swindon	S/OUT/14/1005 S/RES/17/0635 S/18/1403	Erection of 100 residential dwellings, with open space, landscaping, internal roads & footpaths, parking including garages and other associated infrastructure.	1.2km	Allowed on appeal Approved Approved
7	The Ivy Hotel Moormead Road Wroughton Swindon SN4 9BY	S/16/0487	Demolition of buildings on site and the construction of 38 no. residential units of Retirement Living accommodation including communal facilities, guest suite, landscaping and car parking.	1.3km	Approved
8	Artis Farm Swindon Road Wroughton Swindon	S/17/2097	Erection of 13no. dwellings and associated works	1.4km	Approved
9	Carite Car Sales 1,3 And 5 Moormead Road Wroughton	S/OUT/17/2080	Outline application for the erection of 12no dwellings, and associated works - All Matters reserved.	1.3km	Pending
10	Land East Of Marlborough Road Wroughton Swindon	S/RES/19/1852	Erection of 103no. dwellings and associated works – reserved matters pursuant to planning permission S/OUT/15/0912	1.1km	Approved

Ref	Name	Application Ref	Description	Distance from Site	Planning Status
11	Land To The Rear Of Woodland View Wroughton Swindon	S/15/1750 S/OUT/20/0556	Erection of 104no. dwellings, traffic roundabout, roads and associated works - Means of Access, Layout and Scale not reserved	1.7km	Approved Pending
12	Land At Langton Park Wroughton Swindon	S/18/1033	Erection of 18no. dwellings with associated access, parking and landscaping.	1.5km	Approved
13	Land To The West Of Former Electricity Sub Station Langton Park Wroughton Swindon	S/20/0120	Erection of 30no. dwellings with associated access, parking and landscaping	1.6km	Approved
14	Former Haskins Garage High Street Wroughton Swindon	S/15/1190 S/17/0286	Erection of 13no. dwellings and associated works.	1.9km	Approved Approved
15	Land At Clevedon House Woodland View Wroughton Swindon SN4 9BD	S/OUT/15/1338 S/RES/19/0446	Erection of 10no. dwellings and associated works	1.8km	Approved Approved

Ref	Name	Application Ref	Description	Distance from Site	Planning Status
16	Land at Marlborough Park, Pipers Way, Old Town	S/18/0181	Erection of 70no. dwellings and associated access, open space and infrastructure (phased development).	1.9km	Approved
17	Land At Marlborough Park Swindon	S/OUT/15/2051 S/AMEND/18/1327 S/AMEND/18/1481	A Hybrid application for a mix of residential development to include - full details of the erection of 91no. dwellings & 74no. age-restricted retirement dwellings and associated works and an outline proposal for up to 313no. dwellings, public open space and play area (Means of Access not reserved)	1.7km	Approved Approved Approved
18	Wakefield House Pipers Way Old Town	S/14/2137	Demolition of existing energy centre and erection of a mixed use four storey building with a convenience retail store (Class A1) on the ground floor with 18no. apartments above and 16no. houses and associated works.	2.1km	Approved
			The existing electrical infrastructure (11 kV) to the Application Site has adequate power capacity to meet the business demand and energy requirements for the operation of the first phase of the data centre. For the operation of the subsequent phases of the data centre, an upgrade to the electrical infrastructure will be required by the utility company. The existing cables serving the site may not be capable of supplying additional power and future upgrade work would involve upgrade works to the substations at Toothill and Wroughton and also the installation of 33 kV circuits to connect to the Site. There is an existing cable between Toothill and Wroughton that will be evaluated if it can accommodate the infrastructure. Any new cable infrastructure works is expected to be in an industry-standard underground utility trench in public roads or carriageways. Such works would be expected to be undertaken in accordance with standard-utility construction work guidelines and method of construction. It is understood that this upgrade work is required by January 2024 - based on current demand. However, the utility company will also explore the technical feasibility of future reinforcement works to the existing 11 kV infrastructure		

Ref	Name	Application Ref	Description	Distance from Site	Planning Status
			and if this is feasible, the 33 kV upgrade works would be not needed until early 2026 (based on current demand forecasts). As with all power-related supply works; the utility provider will be responsible for the design, permitting, construction and operation of the power infrastructure. However, at this stage, the precise route / location (and timing) of the future works to upgrade the electricity infrastructure has not yet been confirmed but we understand the route will be designed to minimise effects on environmental receptors. In addition to power infrastructure, fibre connectivity and water-utility connections will be required to the site. Offsite connections with respect to water-utility services are limited to connections at the immediate boundary of the site. The fibre works to the site will predominantly consist of leveraging the existing telecommunications duct infrastructure to deliver new fibre cables to the site. Due to the age and installation method, the existing fibre cables can't be reused however where possible, existing ductwork will be reutilised. There will be a requirement to install new lateral connections into the site from an East and West direction along Brimble Hill Road to provide the required fibre diversity. Any new cable duct infrastructure works is expected to be in an industry-standard underground utility trench in public roads or carriageways. Such works would be expected to be undertaken in accordance with standard-utility construction work guidelines and method of construction. All fibre network works related to connecting this site will be undertaken (and permitted) by Licenced Telecommunications Operators. The fibre network will remain under the ownership of the selected Telecommunications Operator and they will be responsible for all associated operations and maintenance works related to the fibre network.		

Appendix 1.1

Information Required within an ES – Extracts from the Town and Country Planning (Environmental Impact Assessment) Regulations 2017: Regulation 18(3) and Schedule 4

REGULATION 18

Environmental Statements

'18.—(1) Subject to regulation 9, an EIA application must be accompanied by an environmental statement for the purposes of these Regulations.

(2) A subsequent application is to be taken to be accompanied by an environmental statement for the purpose of paragraph (1) where the application for planning permission to which it relates was accompanied by a statement referred to by the applicant as an environmental statement for the purposes of these Regulations, but this is subject to regulation 9.

(3) An environmental statement is a statement which includes at least—

a. a *description of the proposed development comprising information on the site, design, size and other relevant features of the development;*

b. *a description of the likely significant effects of the proposed development on the environment;*

c. *a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*

d. *a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;*

e. *a non-technical summary of the information referred to in sub-paragraphs (a) to (d); and*

f. *any additional information specified in Schedule 4 relevant to the specific characteristics of the particular* development or type of development and to the environmental features likely to be significantly affected.

(4) An environmental statement must—

a. *where a scoping opinion or direction has been issued in accordance with regulation 15 or 16, be based on the most recent scoping opinion or direction issued (so far as the proposed development remains materially the same as the proposed development which was subject to that opinion or direction);*

b. *include the information reasonably required for reaching a reasoned conclusion on the significant effects of the development on the environment, taking into account current knowledge and methods of assessment; and*

c. *be prepared, taking into account the results of any relevant UK environmental assessment, which are reasonably available to the person preparing the environmental statement, with a view to avoiding duplication of assessment.*

(5) In order to ensure the completeness and quality of the environmental statement—

a. the *developer must ensure that the environmental statement is prepared by competent experts; and*

b. *the environmental statement must be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts.'*

SCHEDULE 4: INFORMATION FOR INCLUSION IN ENVIRONMENTAL STATEMENTS

'1. A description of the development, including in particular:

a. *a description of the location of the development;*

b. *a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;*

c. *a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;*

d. *an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.*

2. A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.

4. A description of the factors specified in regulation 4(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.

5. A description of the likely significant effects of the development on the environment resulting from, inter alia:

a. the construction and existence of the development, including, where relevant, demolition works;

b. *the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;*

c. *the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;*

d. *the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);*

e. *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;*

f. *the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;*

g. *the technologies* and the substances used.

The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project, including in particular those established under Council Directive 92/43/EEC(a) and Directive 2009/147/EC(b).

6. A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.

7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.

8. A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU(c) of the European Parliament and of the Council or Council Directive 2009/71/Euratom(d) or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.

9. A non-technical summary of the information provided under paragraphs 1 to 8.

10. A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.'

Appendix 1.2

Statement of Expertise

STATEMENT OF EXPERTISE

RPS

A.1 RPS is a member of the Institute if Environmental Management and Assessment (IEMA) Environmental Impact Assessment (EIA) Quality Mark. This means that RPS adheres to the following quality mark commitments:

- EIA Management – We commit to using effective project control and management processes to deliver quality in the EIA we co-ordinate and the Environmental Statements we produce.
- EIA Team Capabilities – We commit to ensuring that all out EIA staff have the opportunity to undertake regular and relevant continuing professional development.
- EIA Regulatory Compliance – We commit to delivering Environmental Statements that meet the requirements established within the appropriate UK EIA Regulations.
- EIA Context and Influence – We commit to ensuring that all EIAs we co-ordinate are effectively scoped and that we will transparently indicate how the EIA process, and any consultation undertaken, influenced the development proposed and any alternatives considered.
- EIA Content – We commit to undertaking assessments that include: a robust analysis of the relevant baseline; assessment and transparent evaluation of impact significance; and an effective description of measures designed to monitor and manage significant effects.
- EIA Presentation – We commit to deliver Environmental Statements that set out environmental information in a transparent and understandable manner.
- Improving EIA Practice – We commit to enhance the profile of good quality EIA by working with IEMA to deliver a mutually agreed set of activities, on an annual basis, and by making appropriate examples of our work available to the wider EIA community.

Management Team

Clare Russel

A.2 Clare is an Associate with RPS with 18 years' experience in environmental consultancy. She specialises in EIA and has managed multi-disciplinary teams to deliver high quality Environmental Statements for a range of developments including Nationally Significant Infrastructure Projects for offshore wind farms and energy projects, and road improvement schemes. Clare is an experienced project manager and co-ordinator of multi-disciplinary EIAs. She has detailed knowledge of the EIA process and offers a holistic approach to resolving difficulties in complex applications.

Topic Authors

Ecology and Nature Conservation

A.3 Paul Turner is an experienced senior ecologist undertaking and managing ecology aspects for projects across the UK. Paul has a detailed understanding of wildlife legislation, biodiversity planning, and protected species survey and mitigation, and provides high quality ecological advice and support in resolving complex ecological issues, with experience of working in the residential, waste, energy and public sectors. Paul project manages the technical delivery of projects including survey planning and implementation, mitigation design, impact assessment, technical reporting and client support.

A.4 Tim Oliver is a highly experienced ecologist leading the ecology team in the Bristol office, managing all the services provided by the team with responsibility for the winning, delivery and quality of the

work. Tim provides high quality ecology support on complex and challenging projects throughout the UK. Having worked in ecology, conservation and consultancy for twenty years, Tim brings a depth of experience and technical expertise to projects and a detailed understanding of how to resolve ecology issues and protect biodiversity.

Landscape and Visual Impact

A.5 Corinna Demmar is a Chartered Member of the Landscape Institute and one of RPS' leading landscape consultants with over 30 years' experience in landscape architecture and landscape planning. During her career she has gained considerable experience in the preparation of Landscape and Visual Impact Assessments (LVIAs) for Environmental Statements. She has also undertaken impact assessments for seascapes and historic landscapes for Nationally Significant Infrastructure Projects. These include more than 20 years' experience on energy projects, in addition to work in the commercial, residential, leisure, NHS education and mineral extraction sectors.

Historic Environment

A.6 Mick Rawlings has 30 years of professional experience within the historic environment sector, with projects in the UK & overseas. He has been employed by contracting and consulting organisations that provide archaeological and historic environment services to a wide range of clients. These include transport and infrastructure providers as well as public agencies and private sector developers. His experience includes road, rail and aviation projects, renewable energy schemes (including onshore and offshore wind farms) and a considerable number of large-scale residential schemes.

Technical Assessment Authors

Air Quality

A.7 Fiona Prismall is a Technical Director of RPS' Air Quality team. She has a BSc in Pure Mathematics, an MSc (Distinction) in Applied Meteorology and is a Chartered Environmentalist, Member of the Institution of Environmental Sciences and Fellow of the Institute of Air Quality Management (IAQM). She has over 17 years extensive experience in undertaking air quality assessments for a broad range of developments including waste management facilities, major transport infrastructure schemes, minerals operations, industrial installations, data centres, commercial, retail, residential and mixed-used developments.

Noise

A.8 Susan Hirst has over 13 years of experience in the field of acoustics. She holds a Bachelor of Science degree in Acoustics from Salford University and a diploma in professional studies for a placement year spent at the Building Research Establishment. She is a Member of the Institute of Acoustics (MIOA). Susan's main areas of expertise include provision of noise and vibration environmental impact assessments. Susan has considerable experience for a range of projects throughout the planning process including engaging with key stakeholders; baseline noise and vibration monitoring and analysis; noise modelling and EIA reporting; and provision of technical mitigation advice where required.

Flood Risk Assessment

A.9 Jonathan Morley is the Associate Director for Hydrology on the project. Jonathan has over 14 years' experience, during which time he has secured the skills and technical knowledge required to lead major project works through the UK. Working within the wider RPS Planning & Environment Team, Jonathan provides expert hydrological, flood risk, drainage and geological support and advice on a range of projects, including; residential, commercial, industry and energy schemes, as well as Nationally Significant Infrastructure Projects.

Drainage Design

A.10 James Chapman is an Associate with RPS with 20+ year experience in an engineering consultancy and is a member of the Institution of Civil Engineers. He specialises in the provision and co-ordination of Civil and Structural Engineering services within a variety of sectors including industrial, logistics, offices and education, on complex and challenging projects from feasibility right through to practical completion. James is an experienced Civil Engineer and has detailed technical knowledge in hydraulic drainage design (including implementation of SUDs techniques), levels and earthworks design.

Traffic

A.11 This document has been prepared by Joanna Gunn, a Senior Consultant who has over four years' experience of transport planning and environmental impact assessment. Joanna's experience has included assisting with the identification and design of access arrangements, analysing the suitability of access routes, estimating construction vehicle movements, analysing the requirements for Abnormal Indivisible Loads and accommodation / mitigation measures, undertaking highway capacity assessments, undertaking environmental impact assessments and drafting the necessary reporting in a format that satisfies Highway Officers and enables progression through the consenting process.

A.12 It has been checked by David Archibald, Director, a Member of the Chartered Institution of Highways and Transportation with 20 years' experience of transport planning, highway engineering and environmental impact assessment. David has a particular expertise in preparing the transport related documents associated with obtaining Development Consent Orders (DCO) for Nationally Significant Infrastructure Projects (NSIP), particularly for Power, Energy and Infrastructure projects. David is experienced in preparing the submission documents and participating during the Examination process, including appearing and contributing to Issue Specific Hearings and other transport related Hearings. David's has provided transport advice and led the transport aspects associated with over 50 waste and energy related development proposals.

Appendix 5.1

Photomontage and Photowireline Methodology

1.1 PHOTOMONTAGE AND PHOTOWIRELINE METHODOLOGY

Introduction

A.1 This document sets out the methods used to photograph and prepare photomontages and the photowireline for the Swindon Data Centre. The photomontage and photowireline methodology set out below is considered to be suitable to accurately illustrate the proposed development within a selection of photographic views and has taken into account of the *Guidelines for Landscape and Visual Impact Assessment: Third Edition* (Landscape Institute and Institute of Environmental Management and Assessment, 2013) as well as Scottish Natural Heritage (now NatureScot) (2014) guidelines. The same methodology is followed for photomontages or photowireline. However, photowirelines are presented as outline wirelines rather than fully rendered images.

Procedure for Taking Photographs from Representative Viewpoints

A.2 Photograph locations are shown on ES Chapter 5: Landscape and Visual Resources, Figure 5.26 and have been selected in order to:

- Meet consultee requirements, including those of Swindon Borough Council;
- Provide a fair representation of Swindon Data Centre from various distances and orientations to inform the Landscape and Visual Impact Assessment (LVIA) contained within ES Chapter 5: Landscape and Visual Resources; and
- Contain at least three visible reference points of existing features that can be used to verify the proposal location later in the photomontage process.

A.3 The photographs were taken in favourable weather conditions and clear visibility in November and January. This photography has been used as the baseline for the photomontages and photowireline.

A.4 A fixed 50 mm lens on a digital SLR camera was used for the photography in a format equivalent to 35 mm. A full frame sensor was used (as recommended in the SNH guidance, 2014). The same exposure setting was used for all the frames. Viewpoint locations were recorded using a hand-held GPS.

A.5 Where possible, the Swindon Data Centre site was placed in the middle of the view with frames taken either side to give the landscape context. The panoramas were photographed with the horizon in the centre using a level tripod that was rotated on the same grid co-ordinate to ensure individual frames were aligned.

A.6 The following text explains the method of the photomontage and photowireline production undertaken.

Method for Production of Photomontages and Photowirelines

A.7 For the purpose of LVIA assessment we produce photomontages and photowirelines in a single frame 50 mm lens 39.6° horizontal field of view. This produces a better representation of how the development will appear within the landscape context. Working in single frames is more accurate than using panoramas and then splicing together, due to lens distortion.

A.8 Known reference points, where possible visible to the naked eye, are used to assist in constructing the photomontage or photowireline, for instance landform, landmarks, buildings and other structures.

A.9 The horizontal field of view for photomontage and photowireline purposes is 39.6°. However, wide panoramas were photographed to provide broad coverage of the landscape to be assessed. The panoramas are produced by splicing the photos together with specialist software. A 50% overlap was taken between frames to allow the sides of each photo to be removed when splicing, to minimise distortion.

A.10 The panoramas are generated using Adobe Photoshop imaging software. The digital photographs are put directly into the computer program and each frame combined cylindrically to form a panoramic view. Photographs are corrected for colour, brightness and / or contrast to ensure that the image quality was optimised. Where possible the representation of the proposed development is at the centre of the image and should be viewed at 300mm printed on A3 paper.

A.11 The Swindon Data Centre site has been modelled to GB National Grid co-ordinates in Autodesk software using detailed topographical survey. The existing elements (buildings and other fixed features) are modelled to accurately align the views.

A.12 Perspective viewpoints are determined using GB National Grid co-ordinates established when taking the photographs. The camera location is determined using GPS co-ordinates and the lens type is matched within the software.

A.13 The photomontage and photowireline computer images are placed onto the photographs and scaled/positioned so that the reference features in the image match those in the photographs. The panoramic views are aligned as a cylindrical projection. Light settings are adjusted to match the time of day and weather conditions of the photograph.

A.14 The computer model is rendered as a ‘solid model’ perspective and saved as an image file thus creating a photomontage or photowireline.

A.15 Each viewpoint location is illustrated through a series of A3 figures as follows:

- The existing view as a 39.6° single frame with a detailed location plan and the metadata and viewpoint data;
- A single frame photowire to illustrate the project in a 50 mm format, printed to a vertical height of 245 mm; and

- Where the weather conditions for the photographs were hazy, the buildings would be adjusted, so as to achieve enough contrast to enable the elements to be seen.

A.16 For Swindon Data Centre Representative Viewpoint 12, an outline photowireline representation of the data centre building was produced, as it would be screened by the intervening woodland, tree belts and other vegetation.

A.17 The methodology provided above and that which is used to prepare the photomontages and photowireline is fully compliant with the relevant guidance and provides images of a high level of accuracy that are fit for purpose and proportionate to the type of proposed development and the context in which it would be seen.

References

A.18 Landscape Institute (2019) Technical Guidance Note 06/19 Visual Representation of Development Proposals.

A.19 Landscape Institute and Institute of Environmental Management and Assessment (IEMA) (2013) Guidelines for Landscape and Visual Impact Assessment (GLVIA3).

A.20 Scottish Natural Heritage (2014) Visual Representation of Wind Farms, Version 2.1, December 2014.

January 2021

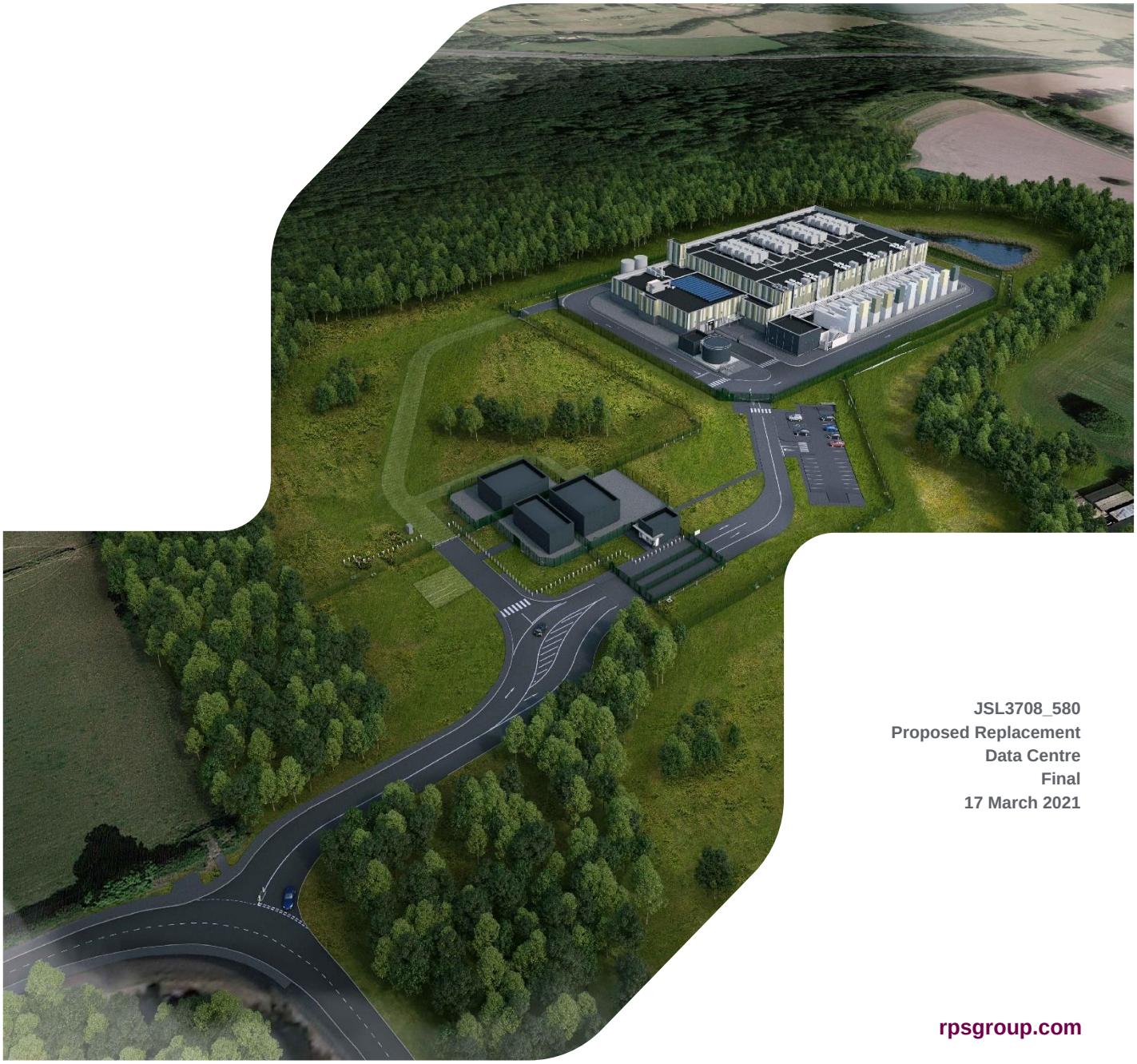
PROPOSED REPLACEMENT DATA CENTRE

Landscape Management Plan

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton, Swindon

Appendix 5.2

20305S-RPS-00-XX-RP-P-9723



JSL3708_580
Proposed Replacement
Data Centre
Final
17 March 2021

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Mullhaven Properties LLC

Contents

Annexes

Annex A: Site Layout - Landscaping (Ref: 20305-RPS-00-XX-DR-A-9533) Landscape Sections Plan (20305S-RPS-00-XX-DR-A-9534) and Grassland Management Plan (Ref. 20305-RPS-SI-00-DR-A-9535)

1 INTRODUCTION

1.1 Purpose of the Report

1.1.1 This Landscape Management Plan (LMP) has been prepared to support the planning application for the redevelopment of land at the National Data Centre, located at the Old Burderop Hospital site, Brimble Hill, Wroughton (the Application Site). The LMP accompanies the Environmental Statement (ES) and a suite of technical reports forming part of the application for a replacement data centre and associated infrastructure (the proposed development).

1.1.2 The report outlines the various soft landscape zones and elements which would be created as part of the proposal and puts forward the necessary actions required for their ongoing maintenance and management. The site is situated off the B4005 Brimble Hill to the south of the town of Swindon, Wiltshire.

1.1.3 This report supplements the proposed Site Layout – Landscaping plan, Landscape Sections Plan and Grassland Management Plan (Ref. 20305S-RPS-00-XX-DR-A-9533,9534 and 9535) (Annex A) for the site, by identifying the maintenance and management regimes necessary to achieve and maintain the long-term soft landscape objectives for the scheme.

1.1.4 The recommendations contained within this report shall be implemented by a suitably qualified and selected landscape contractor and reviewed regularly to ensure compliance and that the specification is continuing to achieve the objectives.

1.1.5 The implementation of landscape works would be carried out concurrently with the development and be completed within one year of substantial completion. Following completion of detailed soft landscape proposals, the recommendations contained within this report shall be implemented post practical completion for a period of five years and then updated accordingly for all soft landscape areas to ensure the effective long-term management requirements of the scheme thereafter.

1.1.6 Defective, dead or inadequately established plants would be replaced at an appropriate time during the five-year maintenance period after completion. Following assessment before the end of each growing season a suitably qualified representative would recommend the extent of replacement which would be carried out at the earliest opportunity in the subsequent planting season. Replacement plants should be of at least the same size, age and quality as the original stock. If it is evident that a species is not surviving in a particular location, then an alternative species shall be agreed with the local planning authority.

2 LANDSCAPE OBJECTIVES

2.1 General

2.1.1 The soft landscape works referred to within this report are associated with the proposed replacement data centre at the Old Burderop Hospital site, Swindon.

2.1.2 The design objectives of the soft landscape proposals are as follows.

- **Landscape Integration**: to provide an appropriate setting for the new development, responding to adjacent land uses where appropriate.
- **Landscape Amenity:** to respond to the scale and character of the site and enhance the resident, employee and visitor experience.
- **Biodiversity:** to protect, manage and enhance the nature conservation value of appropriate areas of the site.

3 LANDSCAPE ELEMENTS

3.1 General

3.1.1 The various landscape elements that make up the soft landscape proposals are listed below:

- Close Mown Wildflower Turf;
- Meadow (Wildflower),
- Existing Grassland translocated and enhanced with wildflower seeding;
- Existing Grassland retained and enhanced with wildflower seeding;
- Wetland Grass;
- Marginal Planting and Plug Planting;
- Native Species Shrub Planting; and
- Individual Trees.

3.2 Performance Requirements

3.2.1 The performance requirements of these elements are detailed below:

Close Mown Wildflower Turf Areas

3.2.2 Wildflower Turf (Species Rich 26), or similar and approved, a soil free turf system that is species rich, with a high grass inclusion rate (90% grasses, 10% wildflowers). Treated as a traditional lawn, as opposed to a wildflower meadow, with a maintenance regime to create an even, uniformly coloured sward to cover at least 95% of the relevant area and contain a maximum of 10% herb species.

3.2.3 To be close mown regularly to maintain a maximum height of 50-75mm throughout the growing season providing an even dense sward free of dips, hollows and other obstacles suitable for general amenity and informal recreation.

General Meadow Grass Areas (including translocated grassed areas and existing grassland retained and enhanced)

3.2.4 EM35 Barbury Castle Meadow Mixture (Emorsgate Seeds or similar and approved) to include grass species appropriate to its location on soils with a high chalk content, with greater wildflower content than close mown grass areas (80% grasses, 20% wildflowers).

3.2.5 General meadow areas to be mown regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings if dense. Carefully dig out or spot treat any residual perennial weeds such as docks. From year 2 onwards, cut regularly to maintain a maximum height of 300mm. Cut annually in Sept to a height of 50mm. Leave the cuttings to dry and shed seed for 1-7 days then remove from site. Mow the re growth through late Autumn/Winter to 50mm and again in Spring if needed.

3.2.6 Maintenance regime to create an even, sward to cover at least 95% of the intended area and contain a minimum of 20% herb species in order to provide an attractive sward of diverse species offering seasonal interest for the benefit of visitors and wildlife alike.

Wet Meadow Grass Areas

3.2.7 EM8 Meadow Mixture for Wetlands (Emorsgate Seeds or similar and approved) to include grass species appropriate to the situation and intended maintenance regime to create an even, sward to cover at least 95% of the intended area and contain a minimum of 20% herb species.

3.2.8 Cutting / maintenance regime during first year of establishment, during winter / early Spring grass to be mown to a height of 30mm. In April to July / August, stop mowing to promote flower growth.

3.2.9 From Year 2 onwards, no mowing from spring to July/August in order to promote flower growth. After flowering (August / September), grass to be cut back with a scythe, petrol strimmer or tractor mower to 50mm. Leave arisings to dry and shed seed for 1-7 days then remove cuttings from site. Late Autumn/Winter, grass to be mown to a height of 50mm and again in Spring.

3.2.10 Maintenance regime to encourage an attractive sward of diverse species, offering seasonal interest for the benefit of wildlife.

Marginal Planting & Plug Planting

3.2.11 EP1 Pond Edge Mixture (Emorsgate Seeds or similar and approved) to include wildflower and grass species appropriate to its location on soils at the wet margins of ponds, streams and ditches. with greater wildflower content than close mown grass areas (80% grasses, 20% wildflowers).

3.2.12 Cutting / maintenance regime during first year of establishment, only cut back weeds to allow good perennial ground cover.

3.2.13 From Year 2 onwards, cut back and remove sections of vegetation every 2-3 years in rotation. Cut out sections and/or work from one bank each year between September and November

3.2.14 Plug planting is to contain a mix of native species marginal plants, to create a variety of habitats suitable for flora and fauna with aggressive growers avoided to prevent over colonisation.

3.2.15 A third of the water surface shall be maintained to ensure healthy water quality and prevent over domination of plant material with thinning of aggressive plant species in winter.

3.2.16 Provide an attractive wetland environment with planting to compliment the setting and offer valuable wildlife habitat and seasonal interest.

Native Shrub Planting

3.2.17 Native shrubs to cover 100% of the relevant area at Year 3 and maintained thereafter as necessary. The plants shall attain growth rates and form typical of the relevant species.

3.2.18 Formative pruning as necessary to establish a dense screen / buffer.

3.2.19 Selectively prune native woodland and shrub planting as required where shrubs / trees start to encroach on dwellings and footpaths. Maintain a full planted screen at all times.

3.2.20 Remedial pruning/tree surgery as necessary in accordance with BS:3998 or to remove growth obstructing paths, carriageways, lighting and signs.

Individual Trees

3.2.21 Individual trees, throughout the proposed development, planted as specimens or in groups include principally native species. At Year 3 they shall have established a single leader or multi stemmed habit where intended. They shall retain their lower branches unless a clear stem is required to avoid encroachment upon footpaths or carriageways.

3.2.22 They shall be maintained thereafter to develop and retain a well-balanced crown, shape and character typical of the species with any redundant stakes, ties and shelters removed and disposed of offsite.

3.2.23 Check, adjust and replace tree support systems and tree guarding as necessary during establishment period. Remove redundant tree support systems once trees are fully established.

3.2.24 Remedial pruning/tree surgery as necessary in accordance with BS:3998 or to remove growth obstructing paths, carriageways, lighting and signs.

3.2.25 Replace any dead, dying or diseased plants in the following planting season with stock of similar specification to the original for the initial five-year establishment period.

3.2.26 Provide an important structural presence to the overall landscape setting of the development, including acting as focal points and reinforcing site layout. They shall offer seasonal interest and climatic benefits such as solar shading, air purification and absorption of rainwater.

Existing Vegetation

3.2.27 Protect, conserve and enhance existing trees and hedgerows where retained to maintain a mature green infrastructure for the development,

3.2.28 Continual tree and hedgerow lines provide important wildlife corridors which shall be enhanced wherever possible to support the movement and feeding for birds, mammals and insects.

3.2.29 Vegetation shall be maintained in a sympathetic manner to ensure species replicate their natural form including imperfections and local characteristics.

3.2.30 Annual inspections shall be carried out to ensure the structural integrity, health and vigour of trees and hedgerows and any remedial works carried out as required.

3.2.31 Provide an established landscape setting for the scheme offering instant maturity and sense of place to the built form and demonstrating integration of existing landscape features into development. The green infrastructure shall be conserved, managed and enhanced for the benefit of the site and the wider setting.

4 WORKMANSHIP

4.1 General

4.1.1 Where and to the extent that materials and workmanship are not fully specified they are to be:

a. Suitable for the purposes of the stated objectives;

b. In accordance with good horticultural practice or the current British Standard with particular reference to:

- BS 3998: Recommendations for tree work
- BS 4428: Code of practice for general landscape operations
- BS 7370: Grounds maintenance

Part 1: Recommendations for establishing and managing grounds maintenance organisations and for design considerations related to maintenance;

Part 2: Maintenance of hard areas;

Part 3: Maintenance of amenity and functional turf (other than sports turf); and,

Part 4: Maintenance of soft landscape (other than amenity turf).

5 SCHEDULE OF MAINTENANCE

5.1 General

5.1.1 The general principals and overarching management requirements relating to all landscape elements are outlined below;

5.2 Health and Safety

5.2.1 The contractor shall refer to the sites Health and Safety File for residual risks and ensure strict compliance to any health and safety measures set out. All maintenance operations shall only be carried out with due consideration to the welfare of the landscape maintenance operatives and members of the public. The contractor shall carry out his own risk assessment(s) as necessary to assess current conditions at the time of operation, including compliance when making use of any subcontractors to carry out specialist areas of works.

5.3 Plant Nutrition

5.3.1 Apply plant nutrients / fertiliser to all planting only if poor growth and signs of deficiency appear subject to soil / leaf analysis and further advice. The use of any fertilisers shall be in strict accordance with the manufacturer's recommendations.

5.3.2 Do not apply fertilisers to meadow/ wildflower areas.

5.4 Watering

5.4.1 Watering shall only be carried out to maintain the health and continued vigour of the trees and shrubs until fully established. Water usage shall be controlled and monitored at all times to avoid waste.

5.4.2 Areas which become prone to waterlogging shall be alleviated suitably, and / or drainage added as required.

5.5 Pesticides Generally

5.5.1 The general principle is that no pesticides shall be used however in limited circumstances when a suitability qualified 'contractor' establishes that alternatives will have limited chance of success, the limited use of pesticides may take place. In such cases all pesticides shall be selected from the current list of approved chemicals and applied in strict accordance with the Control of Pesticide Regulations 1986 and other related Acts and Regulations.

5.5.2 The approval of the Environment Agency would be required when applying a pesticide to or within 3 m of any watercourse.

5.5.3 Take appropriate action only if severe infestation occurs. If problem persists over a number of years, consider changing the plant species concerned to one less vulnerable to infestation.

5.6 Leaf Fall

5.6.1 At regular intervals during the autumn/winter months, remove fallen leaves from grass and paved areas.

5.6.2 Leave fallen leaves in planting areas where they will form a natural mulch and humus layer. Only remove if they are likely to smother smaller plants.

5.7 Litter Control

5.7.1 Scavenging for and removing litter from all soft landscape areas at fortnightly intervals and remove to a licensed tip.

5.8 Swales and attenuation basins

5.8.1 Clearance: Remove litter, debris, accumulated silt and excessive vegetation causing an obstruction or preventing their water holding capacity / discharge or operation of associated equipment.

5.8.2 Frequency: Biannually or more frequently to prevent obstructions and ensure required water holding capacity.

5.8.3 Time of year: Autumn.

5.8.4 Method: Submit proposals.

- Access: From one bank only.
- Position: At least 1 m from the top of the bank.
- Thinning: Thin aggressive over dominant plant species to prevent over colonisation and remove woody vegetation.
- Plant material: Dispose of cleared plant material at side of bank for a fortnight prior to removing to site compost facility to allow insects and amphibians to return to the water.

5.8.5 Management: Allow for deepening of basin/ ditch every 5-10 years as required by removal of built up soils/ silt to ensure adequate water holding capacity in consultation with Civils Engineer.

5.9 Monitoring and Inspection

5.9.1 Provide routine monitoring to ensure that maintenance tasks are being undertaken as programmed and to review their effectiveness and make adjustments as necessary.

5.9.2 Take appropriate action to deal with damage and debris arising from storms, flood events, heavy snowfall and / or interference.

5.9.3 Personnel completing inspections to be suitably qualified and experienced in monitoring landscape works (such as a Member of Landscape Institute).

5.10 Ecological Stewardship

5.10.1 It is an offence to disturb nesting wild birds and their nests under the Wildlife and Countryside Act 1981 (as amended).

5.10.2 As construction (involving tree clearance) is likely to commence in Q3 (July 2021), it is likely to be outside the optimal bird nesting season (mid-March to mid-June). The nesting season continues to potentially the end of August, so if tree clearance operations have to take place during this period, then a qualified Ecologist will check in advance that there are no nesting birds in the planned area of operation.

5.10.3 In terms of ongoing aftercare, pruning and trimming operations will be timed to avoid the bird nesting period, generally March to August inclusive. If operations have to take place during this

period, then a qualified Ecologist shall check in advance that there are no birds nesting in the planned area of operation.

5.10.4 Cutting of meadow / rank grasses shall be carried out in early autumn to prevent disturbance to reptile or ground nesting birds and all material disposed of offsite.

5.10.5 Disturbance and clearance/thinning to water bodies and wetland areas shall be completed in the winter months and any material removed left by the bank side for a fortnight to allow insects and mammals to return to the pond or swale before removal.

5.10.6 Opportunities for further enhancement following routine maintenance and management shall be encouraged in line with a site wide Ecological Management Plan such as creating brash and/or log piles to offer refuge to wildlife.

5.10.7 Reference to the sites specific ecological considerations shall be considered before carrying out any routine maintenance and management operations, if in doubt consult with a suitability qualified Ecologist.

5.11 Biosecurity

5.11.1 The threat of pests and diseases that affect plant species it is widely recognised, and all landscape practitioners have a responsibility in detecting, monitoring and controlling pests and diseases at every stage of a plants' life from growing, specifying, handling, managing and destroying plants.

5.11.2 Wherever possible all planting shall be specified from local province and reputable sources with supporting paperwork provided at each stage to demonstrate an auditable supply chain should proof be requested.

5.11.3 Reference shall be made regularly to updates from DEFRA and the Forestry Commission with any recommendations or warnings strictly adhered to, to prevent further spread of disease, including reporting known outbreaks as appropriate.

5.11.4 Good plant husbandry shall be implemented on site to prevent further spread of diseases particularly where symptoms or confirmed outbreaks of disease has occurred.

6 TYPICAL PROGRAMME OF OPERATIONS

ACTIVITY	J		F		M		A		M		J		J		A		S		O		N		D	
GRASS & MEADOW AREAS:																								
Mow amenity grass																								
Flail meadow																								
Weed control																								
AMENITY SHRUB AND HEDGE PLANTING:																								
Maintain mulch																								
Weed control																								
Selective pruning																								
Trim groundcover & climbers																								
Coppice (if required)																								
Watering (until establishment)																								
INDIVIDUAL TREES:																								
Check and adjust support																								
Formative pruning																								
Remedial pruning																								
LITTER CONTROL:																								
Collect litter																								
LEAF FALL:																								
Clear fallen leaves																								
PLANT NUTRITION:																								
Apply fertiliser																								
PEST AND DISEASE CONTROL																								
Physical / Mechanical means																								
MONITORING AND INSPECTION:																								
Generally																								
TIMING OF OPERATIONS:																								
Avoid nesting birds																								

7 RESPONSIBILITIES FOR MANAGEMENT

7.1 General

7.1.1 The General Contractor is responsible for appointing a suitability qualified 'contractor' to undertake installation of the landscape works, maintenance and management for a period of 1 year post practical completion. Thereafter, the operator will appoint a suitability qualified 'contractor' to undertake maintenance and management works in accordance with the requirements of this document.

7.1.2 Results of inspections shall be presented in a short report including where possible photographic records to inform possible changes to the maintenance and management techniques.

7.1.3 The aims and objectives set out in the proceeding section in no way remove the operator's responsibilities to current or any future statutory and legal obligations. Where conflicts may arise, these shall be highlighted and resolved in accordance with best practice.

7.1.4 The appointed contractor shall work in strict accordance with industry best practice, relevant health and safety procedures, protection of the environment and in particular protected species legislation and avoid any pollution or contamination of the environment.

7.1.5 All equipment shall be used for its designated purpose and all operatives shall be fully trained, qualified and authorised to use the equipment including being made aware of any associated risk assessments and tool box talks.

7.1.6 All equipment shall be stored securely as agreed with the operator and not left unattended. If fuel is to be stored on site, this is required to be located on an area of hardstanding, in a double skinned tank.

7.1.7 Any suspected solid or fluid contaminants on or within the ground shall be reported immediately and further investigated by a suitable expert.

7.1.8 To reduce dependence on chemicals, low intervention horticulture would be practised wherever possible using sustainable materials and methods, i.e. the natural regeneration of trees and hedges and the use of mulch beds to prevent weeds.

7.1.9 The appointed contractor shall ensure that instructions for works are received and acted upon in a timely manner and subsequent inspection is undertaken by the managing agent.

7.1.10 The operator shall satisfy themselves that the Health and Safety requirements of the site operations are maintained at all times.

7.1.11 Management works shall be carried out at regular intervals during the growing season and as necessary to fulfil the requirements of the specification as well as the operational requirements of the site.

7.1.12 Periodically the landscape maintenance works shall be reviewed by a suitably qualified and experienced person to ensure that the landscape management operations are being completed in accordance with the approved report. During the first 2 years of establishment, the works shall be inspected 3 times (during the growing season) and thereafter the works shall be inspected annually.

ANNEXES

Annex A

Site Layout - Landscaping plan, Landscape Sections and Grassland Management Plan (Ref. 20305S-RPS-00-XX-DR-A-9533, 9534 and 9535)

Notes

1. This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided.
2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

Landscape Key

- Development Boundary *Site perimeter will be delineated with a timber post and three rail fence and rabbit proof mesh.
- Outer Security Fence
- Inner Security Fence
- Existing Trees to be Removed
- Existing Trees to be Retained
- Existing Grassland to be Retained and Enhanced
- Existing Grassland to be Translocated and Enhanced (taken from area beneath proposed building)
- Native Broadleaf Tree Planting
- Native understory/ woodland edge Tree and Shrub mix
- Wildflower Mix (wider site)
- Close Mown Grass
- Marginal plug planting to pond
- Existing scrub to be retained
- Native Hedge planting
- Conifer Tree Planting
- Wildflower Mix (max 300mm height zone)
- Pond Edge Wildflower Mix
- Wetland Seed Mix
- Suregreen PP40 Universal Permeable Paver - Green (or similar approved). Sown with a wildflower mix.

NORTH

P03	Berm/Ditches & Translocated Grassland updated. Six trees added to Northern Woodland Boundary.	AH	DB	16:03:21
P02	Berm/ditches added. Tree's removed - ecology comment.	AH	DB	04.03.21
P01	For Planning	AH	DB	18.02.21
Rev	Description	By	Ckd	Date

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Client

Project: Proposed Replacement Data Centre

Title: Site Layout Plan - Landscaping

Status: For Planning
Scale: 1000 @A1
Date Created: February 2021
Task Team Manager: DB
Information Author: DB/AH
Task Information Manager: DB
Document Number: 20305S-RPS-SI-XX-DR-A-9533
Project Code - Originator - Zone - Level - Type - Role - Drawing Number
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Revision: P03

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APPENDIX 7.1

Historic Environment - Legislation and Planning Policy Context

HISTORIC ENVIRONMENT - LEGISLATION AND PLANNING POLICY CONTEXT

Legislation relevant to the historic environment

A.1 Statutory protection for archaeology, including Scheduled Monuments, is contained in the Ancient Monuments and Archaeological Areas Act 1979, amended by the National Heritage Act 1983 and 2002, and updated in April 2014.

A.2 For other components of the historic environment, the Planning (Listed Buildings and Conservation Areas) Act 1990 and the Town and Country Planning Act 1990 provide statutory protection to listed buildings and their settings, and present measures to designate and preserve the character and appearance of Conservation Areas.

A.3 Section 66 of the Planning (Listed Buildings and Conservation Areas) Act 1990 imposes a general duty as respects listed buildings in the exercise of planning functions. Subsection (1) provides that:

'In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses'.

A.4 The setting of a Conservation Area is not enshrined in legislation and therefore does not attract the weight of statutory protection, and should be assessed in respect of relevant national and local planning policies.

A.5 Historic England (formerly English Heritage) is enabled by the Historic Buildings and Ancient Monuments Act 1953 (as amended) to maintain a register of historic parks, gardens and battlefield sites which appear to HE to be of special historic interest. Registration in this way makes the effect of proposed development on these types of sites and their settings a material consideration.

A.6 Under the Hedgerow Regulations 1997, as amended by The Hedgerows (England) (Amendment) Regulations 2002, hedgerows are deemed to be historically Important if they are over 30 years old and either: incorporate, or are associated with, a Scheduled archaeological feature or site; mark the Boundary of a pre-1600 estate or manor recorded at the relevant date in a Sites and Monuments Record [now more commonly known as Historic Environment Records, maintained by local authorities]; or forms an integral part of a pre-1845 field system. However, this does not mean that historic hedgerows which are deemed 'Important' are designated heritage assets.

National Planning Policy

A.7 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019) provides advice to planning authorities regarding the protection of heritage assets within the planning process. The NPPF deals with all types of heritage in a single document. It takes an integrated approach to the historic environment, moving beyond a distinction between buildings, landscapes and archaeological remains.

A.8 Paragraph 7 of the NPPF identifies that '*The purpose of the planning system is to contribute to the achievement of sustainable development'*. Paragraphs 8-10 go on to demonstrate the overarching

objectives for sustainable development, along with the need to avoid potential conflicts and to seek positive improvements.

A.9 In Section 12 regarding the requirement for achieving well-designed places, the NPPF (paragraph 124) states that '*Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities'*.

A.10 Section 16 of the NPPF, entitled '*Conserving and enhancing the historic environment'* provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 16 of the NPPF can be summarised as seeking the:

- Delivery of sustainable development;
- Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment;
- Conservation of England's heritage assets in a manner appropriate to their significance; and
- Recognition that heritage makes to our knowledge and understanding of the past.

A.11 Section 16 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term. Paragraph 184 states that heritage assets '*are an irreplaceable resource, and should be conserved in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of existing and future generations'*.

A.12 Paragraph 189 of the NPPF identifies that planning decisions should be based on the significance of the heritage asset and that level of detail supplied by an applicant should be proportionate to the importance of the asset and should be no more than sufficient to review the potential impact of the proposal upon the significance of that asset.

A.13 In Annex 2 of the NPPF, a *'heritage asset'* is defined as *'A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the local planning authority (including local listing)'.* In the same Annex, 'significance' (for heritage policy) is defined as: 'The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting'.

A.14 Paragraph 193 of the NPPF states that *'When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance'*.

A.15 The NPPF goes on to state in paragraph 194 that '*Any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification'*, before identifying that:

'Substantial harm to or loss of:

…

b) assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional'.*

A.16 In paragraph 195, the NPPF states that *'Where a proposed development will lead to substantial harm (or total loss of significance of) a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm or loss …'*, before continuing *'Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal ….'* (paragraph 196).

A.17 In short, government policy provides a framework which:

- Protects nationally important designated Heritage Assets;
- Protects the settings of such designations;
- In appropriate circumstances seeks adequate information (from desk based assessment and field evaluation where necessary) to enable informed decisions;
- Provides for the excavation and investigation of sites not significant enough to merit in-situ preservation.

Guidance

National Planning Practice Guidance

A.18 The web-based National Planning Practice Guidance (NPPG) has been published by the Government in order to aid the application of the NPPF.

A.19 The NPPG reiterates that the conservation of heritage assets in a manner appropriate to their significance is a core planning principle, requiring a flexible and thoughtful approach. Furthermore, it highlights that neglect and decay of heritage assets is best addressed through ensuring they remain in active use that is consistent with their conservation. The guidance states that if complete, or partial loss of a heritage asset is justified, the aim should then be to capture and record the evidence of the asset's significance and make the interpretation publicly available.

A.20 Key elements of the guidance relate to assessing harm. Important consideration should be whether the proposed works adversely affect a key element of the heritage asset's special architectural or historic interest. Additionally, it is the degree of harm, rather than the scale of development, that is to be assessed. The level of '*substantial harm'* is considered to be a high bar that may not arise in many cases. Essentially, whether a proposal causes substantial harm will be a judgment for the decision taker, having regard to the circumstances of the case and the NPPF.

A.21 Harm may arise from works to the asset or from development within its setting. Setting is defined as the surroundings in which an asset is experienced and may be more extensive than the curtilage. A thorough assessment of the impact of proposals upon setting needs to take into account, and be proportionate to, the significance of the heritage asset and the degree to which proposed changes enhance or detract from that significance and the ability to appreciate it.

Conservation Principles, Policies and Guidance (English Heritage, April 2008)

A.22 Conservation Principles outlines Historic England's approach to the sustainable management of the historic environment. While primarily intended to ensure consistency in Historic England's own advice and guidance, the document is recommended to LPAs to ensure that all decisions about change affecting the historic environment are informed and sustainable. The document sets out six high-level principles:

- The historic environment is a shared resource
- Everyone should be able to participate in sustaining the historic environment
- Understanding the significance of places is vital
- Significant places should be managed to sustain their values
- Decisions about change must be reasonable, transparent and consistent
- Documenting and learning from decisions is essential.

A.23 The guidance describes a range of heritage values which enables the significance of assets to be established systematically, with the four main heritage values being: evidential value; historical value; aesthetic value; and communal value.

A.24 In 2017 HE consulted on their revised Conservation Principles, which was being updated to reflect the language used in the NPPF and legislation. Consultation closed on 2nd February 2018, but a revised version has yet to be published. However, in this draft document, 'Significance' was given a suggested definition of 'The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting'.

Historic Environment Good Practice Advice in Planning

A.25 The PPS5 Practice Guide was withdrawn in March 2015 and replaced with three Good Practice Advice in Planning Notes (GPAs) published by Historic England. GPA 3: The Setting of Heritage Assets replaced guidance published in 2011. These are complemented by the Historic England Advice Notes in Planning (HEANs) and other technical guidance.

GPA1: The Historic Environment in Local Plans (March 2015)

A.26 This document provides information to assist local authorities, planning and other consultants, owners, applicants and other interested parties in implementing historic environment policy in the NPPF and NPPG.

A.27 The advice in this document, in accordance with the NPPF, emphasises that all information requirements and assessment work in support of plan-making and heritage protection needs to be

proportionate to the significance of the heritage assets affected and the impact on the significance of those heritage assets, and recognises the primacy of the NPPF and NPPG.

GPA2: Managing Significance in Decision-Taking in the Historic Environment (March 2015)

A.28 This document provides advice on numerous ways in which decision making in the historic environment could be undertaken, emphasising that the first step for all applicants is to understand the significance of any affected heritage asset and the contribution of its setting to that significance. In line with the NPPF and NPPG, the document states that early engagement and expert advice in considering and assessing the significance of heritage assets is encouraged. The advice suggests a structured, staged approach to the assembly and analysis of relevant information:

- Understand the significance of the affected assets;
- Understand the impact of the proposal on that significance;
- Avoid, minimise and mitigate impact in a way that meets the objectives of the NPPF;
- Look for opportunities to better reveal or enhance significance;
- Justify any harmful impacts in terms of the sustainable development objective of conserving significance balanced with the need for change; and
- Offset negative impacts to significance by enhancing others through recording, disseminating and archiving archaeological and historical interest of the important elements of the heritage assets affected.

GPA3: The Setting of Heritage Assets (Second Edition; December 2017)

A.29 This advice note focuses on the management of change within the setting of heritage assets. This document replaced GPA3: *The Setting of Heritage Assets* (March 2015) and *Seeing History in the View* (English Heritage 2011) in order to aid practitioners with the implementation of national legislation, policies and guidance relating to the setting of heritage assets found in the 1990 Act, the NPPF and PPG. The guidance is largely a continuation of the philosophy and approach of the 2011 and 2015 documents and does not present a divergence in either the definition of setting or the way in which it should be assessed.

A.30 As with the NPPF the document defines setting as *'the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve'*. Setting is also described as being a separate term to curtilage, character and context. The guidance emphasises that setting is not a heritage asset, nor a heritage designation, and that its importance lies in what it contributes to the significance of the heritage asset, or the ability to appreciate that significance. It also states that elements of setting may make a positive, negative or neutral contribution to the significance of the heritage asset, including below-ground archaeological remains.

A.31 While setting is largely a visual term, with views considered to be an important consideration in any assessment of the contribution that setting makes to the significance of an asset, and thus the way in which an asset is experienced, setting also encompasses other environmental factors including noise, vibration and odour. Historical and cultural associations may also form part of the asset's setting, which can inform or enhance the significance of a heritage asset.

A.32 This document provides guidance on practical and proportionate decision making with regards to the management of change within the setting of heritage assets. It is stated that the protection of the setting of a heritage asset need not prevent change and that decisions relating to such issues need to be based on the nature, extent and level of the significance of a heritage asset, further weighing up the potential public benefits associated with the proposals. It is further stated that changes within the setting of a heritage asset may have positive or neutral effects.

A.33 The document also states that the contribution made to the significance of heritage assets by their settings will vary depending on the nature of the heritage asset and its setting, and that different heritage assets may have different abilities to accommodate change without harming their significance. Setting should, therefore, be assessed on a case-by-case basis.

A.34 Historic England recommends using a series of detailed steps in order to assess the potential effects of a proposed development on significance of a heritage asset. The 5-step process is as follows:

- Identify which heritage assets and their settings are affected;
- Assess the degree to which these settings and views make a contribution to the significance of a heritage asset(s) or allow significance to be appreciated;
- Assess the effects of the proposed development, whether beneficial or harmful, on the significance or on the ability to appreciate it;
- Explore ways to maximise enhancement and avoid or minimise harm; and
- Make and document the decision and monitor outcomes.

HEAN 12 Statements of Heritage Significance: Analysing Significance in Heritage Assets (October 2019)

A.35 The purpose of this HEAN is to provide information on the analysis and assessment of heritage significance in line with the NPPF to assist owners, applicants, local planning authorities (LPAs), planning and other consultants, and other interested parties in implementing historic environment legislation, the policy in the NPPF and the related guidance given in the NPPG.

A.36 In this document, HE states that *'Alternative approaches may be acceptable, provided they are demonstrably compliant with legislation and national policy'*.

A.37 The advice in this document, in accordance with the NPPF, emphasises that the level of detail in support of applications for planning permission and listed building consent should be no more than is necessary to reach an informed decision, and that activities to conserve the asset(s) need to be proportionate to the significance of the heritage asset(s) affected and the impact on that significance. At the same time those carrying out this work need enough information to understand the issues (NPPF, paragraphs 43-44 and 189).

Guidance on Landscape and Visual Impact Assessment (GLVIA3)

A.38 Guidance published by the Landscape Institute and Institute of Environmental Management & Assessment (IEMA) is now in its 3rd edition ('GLVIA3', 2013) and there is also a more recent technical guidance note on visual representation of development proposals, published by the Landscape Institute ('TGN 06/19', September 2019).

A.39 As stated at para 1.17 in GLVIA3, '*…the emphasis is on identification of likely significant environmental effect….Identifying significant effects stresses the need for an approach that is in proportion to the scale of the project that is being assessed and the nature of its likely effects*'. Taking a proportionate approach is also set out in more detail in TGN 06/19.

A.40 Figure 6.1 in GLVIA3 illustrates the steps in assessing visual effects (GLVIA3, p 99). Paragraph 6.5 sets out the interrelationships between LVIA and cultural heritage topics within the EIA process. The steps set out mirror those for addressing the assessment of the settings of heritage assets set out above.

Local Planning Policy

A.41 The site lies within the administrative area of Swindon Borough Council. The relevant current adopted local plan comprises the Swindon Borough Local Plan 2026 (adopted March 2015).

A.42 Policy EN5: Landscape Character and Historic Landscape states:

a. Proposals for development will only be permitted when:

- *the intrinsic character, diversity and local distinctiveness of landscape within Swindon Borough are protected, conserved and enhanced;*
- *the design of the development and materials used are sympathetic to the surrounding landscape;*
- *unacceptable impacts upon the landscape are avoided; and*
- *where other negative effects are considered unavoidable, they are satisfactorily mitigated.*

b. In meeting the requirements of EN5a, applicants for development should demonstrate how they have taken into account Landscape Character Assessments and assessed the potential impact of the proposal upon the following attributes of the landscape:

- *existing landscape form, features, topography and character;*
- *the contribution of the landscape to biodiversity and wildlife;*
- *local geology and geo-diversity;*
- *views, visual amenity and the landscape setting;*
- *valuable historic and heritage areas and assets*
- *environmental amenity such as tranquillity and noise, pollution and light pollution; and*
- *the existing social, physical, economic and environmental roles and functions of the landscape at the local and strategic scale (for example as a place of cultural and leisure activity, living, employment and separation of settlements.*

c. The North Wessex Downs Area of Outstanding Natural Beauty (AONB) is a nationally recognised area of landscape protection. Proposals within the Borough which are within and or abut the North Wessex Downs AONB must accord with relevant criteria set out in the AONB

Management Plan and paragraph 115 and 116 of the NPPF. Proposals outside the AONB should not adversely affect its setting.

A.43 Policy EN10: Historic Environment and Heritage Assets states:

a. Swindon Borough's historic environment shall be sustained and enhanced. This includes all heritage assets including historic buildings, conservation areas, historic parks and gardens, landscape and archaeology.

b. Proposals for development affecting heritage assets shall conserve and, where appropriate, enhance their significance and setting. Any harm to the significance of a designated or non-designated heritage asset, or their loss, must be justified. Proposals will be weighed against the public benefits of the proposal, whether it has been demonstrated that all reasonable efforts have been made to sustain the existing use, find new uses, or mitigate the extent of the harm to the significance of the asset; and whether the works proposed are the minimum required to secure the long term use of the asset.

c. Any alterations, extensions or changes of use to a listed building, or development in the vicinity of a listed building, shall not be permitted where there will be an adverse impact on those elements which contribute to their special architectural or historic significance, including their setting.

d. Scheduled monuments and other nationally important archaeological sites and their settings will be preserved in situ, and where not justifiable or feasible, provision to be made for excavation and recording. Development proposals affecting archaeological remains of less than national importance will be conserved in a manner appropriate to their significance. An appropriate assessment and evaluation should be submitted as part of any planning application in areas of known or potential archaeological interest.

e. Development within or which would affect the setting of the Borough's Conservation Areas will conserve those elements which contribute to their special character or appearance.

f. Features which form an integral part of a Park or Garden's historic interest and significance will be conserved and development will not detract from the enjoyment, layout, design, character, appearance or setting of them, including key views into and out from, or prejudice future restoration.

g. Any development proposal that would affect a locally important or non-designated heritage asset, including its setting, will be expected to conserve its significance, and any harm should be weighed against the public benefits of the proposal, including securing its optimum viable use.

A.44 The local plan is currently under review for the period to 2036, and in December 2019 Swindon Borough Council published the Regulation 19 Proposed Submission Draft Version of the new local plan. The public consultation on this draft ended on 31 January 2020.

A.45 Policy DM33 Landscape within the Regulation 19 Proposed Submission Draft Version of the new local plan is very similar to Policy EN5 in the adopted local plan. It states:

1. Proposals for development will only be permitted when:

a. the intrinsic character, diversity and local distinctiveness of landscape within Swindon Borough are protected, conserved and enhanced;

b. the design of the development and materials used are sympathetic to the surrounding landscape;

c. unacceptable impacts upon the landscape are avoided; and

d. where other negative effects are considered unavoidable, they are satisfactorily mitigated.

2. In meeting the requirements of paragraph 1 of this policy, applicants for development should demonstrate how they have taken into account Landscape Character Assessments and assessed the potential impact of the proposal upon the following attributes of the landscape:

a. existing landscape form, features, topography and character;

b the contribution of the landscape to biodiversity and wildlife;

c. local geology and geo-diversity;

d. views, visual amenity and the landscape setting;

e. historic and heritage areas and assets

f. environmental amenity such as tranquillity and noise, pollution and light pollution; and

g. the existing social, physical, economic and environmental roles and functions of the landscape at the local and strategic scale (for example as a place of cultural and leisure activity, living, employment and separation of settlements.

3. National policy and legislation will be applied in assessing proposals within or affecting the setting of The North Wessex Downs Area of Outstanding Natural Beauty. Regard will be had to the North Wessex Downs AONB Management Plan in considering such applications.

A.46 Policy DM34 Historic Environment within the Regulation 19 Proposed Submission Draft Version of the new local plan is very similar to Policy EN10 in the adopted local plan. It states:

1. Swindon Borough's historic environment shall be sustained and enhanced. This includes all heritage assets including historic and listed buildings, conservation areas, historic parks and gardens, landscape and archaeology.

2. Proposals for development affecting heritage assets shall conserve and, where appropriate, enhance their significance and setting. Any harm to the significance of a designated or non-designated heritage asset must be justified. Proposals will be weighed against the public benefits of the proposal; whether it has been demonstrated that all reasonable efforts have been made to sustain the existing use, find new uses, or mitigate the extent of the harm to the significance of the asset; and whether the works proposed are the minimum required to secure the long term use of the asset representing their optimum viable use.

3. Any alterations or development affecting a listed building will be permitted where there will be no adverse impact on those elements which contribute to their interest and significance including their setting.

4. Development proposals affecting archaeological remains, will be conserved in a manner appropriate to their significance. Appropriate assessment and evaluation should be submitted as

part of any planning application in areas of known or potential archaeological interest. Development should not cause loss or harm of scheduled monuments and other nationally important archaeological sites or harm their setting. Those sites currently known are identified on the local development plan. Development proposals affecting archaeological remains of less than national importance will be conserved in a manner appropriate to their significance. Any harm to archaeological remains will need to be justified. Where permitted, in response to proposed loss or harm, provision for mitigation, which may include preservation in situ or excavation will be required but should not be determinative of accepting harm.

5. Development within or which would affect the setting of the Borough's Conservation Areas will conserve those elements which positively contribute to their special character or appearance.

6. Features which positively contribute to a Park or Garden's historic interest and significance will be conserved. Development will not detract from the enjoyment, layout, design, character, appearance or setting of them, including key views into and out from, or prejudice future restoration.

7. Development proposals that would affect a locally important or non-designated heritage asset, including its setting, shall conserve its significance. Any harm should be weighed against the public benefits of the proposal.

1 References

English Heritage (2008) Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment.

Historic England (2015) Historic Environment Good Practice Advice in Planning Note 1: The Historic Environment in Local Plans, July 2015.

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Swindon Borough Council (2015) Swindon Borough Local Plan 2026.

Swindon Borough Council (2019) Swindon Borough Local Plan 2036 Regulation 19 Proposed Submission Draft Version

APPENDIX 7.2

Gazetteer of Identified Heritage Assets

Site Gazetteer

NHL = National Heritage List
HER = Wiltshire and Swindon Historic Environment Record

Site No.	*Source*	*Name / Description*	*NGR*	*Period*
1	NHL 108274	Medieval settlement remains at Overtown – Scheduled Monument comprising two areas of earthworks representing the remains of medieval settlement. Principal feature is a clearly defined main street visible as a hollow way running for a distance of 200 m on a north west/south east alignment. This is flanked by numerous house platforms, with additional house platforms present within land to the west.	SU 1536 7950 SU 1560 7955	Medieval
2	NHL 1014557	Barbury Castle hillfort and bowl barrow – Scheduled Monument comprising large multivallate hillfort of Iron Age date and an adjacent bowl barrow of probable Bronze Age date.	SU 1494 7629	Bronze Age Iron Age
3	NHL 1010468	Saucer barrow - Scheduled Monument comprising a single saucer barrow set on a prominent ridge-top just to the west of Barbury Castle.	SU 1468 7634	Bronze Age
4	NHL 1012165	Three bowl barrows - Scheduled Monument comprising three bowl barrows in an east-west aligned arrangement to the west of Barbury Castle.	SU 1452 7636	Bronze Age
5	NHL 1016357	Earthwork enclosure and dewpond 490 m north of Barbury Castle - Scheduled Monument comprising a rectangular earthwork enclosure (*c*. 110 m by 100 m) considered to be of Roman date and a dewpond (in the south-eastern part of the enclosure) which is likely to be of medieval or post-medieval date.	SU 1489 7677	Roman Medieval / Post-medieval
6	NHL 1016362	Two earthwork enclosures and a linear earthwork 625 m north of Barbury Castle - Scheduled Monument comprising two curvilinear earthwork enclosures links by an 80 m long linear earthwork.	SU 1492 7692	Prehistoric / Roman
7	NHL 1013415	Badbury Castle Farm deserted medieval village - Scheduled Monument comprising well-preserved and extensive building platforms, hollow-ways and associated enclosures and plots, also evidence for a Roman settlement at the same location.	SU 1518 7581	Roman Medieval
8	NHL 1016383	Field system and earthwork enclosure on Burderop Down - Scheduled Monument comprising fields on a north-east / south-west alignment and extending for *c*. 600 m. The field system is overlain by a sub-rectangular earthwork enclosure which may be much later in date.	SU1606 7646	Prehistoric

9	NHL 1016356	Two bowl barrows 680 m north of Upper Herdswick Farm, Barbury Down - Sceduled Monument comprising two bowl barrows situated on a low crest and aligned north-south.	SU 1579 7667	Bronze Age
10	NHL 1010457	Disc barrow on Burderop Down, 1 km north-east of Upper Herdswick Farm - Scheduled Monument comprising a single large disc barrow. This was partially excavated in 1977 and finds included Bronze Age pottery.	SU 1673 7642	Bronze Age
11	NHL 1016312	Liddington Castle - Scheduled Monument comprising a univallate hillfort of oval plan and with a single entrance on the eastern side. Excavation has confirmed the Iron Age date of the hillfort and also found that it was re-fortified in the Saxon period.	SU 2089 7970	Iron Age
12	NHL 1016391	Linear boundary earthwork west of Liddington Castle - Scheduled Monument comprising *c*. 49 m length of linear earthwork. It continues for at least 100 m further to the west but has been levelled by cultivation.	SU 2068 7962	Bronze Age
13	NHL 1023307	Burderop Park – Grade II* listed house of early-mid 17th century date given a square plan and 3rd story in the 18th century. Now 3 storeys of 4 and 5 bays, cement rendered with ashlar dressings and moulded ashlar plinth, hipped roofs.	SU 1667 8013	17th century
14	NHL 1184299	West wing to Burderop Park – Grade II listed former service wing, built 19th century with 17th century features and design elements. Blank wall to south, north elevation of limestone rubble and brick, 2 storeys.	SU 1665 8015	19th century
15	NHL 1184319	Granary in kitchen court, Burderop Park – Grade II listed granary of early 18th century date, probably repaired in the 20th century. Half-timbered structure on staddle stones, with stone tile roof.	SU 1667 8020	18th century
16	NHL 1300178	Walls to kitchen court on north and east sides and attached building, Burderop Park – Grade II listed red bricks walls c. 10 feet tall and stone-capped, door on east side is adjacent to a large single storey brick building of mid-19th century date.	SU 1668 8017	18th century
17	NHL 1023308	Kitchen garden walls, gates and gatepiers, Burderop Park – Grade II listed walls of large trapezoidal kitchen garden, red bricks walls c. 10 feet tall and stone-capped, also wrought iron gates and ashlar gatepiers on south and east sides.	SU 1663 8020	18th century
18	NHL 1023309	Burderop Cottage and stables to north, Burderop Park – Grade II listed building with late 17th century origins, partially rebuilt 1768.	SU 1664 8009	17th century
19	NHL 1355969	Coach house and stable block east of Burderop Cottage, Burderop Park – Grade II listed building.	SU 1668 8008	17th century
20	NHL 1023310	Barn at Lodge Farm – Grade II listed barn of 18th century date, timber-framed with brick infill and thatched roof, later 19th century extension to the west.	SU 1685 8057	18th century
21	NHL 1023325	Former toll house – Grade II listed tollhouse on Marlborough Road,, looks mid-19th century, 2 storeys, stucco with hipped slate roof. Now residential.	SU 1638 7994	19th century

22	NHL 1299581	Brimble Hill milestone – Grade II listed milestone of probably early 19th century date, facetted painted stone with dented top. Painted 'B.4005, Marlborough 9 miles, Swindon 3 miles'.	SU 1592 8026	19th century
23	NHL 1185738	Overtown House, Overtown - Grade II* listed house of *c*. 1700, with early-mid 19th century flanking wings	SU 1549 7972	18th century
24	NHL 1023445	Walls enclosing small garden to south of Overtown House - Grade II listed brick walls with stone capping and piers, 18th or early 19th century in date.	SU 1553 7969	18th century
25	NHL 1185740	Cottage now among stable range to east of Overtown House - Grade II listed cottage of one and a half storeys with thatched roof and catslide to rear, now part of stables. 18th or early 19th century in date.	SU 1558 7974	18th century
26	NHL 1185742	Overtown Manor, Overtown - Grade II listed house built *c*. 1693, large mid-19th century extension to south.	SU 1536 7963	17th century
27	NHL 1355932	Nos. 5, 7 and 8 Overtown - Grade II listed former farmhouse of 18th century date, now residential dwellings.	SU 1546 7938	18th century
28	NHL 1395440	K8 Telephone Kiosk, Langton Park - Grade II listed telephone kiosk of a type introduced in 1968 but now quite rare.	SU 1522 7920	20th century
29	HER MWI15085	Findspot – fragment of an Acheulian flint hand-axe.	SU 1642 7988	Palaeolithic
30	HER MWI16165	Findspot - part of a Neolithic flint knife.	SU 1720 8080	Neolithic
31	HER MWI16167	Fir Clump stone circle – two concentric rings – destroyed during construction of the M4 motorway. About 125 m west of the stone circle was a single row of stones aligned NNW-SSE.	SU 1629 8163	Neolithic
32	HER MWI15105	Findspot – pieces of worked flint found in the 1980s.	SU 1610 7960	Bronze Age
33	HER MWI16181	Findspot – flint cores and tools found in the 1980s and 1990s.	SU 1530 8040	Bronze Age
34	HER MWI75733	Ditches of Late Bronze Age date found during archaeological observations along the route of a water pipeline.	SU 1547 8001	Bronze Age
35	HER MWI75734	Pits of Early Bronze Age to Late Iron Age date found during archaeological investigations along the route of a water pipeline.	SU 1556 8014	Bronze Age / Iron Age
36	HER MWI16191	Iron Age 'A' sherds found by Owen Meyrick.	SU 1625 8047	Iron Age
37	HER MWI16336	Undated human skeleton found by Owen Meyrick at a depth of 3.5 ft.	SU 1625 8047	Undated
38	HER MWI16196	Sherds of Iron Age pottery found in 1952 with ox and sheep bones and teeth, all within an enclosure.	SU 1640 8030	Iron Age

39	HER MWI16342	Rectangular earthwork enclosure, internal pits uncovered by mechanical excavator.	SU 1641 8033	Undated
40	HER MWI16194	Large ditch aligned E/W sectioned by a sewage trench – contained probable Iron Age sherds, also animal bone and charcoal fragments.	SU 1664 8019	Iron Age
41	HER MWI16190	Cropmark enclosure showing on aerial photographs, associated with sherds of Iron Age pottery.	SU 1601 8015	Iron Age
42	HER MWI15185	Possible ditch extant on 1967 aerial photograph, also seen as a cropmark on a 1991 aerial photograph.	SU 1666 7952	Undated
43	HER MWI15176	Cropmarks recorded on aerial photographs.	SU 1600 7990	Undated
44	HER MWI16350	Connected linear features recorded as cropmarks on aerial photographs.	SU 1646 8051	Undated
45	HER MWI16351	Two parallel linear features recorded on aerial photographs.	SU 1646 8005	Undated
46	HER MWI16208	Line of three large postholes or pits, contained Roman pottery (mostly 2nd century AD) along with a fragment of tile and a cake of slag.	SU 1625 8152	Roman
47	HER MWI16250	Few small sherds of Roman pottery found in the 1980s.	SU 1530 8040	Roman
48	HER MWI16233	One sherd of pottery found in a ditch.	SU 1650 8013	Roman
49	HER MWI75732	Ditch containing small quantity of Saxon pottery found during archaeological work on a pipeline reinforcement scheme.	SU 1535 7987	Saxon
50	HER MWI16272	Organic-tempered sherds of Saxon pottery found in the 1980s and in 1991.	SU 1530 8040	Saxon
51	HER MWI16273	Two late 6th century burials examined following discovery in 2000 by a metal detectorist. A grave containing the remains of a child cut another containing an elderly adult male. The child grave also contained two gilded saucer brooches, a glass bead and an amber bead, whilst the adult male was associated with a sword, two spears, a shield boss and a small buckle.	SU 1558 8028	Saxon
52	HER MWI15145	Late Medieval pit found during evaluation at the former Princess Alexandra Hospital.	SU 1633 7943	Medieval
53	HER MWI15143	Large Medieval pit (or ditch) found during evaluation at the former Princess Alexandra Hospital.	SU 1624 7943	Medieval
54	HER MWI16352	Features recorded on aerial photographs, possibly associated with medieval settlement.	SU 1700 8025	Undated

55		Ladder Lane aka Jacob's Ladder - historic routeway which has associations with the author Richard Jefferies.		Undated
56	HER MWI16276	Deer park mentioned in 1583, but likely to be earlier. A park pale ditch survives in places.	SU 1622 8023	Medieval

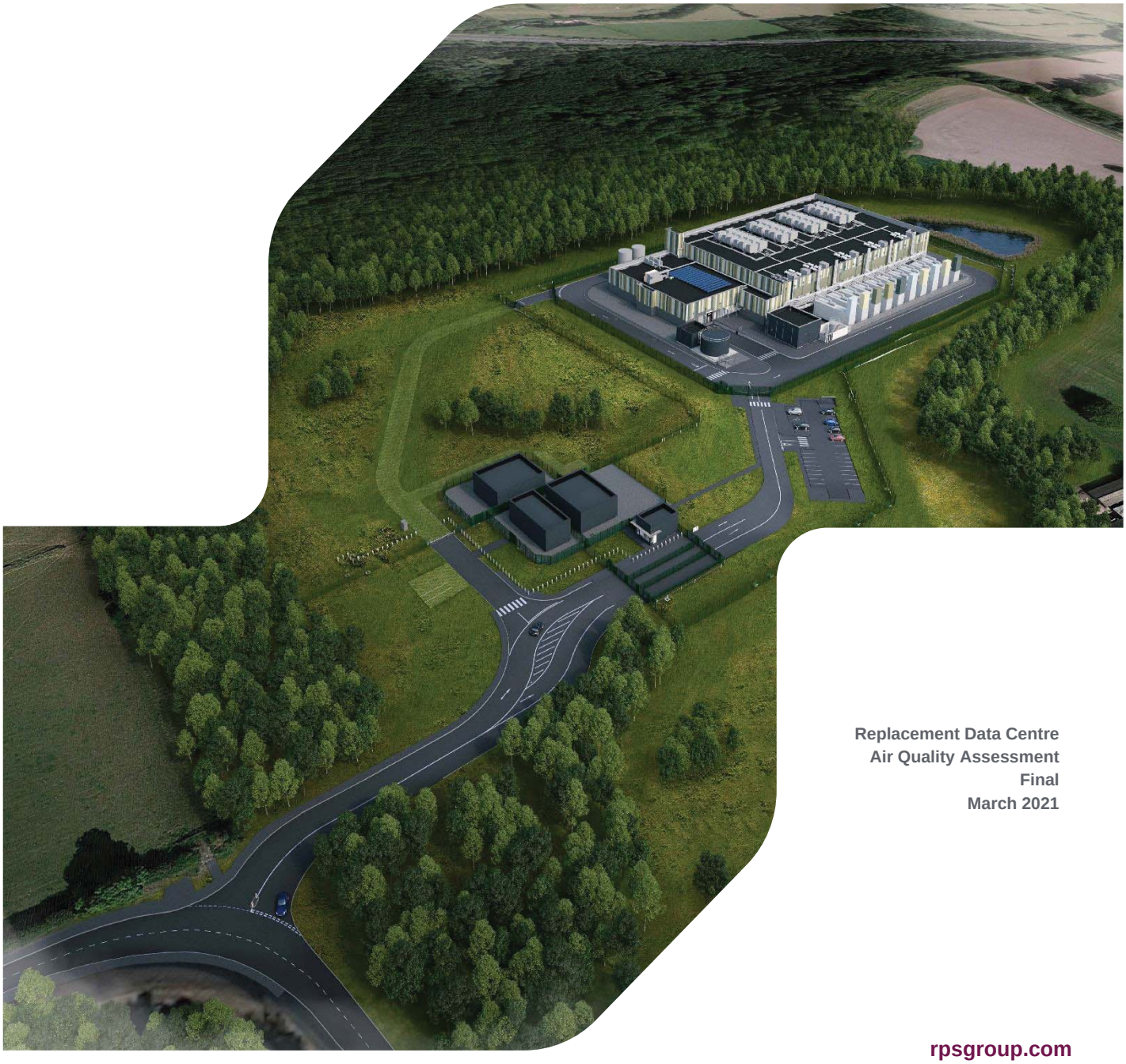
PROPOSED REPLACEMENT DATA CENTRE

AIR QUALITY ASSESSMENT

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton, Swindon

Appendix 8.2

2035S-RPS-XX-XX-RP-R-9721



Replacement Data Centre
Air Quality Assessment
Final
March 2021

rpsgroup.com

Approval for issue

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1 INTRODUCTION

1.1 Purpose of the Report

1.1.1 This Air Quality Assessment has been prepared to support the planning application for the redevelopment of land at the National Data Centre. The Application Site is located at the Old Burderop Hospital site, Brimble Hill, Swindon. The proposed development comprises a replacement data centre and associated infrastructure. This Air Quality Assessment accompanies the Environmental Statement (ES) and a suite of technical reports.

1.1.2 The Application Site is located within the administrative area of Swindon Borough Council (SBC). SBC has designated an Air Quality Management Area (AQMA) for Kingshill Road, approximately 3.7 km to the north west of the Application Site. The AQMA is highly unlikely to be affected by emissions to air from the proposed development.

1.1.3 This air quality assessment covers the:

- Construction phase - an evaluation of the temporary effects from fugitive construction dust; and
- Operational phase –an evaluation of the impacts of the key emission sources to air (i.e. the 11 diesel-powered generators) during testing and emergency use on the local area.

1.1.4 This report begins by setting out the policy and legislative context for the assessment. The methods and criteria used to assess potential air quality effects have then been described. The baseline air quality conditions have been established taking into account Defra estimates, local authority documents and the results of any local monitoring. The results of the assessment of air quality impacts have been presented. A conclusion has been drawn on the significance of the residual construction and operational-phase effects.

2 LEGISLATION AND POLICY CONTEXT

2.1 Legislation

The Ambient Air Quality Directive and Air Quality Standards Regulations

2.1.1 The 2008 Ambient Air Quality Directive (2008/50/EC) (EC, 2008) aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants; it sets legally binding concentration-based limit values, as well as target values. There are also information and alert thresholds for reporting purposes. These are to be achieved for the main air pollutants: particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), lead (Pb) and benzene. This Directive replaced most of the previous EU air quality legislation and in England was transposed into domestic law by the Air Quality Standards Regulations 2010 (Defra, 2010), which in addition incorporates the 4th Air Quality Daughter Directive (2004/107/EC) that sets targets for ambient air concentrations of certain toxic heavy metals (arsenic, cadmium and nickel) and polycyclic aromatic hydrocarbons (PAHs). Equivalent regulations exist in Scotland, Wales and Northern Ireland. Member states must comply with the limit values (which are legally binding on the Secretary of State) and the Government and devolved administrations operate various national ambient air quality monitoring networks to measure compliance and develop plans to meet the limit values.

UK Air Quality Strategy

2.1.2 The Environment Act 1995 (HMSO. 1995) established the requirement for the Government and the devolved administrations to produce a National Air Quality Strategy (AQS) for improving ambient air quality, the first being published in 1997 and having been revised several times since, with the latest published in 2007 (Defra, 2007). The Strategy sets UK air quality standards♦ and objectives# for the pollutants in the Air Quality Standards Regulations plus 1,3-butadiene and recognises that action at national, regional and local level may be needed, depending on the scale and nature of the air quality problem. There is no legal requirement to meet objectives set within the UK AQS except where equivalent limit values are set within the EU Directives.

2.1.3 The 1995 Environment Act also established the UK system of Local Air Quality Management (LAQM), that requires local authorities to go through a process of review and assessment of air quality in their areas, identifying places where objectives are not likely to be met, then declaring Air Quality Management Areas (AQMAs) and putting in place Air Quality Action Plans to improve air quality. These plans also contribute, at local level, to the achievement of EU limit values.

2.1.4 For the purposes of this assessment, the limit values set out in the Air Quality Standards Regulations 2010 and the objective levels specified under the current UK AQS have been used.

♦ Standards are concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. Standards, as the benchmarks for setting objectives, are set purely with regard to scientific evidence and medical evidence on the effects of the particular pollutant on health, or on the wider environment, as minimum or zero risk levels.

Objectives are policy targets expressed as a concentration that should be achieved, all the time or for a percentage of time, by a certain date.

2.1.5 The limit values and objectives relevant to this assessment are summarised in Table 2.1. Although the EU limit values and the UK AQS objectives are numerically equal, there are some differences in where they apply and who is responsible for their achievement.

2.1.6 The Environment Agency online guidance entitled *'Environmental management – guidance, Air emissions risk assessment for your environmental permit'* (EA, 2020) provides further assessment criteria in the form of Environmental Assessment Levels (EALs). For benzene, the EAL is more stringent that the AQS objective. The Environment Agency EAL has therefore been used to ensure that the assessment is conservative.

Table 2.1: Summary of Relevant Air Quality Limit Values, Objectives and EALs

Pollutant	Averaging Period	Objectives/ Limit Values	Not to be Exceeded More Than
Nitrogen Dioxide (NO_2)	1 hour	200 µg.m^{-3}	18 times per calendar year
	Annual	40 µg.m^{-3}	-
Particulate Matter (PM_{10})	24 Hour	50 µg.m^{-3}	35 times per calendar year
	Annual	40 µg.m^{-3}	-
Particulate Matter ($PM_{2.5}$)	Annual	25 µg.m^{-3}	-
Sulphur Dioxide (SO_2)	15-minute	266 µg.m^{-3}	35 times per calendar year
	1 hour	350 µg.m^{-3}	24 times per calendar year
	24-hour	125 µg.m^{-3}	3 times per calendar year
Carbon monoxide	Maximum daily running 8 hour mean	10,000 µg.m^{-3}	-
	Maximum 1-hour	30,000 µg.m^{-3}	-
Benzene (a)	Annual	5 µg.m^{-3}	-
	Maximum 1-hour	195 µg.m^{-3}	-

(a) The generators emit hydrocarbons. The Environment Agency EAL for benzene (the most harmful local hydrocarbon pollutant) has been used for total hydrocarbons. This is a highly conservative and precautionary approach and unlikely in the extreme. This is a conservative approach.

2.2 Planning Policy

2.2.1 The National Planning Policy Framework (NPPF) (CLG, 2019) is a material consideration for local planning authorities and decision-takers in determining applications. At the heart of the NPPF, is a presumption in favour of sustainable development, subject to caveats where a plan or project affects a habitats site (A habitat is an assemblage of physical and biological elements which form a recognisable unit). For determining planning applications, this means approving development proposals if they accord with an up-to-date local development plan, unless material considerations indicate otherwise. If the development plan does not contain relevant policies, or the policies are out of date, then planning permission should be granted unless the application of policies in the NPPF that protect areas or assets of particular importance provides a clear reason for refusing the development, or any adverse impacts would significantly outweigh the benefits.

2.2.2 The NPPF sets out three overarching objectives to achieve sustainable development. The relevant objective in the context of this air quality assessment is:

"an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution and adapting to climate change, including moving to a low carbon economy" (Paragraph 8c)

2.2.3 Under the heading 'Promoting sustainable transport', the NPPF states:

"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making." (Paragraph 103)

2.2.4 Under the heading 'Conserving and enhancing the natural environment', the NPPF states:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

…

Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; …" (Paragraph 170)

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, 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." (Paragraph 181)

2.3 Guidance

2.3.1 The National Planning Practice Guidance (NPPG) was issued on-line on 6 March 2014 and is updated periodically by government as a live document. The last major update was on 1 November 2019. The Air Quality section of the NPPG describes the circumstances when air quality, odour and dust can be a planning concern, requiring assessment.

2.3.2 The NPPG advises that whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity. The NPPG states that when deciding whether air quality is relevant to a planning application, considerations could include whether the development would:

"Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;

Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;

Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;

Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;

Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."

2.3.3 The NPPG provides advice on how air quality impacts can be mitigated and notes

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met."

2.4 Local Planning Policy

2.4.1 The Swindon Borough Local Plan 2026 (SBC, 2015) was formally adopted on 26 March 2015. It is the main planning policy document for the Borough. It sets out how much housing, employment and retail development the Borough needs up to the year 2026 and where this should be located. It includes policies to ensure development is of the highest quality, avoids environmentally sensitive locations, respects the existing built environment and meets the needs of present and future residents.

2.4.2 In relation to air quality, *Policy EN7: Pollution* states:

"a. Development that is likely to lead to emissions of pollutants such as noise, light, vibration, smell, fumes, smoke, soot, ash, dust, grit or toxic substances that may adversely affect existing development and vulnerable wildlife habitats, shall only be permitted where such emissions are controlled to a point where there is no significant loss of amenity for existing land uses, or habitats.

b. Similarly; where development would be adversely affected by the emission of pollutants from an existing use; the proposal will only be permitted where the users of the future development are protected from loss of amenity from those emissions in accord with Policy DE1."

2.4.3 SBC is currently reviewing the Local Plan for the Borough of Swindon for the period to 2036. Consultation on the Proposed Submission Draft Stage of the document took place between December 2019 and January 2020.

2.4.4 As the policies have not been through a public examination process, limited weight can be attached to them. However, they provide a view of the direction of the planning policies that SBC wishes to take in the future.

2.4.5 In relation to air quality, *Policy DM37 Pollution* states that:

"6) Development shall not lead to a further deterioration of existing areas of poor air quality, create new areas that exceed limits, or expose future residents or building users to unacceptable levels of air quality. This should include as assessment of traffic fumes as a result of the design of the development.

7) Development should make a positive contribution to air quality improvements where this is possible.

8) Cumulative impacts of development on air quality, including Air Quality Management Areas and areas at risk of exceeding relevant limit values for air pollution, will be considered in determining planning applications. Major development proposals which would impact upon areas identified at being at risk of non-compliance with limit values in the Council's most recent Air Quality Annual Status Report (or may create other areas of non-compliance) will need to be supported by an air quality assessment. The assessment must take into account any potential cumulative impacts as a result of known proposals in the vicinity of the proposed development site, and should consider pollutant emissions generated by the development.

9) Where an air quality assessment indicates that the proposal would be likely to be in conflict with paragraph 6 of this policy, and where that conflict cannot be mitigated, planning permission may be refused.

10) Where it is identified that a development proposal could be at risk from exposure to air pollution or contribute to air pollution problems elsewhere, the following measures may be sought:

11) a. Design measures such as altering the siting, orientation and/or massing of buildings to avoid trapping air pollution roadside by creating canyons; locating habitable accommodation away from busy roads; requiring roadside habitable room windows to be non-openable and alternative means of ventilation to be provided; requiring the creation landscape buffers between air pollution sources and receptors; ensuring point sources of air pollution are suitably ventilated away from receptors.

b. Reduction measures such as the provision of on-site electric vehicle charging points and car club spaces; enhancements to bicycle infrastructure; enhanced walking routes, site travel plans (including public transport); the planting of street trees."

3 ASSESSMENT METHODOLOGY

3.1.1 Neither the NPPF nor the NPPG is prescriptive on the methodology for assessing air quality effects or describing significance; practitioners continue to use guidance provided by Defra and non-governmental organisations, including Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM). However, the NPPG does advise that "*Assessments should be proportionate to the nature and scale of development proposed and the level of concern about air quality, and because of this are likely to be locationally specific. The scope and content of supporting information is therefore best discussed and agreed between the local planning authority and applicant before it is commissioned."* It lists several areas that might be usefully agreed at the outset.

3.1.2 The scope and methodology for this assessment was agreed with the Environmental Health Officer at the Healthy Neighbourhoods Team within SBC in an email dated 16 December 2020.

3.1.3 This air quality assessment covers the elements recommended in the NPPG. The approach is consistent with the EPUK & IAQM Land-Use Planning & Development Control: Planning For Air Quality document (EPUK&IAQM, 2017), and, where relevant, Defra's Local Air Quality Management Technical Guidance: LAQM.TG16 (Defra, 2016). It includes the key elements listed below:

- Establishing the background Ambient Concentration (AC) from consideration of Air Quality Review & Assessment findings and assessment of existing local air quality through a review of available air quality monitoring and Defra background map data in the vicinity of the Application Site;
- A qualitative assessment of likely construction-phase impacts with mitigation and controls in place; and
- Quantitative assessment of the operational effects on local air quality from stack emissions utilising a "new generation" Gaussian dispersion model, ADMS 5. Assessment of Process Contributions (PC) from the facility in isolation, and assessment of resultant Predicted Environmental Concentrations (PEC), taking into account cumulative impacts through incorporation of the AC.

3.1.4 Air quality guidance advises that the organisation engaged in assessing the overall risks should hold relevant qualifications and/or extensive experience in undertaking air quality assessments. The RPS air quality team members involved at various stages of this assessment have professional affiliations that include Fellow and Member of the Institute of Air Quality Management, Chartered Chemist, Chartered Scientist, Chartered Environmentalist and Member of the Royal Society of Chemistry and have the required academic qualifications for these professional bodies. In addition, the Director responsible for authorising all deliverables has over 15 years' experience in preparing air quality assessments.

3.2 Construction Phase - Methodology

3.2.1 Regarding exhaust emissions from construction-related vehicles (contractors' vehicles and Heavy Duty Vehicles (HDVs), diggers, and other diesel-powered vehicles), these are unlikely to have a significant impact on local air quality except for large, long-term construction sites: Highways England's Design Manual for Roads and Bridges (HE, 2019) states that an air quality assessment of construction-related vehicle traffic need only be assessed where construction activities are programmed to last more than two years.

3.2.2 The construction phase is estimated to take 10 – 12 months to complete and will comprise external construction and civils activities. This is forecast to commence in Q3 2021 (subject to the

progress of the planning process). At the end of the construction period all external construction activities and civils work will be completed. The construction phase will be followed by the installation and testing of the IT equipment (data storage and data processing technology) and then the creation of the data networks and various cloud computing services that will operate from the facility. All the Electrical, Mechanical and IT will not be deployed across the entire facility at one time. Instead the internal fitouts will occur in four phases, the initial phase commencing within the site construction works in Q3 2021 with follow on phased fit outs determined by Customer demand. Fitout works associated with these subsequent phases will primarily be carried out inside the completed building and be approximately six months in duration.

3.2.3 Dust is the generic term used to describe particulate matter in the size range 1-75 µm in diameter (BSI, 1983). Particles greater than 75 µm in diameter are termed grit rather than dust. Dusts can contain a wide range of particles of different sizes. The normal fate of suspended (i.e. airborne) dust is deposition. The rate of deposition depends largely on the size of the particle and its density; together these influence the aerodynamic and gravitational effects that determine the distance it travels and how long it stays suspended in the air before it settles out onto a surface. In addition, some particles may agglomerate to become fewer, larger particles; whilst others react chemically.

3.2.4 The effects of dust are linked to particle size and two main categories are usually considered:

- PM_{10} particles, those up to 10 µm in diameter, remain suspended in the air for long periods and are small enough to be breathed in and so can potentially impact on health; and
- Dust, generally considered to be particles larger than 10 µm which fall out of the air quite quickly and can soil surfaces (e.g. a car, window sill, laundry). Additionally, dust can potentially have adverse effects on vegetation and fauna at sensitive habitat sites.

3.2.5 The IAQM *Guidance on the assessment of dust from demolition and construction* (IAQM, 2014) sets out 350 m as the distance from the site boundary and 50 m from the site traffic routes up to 500 m of the entrance, within which there could potentially be nuisance dust and PM_{10} effects on human receptors. For sensitive ecological receptors, the corresponding distances are 50 m in both cases. These distances are set to be deliberately conservative.

3.2.6 Concentration-based limit values and objectives have been set for the PM_{10} suspended particle fraction, but no statutory or official numerical air quality criterion for dust annoyance has been set at a UK, European or World Health Organisation (WHO) level. Construction dust assessments have tended to be risk based, focusing on the appropriate measures to be used to keep dust impacts at an acceptable level.

3.2.7 The IAQM dust guidance aims to estimate the impacts of both PM_{10} and dust through a risk-based assessment procedure. The IAQM dust guidance document states: *"The impacts depend on the mitigation measures adopted. Therefore, the emphasis in this document is on classifying the risk of dust impacts from a site, which will then allow mitigation measures commensurate with that risk to be identified."*

3.2.8 The IAQM dust guidance provides a methodological framework, but notes that professional judgement is required to assess effects: *"This is necessary, because the diverse range of projects that are likely to be subject to dust impact assessment means that it is not possible to be prescriptive as to how to assess the impacts. Also a wide range of factors affect the amount of dust that may arise, and these are not readily quantified."*

3.2.9 Consistent with the recommendations in the IAQM dust guidance, a risk-based assessment has been undertaken for the development, using the well-established source-pathway-receptor approach:

- The dust impact (the change in dust levels attributable to the development activity) at a particular receptor will depend on the magnitude of the dust source and the effectiveness of the pathway (i.e. the route through the air) from source to receptor.

- The effects of the dust are the results of these changes in dust levels on the exposed receptors, for example annoyance or adverse health effects. The effect experienced for a given exposure depends on the sensitivity of the particular receptor to dust. An assessment of the overall dust effect for the area as a whole has been made using professional judgement taking into account both the change in dust levels (as indicated by the Dust Impact Risk for individual receptors) and the absolute dust levels, together with the sensitivities of local receptors and other relevant factors for the area.

3.2.10 The detail of the dust assessment methodology is provided in Annex A.

3.2.11 The dust risk categories that have been determined for each of the four activities (demolition, earthworks, construction and trackout) have been used to define the appropriate site-specific mitigation measures based on those described in the IAQM dust guidance. The guidance states that provided the mitigation measures are successfully implemented, the resultant effects of the dust exposure will normally be *"not significant"*.

3.2.12 The assessment methodology does not consider the air quality impacts of dust from any contaminated land or buildings; however, in this case, the Application Site is not considered to be contaminated (see Ground Conditions Report – 2035S-RPS-XX-XX-RP-P-9734).

3.3 Operational Phase - Methodology

Summary of Key Pollutants Considered

3.3.1 The key pollutant emissions associated with the diesel-powered back-up generators are oxides of nitrogen (NO_x), PM_{10}, $PM_{2.5}$ (particles up to 2.5 µm in diameter, a subset of PM_{10}), SO_2, CO and hydrocarbons.

3.3.2 Emissions of total NO_x from combustion sources comprise nitric oxide (NO) and NO_2. The NO oxidises in the atmosphere to form NO_2. The assessment of operational impacts therefore focuses on changes in NO_2 concentrations at ground level receptors.

3.3.3 The EPUK/IAQM Land-Use Planning & Development Control: Planning For Air Quality document indicates that air quality assessments should include developments increasing annual average daily Light Duty Vehicle (LDV) traffic flows by more than 100 within or adjacent to an AQMA and more than 500 elsewhere. Traffic generation associated with the development, once operational is low in the context of other traffic in the area; typically 6 HDVs arriving and departing each day (i.e. 12 in total) and 74 total car movements per day.. On this basis, the EPUK/IAQM thresholds are highly unlikely to be exceeded; therefore, operational-vehicle exhaust emissions have not been assessed and can be considered negligible.

Atmospheric Dispersion Modelling of Pollutant Concentrations

3.3.4 In urban areas, pollutant concentrations are primarily determined by the balance between pollutant emissions that increase concentrations, and the ability of the atmosphere to reduce and remove pollutants by dispersion, advection, reaction and deposition. An atmospheric dispersion model is used as a practical way to simulate these complex processes; such a model requires a range of input data, which can include emissions rates, meteorological data and local topographical information. The model used and the input data relevant to this assessment are described in the following sub-sections.

3.3.5 The atmospheric pollutant concentrations in an urban area depend not only on local sources at a street scale, but also on the background pollutant level made up of the local urban-wide background, together with regional pollution and pollution from more remote sources brought in on the incoming air mass. This background contribution needs to be added to the fraction from the

modelled sources, and is usually obtained from measurements or estimates of urban background concentrations for the area in locations that are not directly affected by local emissions sources. Background pollution levels are described in detail in Section 4.

Dispersion Model Selection

3.3.6 Several commercially available dispersion models can predict ground level concentrations arising from emissions to atmosphere from elevated point sources. Modelling for this study has been undertaken using ADMS 5, a version of the ADMS (Atmospheric Dispersion Modelling System) developed by Cambridge Environmental Research Consultants (CERC) that models a wide range of buoyant and passive releases to atmosphere either individually or in combination. The model calculates the mean concentration over flat terrain and also allows for the effect of plume rise, complex terrain, buildings and deposition. Dispersion models predict atmospheric concentrations within a set level of confidence and there can be variations in results between models under certain conditions. The ADMS 5 model has been formally validated and is widely used in the UK and internationally for regulatory purposes.

3.3.7 ADMS comprises a number of individual modules each representing one of the processes contributing to dispersion or an aspect of data input and output. Amongst the features of ADMS are:

- An up-to-date dispersion model in which the boundary layer structure is characterised by the height of the boundary layer and the Monin-Obukhov length, a length scale dependent on the friction velocity and the heat flux at the surface. This approach allows the vertical structure of the boundary layer, and hence concentrations, to be calculated more accurately than does the use of Pasquill-Gifford stability categories, which were used in many previous models (e.g. ISCST3). The restriction implied by the Pasquill-Gifford approach that the dispersion parameters are independent of height is avoided. In ADMS the concentration distribution is Gaussian in stable and neutral conditions, but the vertical distribution is non-Gaussian in convective conditions, to take account of the skewed structure of the vertical component of turbulence;
- Several complex modules including the effects of plume rise, complex terrain, coastlines, concentration fluctuations and buildings; and
- A facility to calculate long-term averages of hourly mean concentration, dry and wet deposition fluxes and radioactivity, and percentiles of hourly mean concentrations, from either statistical meteorological data or hourly average data.

Model Input Data

Meteorological Data

3.3.8 The most important meteorological parameters governing the atmospheric dispersion of pollutants are wind direction, wind speed and atmospheric stability as described below:

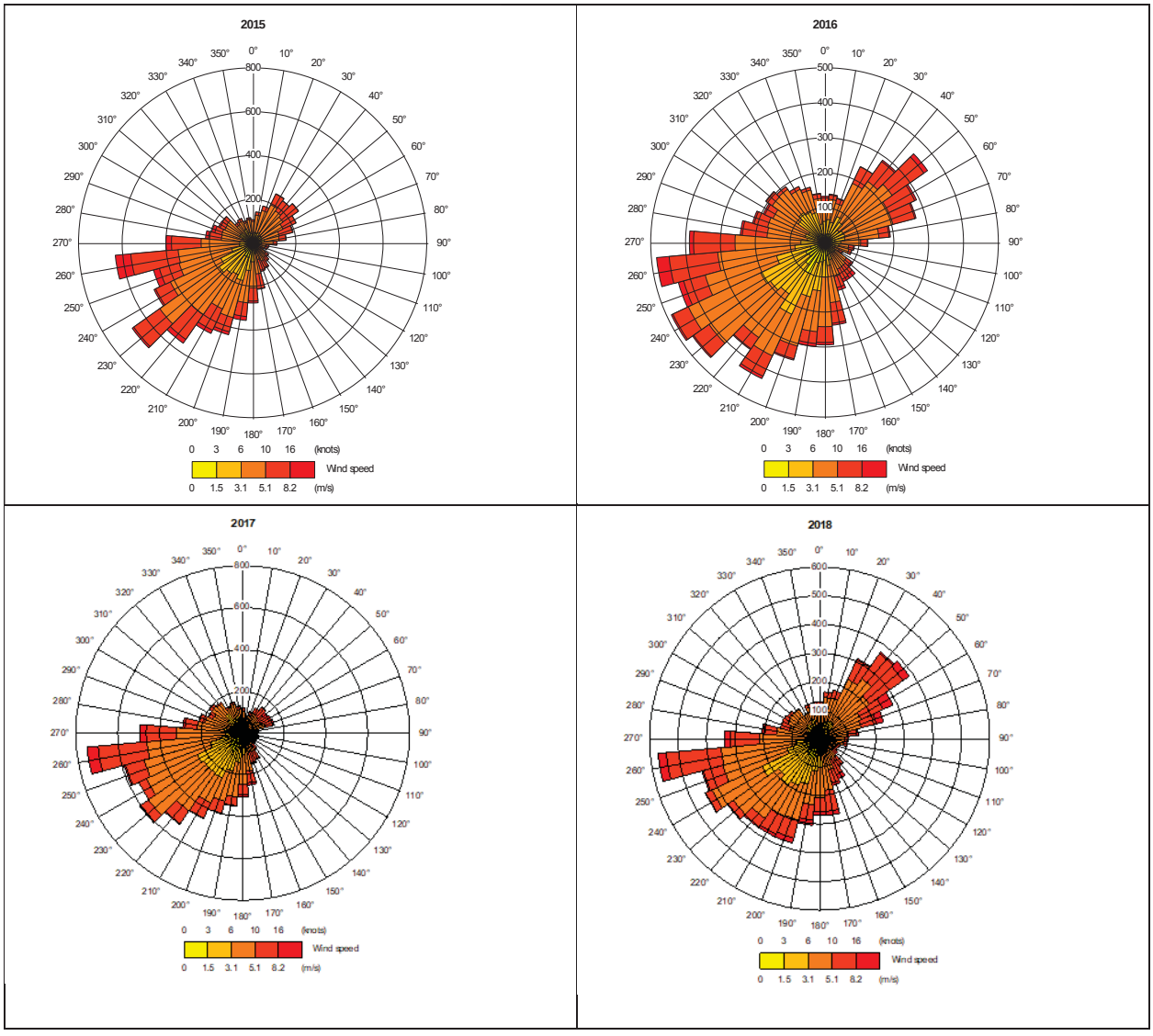
- wind direction determines the sector of the compass into which the plume is dispersed;
- wind speed affects the distance that the plume travels over time and can affect plume dispersion by increasing the initial dilution of pollutants and inhibiting plume rise; and
- atmospheric stability is a measure of the turbulence of the air, and particularly of its vertical motion. It therefore affects the spread of the plume as it travels away from the source. New generation dispersion models, including ADMS, use a parameter known as the Monin-Obukhov length that, together with the wind speed, describes the stability of the atmosphere.

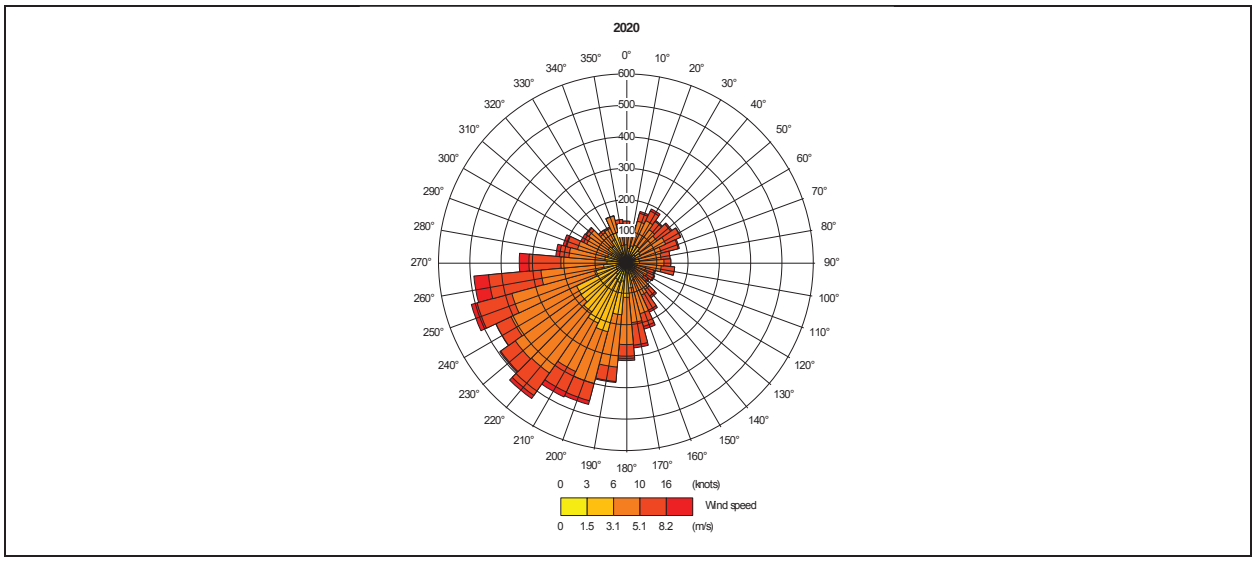
3.3.9 For meteorological data to be suitable for dispersion modelling purposes, a number of meteorological parameters need to be measured on an hourly basis. These parameters include wind speed, wind direction, cloud cover and temperature. There are only a limited number of sites where the required meteorological measurements are made.

3.3.10 The year of meteorological data that is used for a modelling assessment can have a significant effect on source contribution concentrations. Dispersion model simulations have been performed using five years of data from the Lyneham meteorological station between 2015 and 2019, approximately 15 km west of the site.

3.3.11 Wind roses have been produced for each of the years of meteorological data used in this assessment and are presented in Figure 3.1.

Figure 3.1: Wind Roses - Lyneham 2015 to 2019





Terrain

3.3.12 The presence of elevated terrain can significantly affect (usually increase) ground level concentrations of pollutants emitted from elevated sources such as stacks, by reducing the distance between the plume centre line and ground level and by increasing turbulence and, hence, plume mixing. A complex terrain has been included in the model.

Surface Roughness

3.3.13 The roughness of the terrain over which a plume passes can have a significant effect on dispersion by altering the velocity profile with height, and the degree of atmospheric turbulence. This is accounted for by a parameter called the surface roughness length.

3.3.14 A surface roughness length of 0.5 m, which the software developer recommends for use in suburban areas, has been used within the model to represent the average surface characteristics across the study area.

Building Wake Effects

3.3.15 The movement of air over and around buildings generates areas of flow circulation, which can lead to increased ground level concentrations in the building wakes. Where building heights are greater than about 30 - 40% of the stack height, downwash effects can be significant. The dominant structures (i.e. with the greatest dimensions likely to promote turbulence) have been included within the model. The location and dimensions of the structure included in the model are listed in Table 3.1.

Table 3.1 : Dimensions of Buildings Included Within the Dispersion Model

Building ID	Approx. Building Centre		Length (m)	Width (m)	Height (m)	Angle (Degrees)
	X (m)	Y (m)				
Data Hall	416443	180592	136	67	12.4	69

Model Scenarios

3.3.16 Modelling has been undertaken for the following scenarios:

- Testing Scenario 1 – each generator unit tested separately at 25% load for 0.5 hour every two weeks per year and 1 hour each quarter, i.e. 17 hours per generator;
- Testing Scenario 2 - each generator unit tested separately at 100% load for 1.5 hours, twice a year, i.e. 3 hours per generator; and
- Scenario 3 (Emergency) – all 11 generators operating at 100% load for 72 hours.

3.3.17 The period of 72 hours used in the modelling for emergency operation is a highly conservative estimate. Such events are triggered by utility (grid) power outages or critical (and unplanned/emergency) maintenance of the power infrastructure system.

Stack Parameters and Emissions Rates used in the Model

3.3.18 A total of 11 generators is proposed comprising: 10 x 2,400 kW_e output and 1 x 600 kW_e output generator units. To ensure that the assessment is conservative, 11 generators have been modelled using the emissions data from a global generator-supplier for a standard 2,400 kW_e generator. Table 3.2 summarises the expected stack emissions characteristics for each engine operating at 100% and 25% load. The final engines used will have similar characteristics to those which have been modelled. The stack coordinates for each stack are provided in Annex C.

Table 3.2 :Stack Characteristics – 2,400 kW_e Diesel Generators

Parameters	Units	100% load	25% load
Stack height	From ground to the top of the stack (m)	15	
Internal diameter of the flue at point of release to air	m	0.6	
Temperature of the stack gases	°C	481	382
Actual volumetric flow	$Am^3.s^{-1}$	9.0	3.5
Actual O_2 (wet)	%	8.7	11.7
Actual H_2O	%	8.8	6.9
Normalised volumetric flow (0°C, dry, 5% O_2)	$Nm^3.s^{-1}$	2.1	0.7
NOx concentration	$mg.Nm^{-3}$	2181	1652
PM_{10} concentration	$mg.Nm^{-3}$	31	75
CO concentration	$mg.Nm^{-3}$	338	382
Hydrocarbons concentration#	$mg.Nm^{-3}$	43	172
NOx mass emission rate	$g.s^{-1}$	4.643	1.189
PM_{10} mass emission rate	$g.s^{-1}$	0.066	0.054
SO_2 mass emission rate*	$g.s^{-1}$	0.004	0.001
CO mass emission rate	$g.s^{-1}$	0.720	0.275
Hydrocarbons mass emission rate#	$g.s^{-1}$	0.092	0.124

Assumed to be total non-methane hydrocarbons *Based on fuel containing 0.0015% sulphur by mass. Pollutant concentrations are all at 5% O_2, dry.

3.3.19 For the modelling and assessment of hydrocarbons releases, the highly conservative and precautionary approach that has been taken is to assume all emissions are in the form of benzene (the most harmful local hydrocarbon pollutant), which is unlikely in the extreme. This is consistent

with the Environment Agency's online guidance (Environment Agency, 2020a) which states that *"If you release volatile organic compounds into the air and do not know what all the substances in them are, treat them all as 100% benzene in your risk assessment."*

Model Outputs

Receptors

3.3.20 The air quality assessment predicts the impacts at locations that could be sensitive to any changes. For assessing human-health impacts, such sensitive receptors should be selected where the public is regularly present and likely to be exposed over the averaging period of the objective. Local Air Quality Management Technical Guidance, LAQM.TG16 (Defra, 2016), provides examples of exposure locations and these are summarised in Table 3.3.

Table 3.3 : Examples of Where Air Quality Objectives Apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual-mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building's façades), or any other location where public exposure is expected to be short-term.
Daily-mean	All locations where the annual-mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building's façade), or any other location where public exposure is expected to be short-term.
Hourly-mean	All locations where the annual and 24 hour mean would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.

3.3.21 The effects of the proposals have been assessed at the facades of a representative selection of discrete sensitive receptors. All human receptors have been modelled at a height of 1.5 m, representative of typical head height. The locations of these discrete receptors are listed in

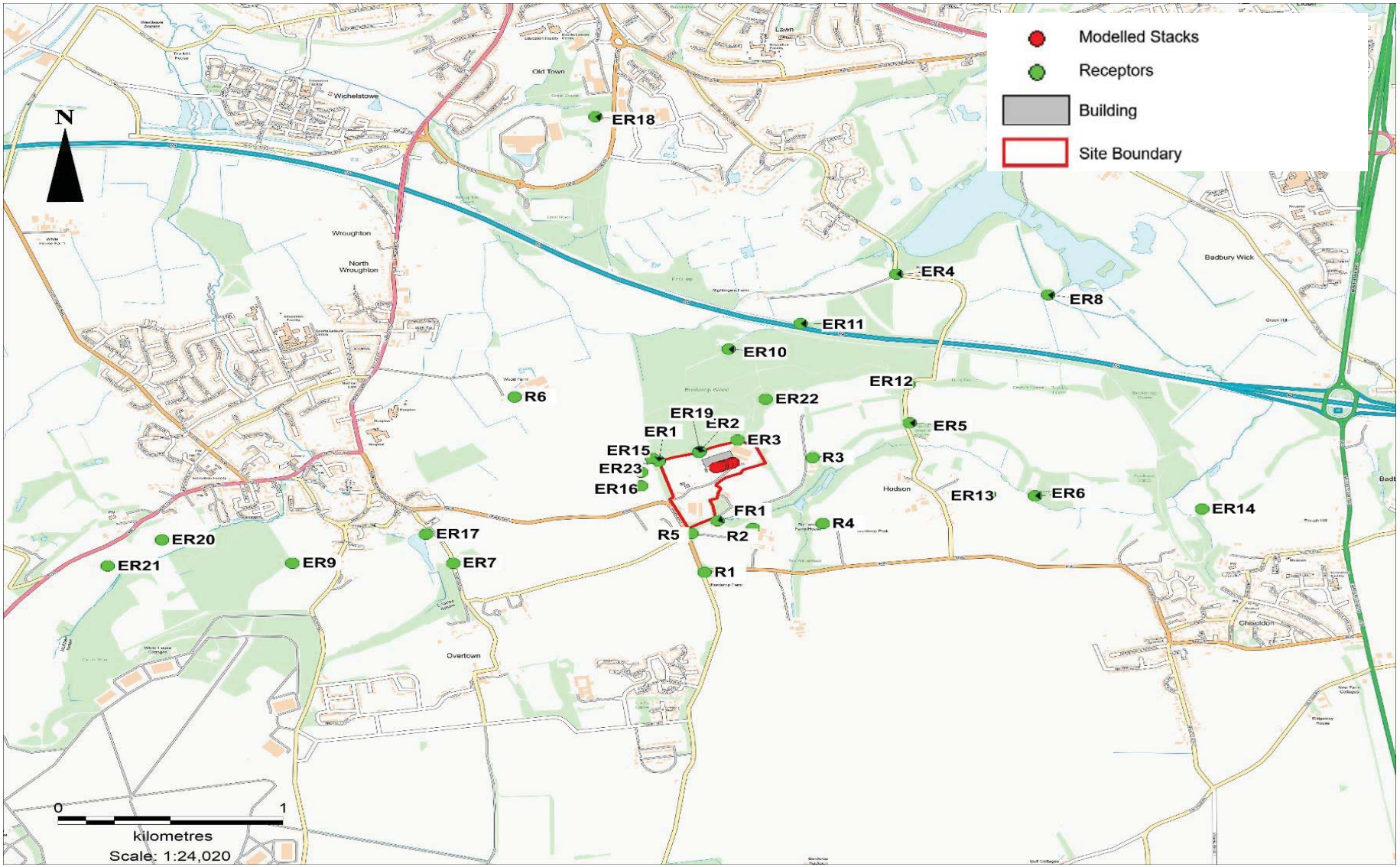
3.3.22 Table 3.4 and shown in Figure 3.2.

Table 3.4 : Modelled Sensitive Receptors

ID	Description	x	y
R1	Residential Property	416380	179943
R2	Residential Property	416593	180197
R3	Residential Property	416858	180602
R4	Residential Property	416902	180224
R5	Residential Property	416322	180167
R6	Residential Property	415540	180951
FR1	Future Residential Property	416438	180240

3.3.23 The locations of the ecological receptors (pre-fixed with ER) are also shown in Figure 3.2. These are discussed in detail in Annex D.

Figure 3.2: Stacks and Sensitive Receptors Modelled



3.3.24 In addition, concentrations have been modelled across a 3 km by 3 km grid, with a spacing of 30 m, at a height of 1.5 m (representative of average breathing height), centred on the Application Site.

3.3.25 The AQS objectives of all averaging periods (i.e. annual, daily and hourly-mean) apply at the front and rear façades of all the receptors modelled.

NO_X to NO_2 Relationship

3.3.26 The NOx emissions will typically comprise approximately 90-95% nitrogen monoxide (NO) and 5-10% nitrogen dioxide (NO_2) at the point of release. The NO oxidises in the atmosphere in the presence of sunlight, ozone and volatile organic compounds to form NO_2, which is the principal concern in terms of environmental health effects.

3.3.27 There are various techniques available for estimating the proportion of NOx converted to NO_2 by the time it has reached receptors which depends on the distance and hence travel time between the source and receptor. The methods used in this assessment are discussed below.

NO_X to NO_2 Assumptions for Annual-Mean Calculations

3.3.28 Total conversion (i.e. 100%) of NO to NO_2 is sometimes used for the estimation of the absolute upper limit of the annual mean NO_2. This technique assumes that all NO emitted is converted to NO_2 before it reaches ground level. However, in reality, the conversion is an equilibrium reaction and even at ambient concentrations a proportion of NO_X remains in the form of NO. Total conversion is, therefore, an unrealistic assumption, particularly in the near field (EA, 2017). While this approach is useful for screening assessments, it is not appropriate for detailed assessments.

3.3.29 Historically, the Environment Agency has recommended that for a 'worse case scenario', a 70% conversion of NO to NO_2 should be considered for calculation of annual average concentrations. If a breach of the annual average NO_2 objective/limit value occurs, the Environment Agency requires a more detailed assessment to be carried out with operators asked to justify the use of percentages lower than 70%.

3.3.30 Following the withdrawal of the Environment Agency's H1 guidance document, there is no longer an explicit recommendation; however, for the purposes of this detailed assessment, a 70% conversion of NO to NO_2 has been assumed for annual average NO_2 concentrations in line with the Environment Agency's historic recommendations.

NO_X to NO_2 Assumptions for Hourly-Mean Calculations

3.3.31 An assumed conversion of 35% follows the Environment Agency's recommendations (EA, undated) for the calculation of 'worse case scenario' short-term NO_2 concentrations.

Modelling of Long-Term and Short-Term Emissions

3.3.32 Long-term (annual-mean) pollutants have been modelled for comparison with the relevant annual mean objectives. The models were run with every engine assumed to run for all hours in the year. The model output was then multiplied by the percentage of the year each engine is expected to run.

3.3.33 For short-term NO_2, the objective is for the hourly-mean concentration not to exceed 200 $\mu g.m^{-3}$ more than 18 times per calendar year. As there are 8,760 hours in a non-leap year, the hourly-mean concentration would need to be below 200 $\mu g.m^{-3}$ in 8,742 hours, i.e. 99.79% of the time.

3.3.34 The model has been run with all generators operating in every hour to test the impacts associated with the widest range of meteorological conditions. Where the 99.79th percentile is exceeded, the

cumulative hypergeometric distribution has been used to estimate the likelihood of there being 19 or more hours where the predicted hourly-mean NO_2 concentration exceeds 200 µg.m^{-3} in a calendar year, coinciding with operational hours. In accordance with the Environment Agency *Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators* version 1 (undated), the probability has then been multiplied by a *safety factor* of 2.5. For the purposes of this assessment, if the probability is below 1% an exceedance is considered highly unlikely. If it is below 5%, an exceedance is considered unlikely.

3.4 Significance Criteria for Process Impacts on the Local Area

3.4.1 The EPUK & IAQM Land-Use Planning & Development Control: Planning For Air Quality document (EPUK&IAQM, 2017) provides further advice on determining the significance of effects arising from the impacts on air quality. In particular, it advises that:

"The significance of the effects arising from the impacts on air quality will depend on a number of factors and will need to be considered alongside the benefits of the development in question. Development under current planning policy is required to be sustainable and the definition of this includes social and economic dimensions, as well as environmental. Development brings opportunities for reducing emissions at a wider level through the use of more efficient technologies and better designed buildings, which could well displace emissions elsewhere, even if they increase at the development site. Conversely, development can also have adverse consequences for air quality at a wider level through its effects on trip generation."

3.4.2 When describing the air quality impact at a sensitive receptor, the change in magnitude of the concentration should be considered in the context of the absolute concentration at the sensitive receptor. Table 3.5 provides the EPUK & IAQM approach for describing the long-term air quality impacts at sensitive human-health receptors in the surrounding area.

Table 3.5 : Impact Descriptors for Individual Sensitive Receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level			
	1	2-5	6-10	>10
75 % or less of AQAL	Negligible	Negligible	Slight	Moderate
76 -94 % of AQAL	Negligible	Slight	Moderate	Moderate
95 - 102 % of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109 % of AQAL	Moderate	Moderate	Substantial	Substantial
110 % or more than AQAL	Moderate	Substantial	Substantial	Substantial

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.
2. The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as negligible.
3. The table is only designed to be used with annual mean concentrations.

4. Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.
5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.
6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.
7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

3.4.3 The human-health impact descriptors above apply at individual receptors. The EPUK & IAQM guidance states that the impact descriptors *"are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it maybe that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances."*

3.4.4 The above criteria and matrix are for assessing the long-term impacts; for short term impacts the EPUK/IAQM guidance states that:

"The Environment Agency uses a threshold criterion of 10% of the short term AQAL as a screening criterion for the maximum short term impact. This is a reasonable value to take and this guidance also adopts this as a basis for defining an impact that is sufficiently small in magnitude to be regarded as having an insignificant effect. Background concentrations are less important in determining the severity of impact for short-term concentrations, not least because the peak concentrations attributable to the source and the background are not additive."

3.4.5 Professional judgement by a competent, suitably qualified professional is required to establish the significance associated with the consequence of the impacts. This judgement is likely to take into account the extent of the current and future population exposure to the impacts and the influence and/or validity of any assumptions adopted during the assessment process.

3.4.6 The on-line Environment Agency online guidance entitled *'Environmental management – guidance, Air emissions risk assessment for your environmental permit'* (EA, 2020a). This guidance provides details for screening out substances for detailed assessment. In particular, it states that:

"To screen out a PC for any substance so that you don't need to do any further assessment of it, the PC must meet both of the following criteria:

- *the short-term PC is less than 10% of the short-term environmental standard*
- *the long-term PC is less than 1% of the long-term environmental standard*

If you meet both of these criteria you don't need to do any further assessment of the substance.

If you don't meet them you need to carry out a second stage of screening to determine the impact of the PEC."

3.4.7 It continues by stating that:

"You must do detailed modelling for any PECs not screened out as insignificant.[1]"

3.4.8 It then states that further action may be required where:

- *"your PCs could cause a PEC to exceed an environmental standard (unless the PC is very small compared to other contributions – if you think this is the case contact the Environment Agency)*
- *The PEC is already exceeding an environmental standard"*

3.5 Uncertainty

3.5.1 All air quality assessment tools, whether models or monitoring measurements, have a degree of uncertainty associated with the results. The choices that the practitioner makes in setting-up the model, choosing the input data, and selecting the baseline monitoring data will decide whether the final predicted impact should be considered a central estimate, or an estimate tending towards the upper bounds of the uncertainty range (i.e. tending towards worst-case).

3.5.2 The atmospheric dispersion model itself contributes some of this uncertainty, due to it being a simplified version of the real situation: it uses a sophisticated set of mathematical equations to approximate the complex physical and chemical atmospheric processes taking place as a pollutant is released and as it travels to a receptor. The predictive ability of even the best model is limited by how well the turbulent nature of the atmosphere can be represented.

3.5.3 Each of the data inputs for the model, listed earlier, will also have some uncertainty associated with them. Where it has been necessary to make assumptions, these have mainly been made towards the upper end of the uncertainty range informed by an analysis of relevant, available data.

3.5.4 The main components of uncertainty in the total predicted concentrations, made up of the background concentration and the modelled fraction, include those summarised in Table 3.6.

Table 3.6: Approaches to Dealing with Uncertainty used Within the Assessment

Concentration	Source of Uncertainty	Approach to Dealing with Uncertainty	Comments
Background Concentration	Characterisation of current baseline air quality conditions	The background concentration for the assessment is based on a comparison of monitored concentrations and Defra mapped concentration estimates.	The background concentration is the major proportion of the total predicted concentration.
	Characterisation of future baseline air quality (i.e. the air quality conditions in the future assuming that the proposed development does not proceed)	The future background concentration used in the assessment is the same as the current background concentration and no reduction has been assumed. This is a conservative assumption as, in reality, background concentrations are likely to reduce over time as	The conservative assumptions adopted ensure that the background concentration used within the model contributes to the result being towards the top of the uncertainty range, rather than a central estimate.

[1] PCs and PECs are explained in paragraph 3.1.3.

Concentration	Source of Uncertainty	Approach to Dealing with Uncertainty	Comments
		cleaner vehicle technologies form an increasing proportion of the fleet.	
Fraction from Modelled Sources	Generator emissions	A conservative approach has been adopted for modelling the emissions to air from the generators, as discussed in the sections above. In particular, for emergency usage, the generators are assumed to operate at 100% load which has a higher mass emission rate.	The modelled fraction is likely to contribute to the result being between a central estimate and the top of the uncertainty range.
	Meteorological Data	Uncertainties arise from any differences between the conditions at the met station and the development site, and between the historical met years and the future years. These have been minimised by using meteorological data collated at a representative measuring site. The model has been run for five full years of meteorological conditions.	
	Receptors	Impacts at both discrete sensitive receptors and across a grid of receptors have been predicted.	

3.5.5 The analysis of the component uncertainties indicates that, overall, the predicted total concentration is likely to be towards the high end of the range of predictions (i.e. towards worst-case) rather than being a central estimate. The actual concentrations that will be found when the site is operational are unlikely to be higher than those presented within this report and are more likely to be lower.

4 BASELINE

4.1 Baseline Methodology

4.1.1 The background concentration often represents a large proportion of the total pollution concentration, so it is important that the ambient concentration selected for the assessment is realistic. NPPG and EPUK & IAQM guidance highlight public information from Defra and local monitoring studies as potential sources of information on background air quality. LAQM.TG16 recommends that Defra mapped concentration estimates are used to inform background concentrations in air quality modelling and states that: *"Where appropriate these data can be supplemented by and compared with local measurements of background, although care should be exercised to ensure that the monitoring site is representative of background air quality".*

4.1.2 For this assessment, baseline air quality has been characterised by drawing on information from the following public sources:

- Defra maps (Defra, 2018), which show estimated pollutant concentrations across the UK in 1 km grid squares; and
- published results of local authority Review and Assessment (R&A) studies of air quality, including local monitoring and modelling studies.

4.1.3 A detailed description of how the baseline air quality has been derived for the Application Site is summarised in the following paragraphs.

4.2 Baseline Conditions

Review and Assessment Process

4.2.1 The Application Site is located within the administrative area of SBC. SBC has designated an AQMA for Kingshill Road, approximately 3.7 km to the north west of the Application Site. The AQMA is highly unlikely to be affected by emissions to air from the proposed development.

Local Monitoring

4.2.2 The nearest monitoring stations are more than 2 km from the Application Site. Measured concentrations are therefore unlikely to be representative of baseline air quality at the Application Site.

Appropriate Ambient Concentrations for the Development Site

4.2.3 In the absence of local monitoring, ambient annual-mean concentrations have been derived from the latest available Defra mapped background concentration estimates for the 1 km grid square of the Application Site.

4.2.4 Historically the view has been that background traffic-related NO_2 concentrations in the UK would reduce over time, due to the progressive introduction of improved vehicle technologies and increasingly stringent limits on emissions. After a prolonged period through the last decade where background annual-mean NO_2 concentrations did not generally decrease in line with expectations, the most recent monitoring studies indicate ambient traffic-related NO_2 concentrations are now falling. To ensure that the assessment presents conservative results, no reduction in the background has been applied for future years.

4.2.5 To ensure that the assessment presents conservative results, no reduction in the background has been applied for future years.

4.2.6 Table 4.1 summarises the annual-mean ambient concentrations for used in this assessment.

Table 4.1: Summary of Ambient Annual-Mean (Long-term) Concentrations used in the Assessment

Pollutant	Data Source	Concentration (µg.m^{-3})
NO_2	Defra mapped (2018)	9.5
PM_{10}		13.9
SO_2	Defra mapped (2001)	2.4
CO		276
Benzene*		0.3

*Defra limits its hydrocarbon concentration estimate to those of the hydrocarbon of greatest concern, benzene.

4.2.7 For NO_2, SO_2 and benzene a short-term ambient concentration has been estimated as double the annual-mean concentration.

5 MITIGATION

5.1 Construction

5.1.1 The IAQM dust guidance lists mitigation measures for low, medium and high dust risks. The risk of dust impacts during construction is assessed in Section 6. Without mitigation, the risk is considered to be medium (see para 6.1.11).

5.1.2 The measures below are based on the IAQM general site measures described as 'highly recommended' for medium risks. Measures based on the 'highly recommended' measures for high risk demolition and medium risk construction and trackout are also listed

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site (refer to the Code of Construction Practice (CoCP) Appendix 2.1 of the Environmental Statement)
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information

Dust Management Plan

- The mitigation meeasures listed below to control the emissions from dust are included the CoCP (Appendix 2.1 of the Environmental Statement).

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to SBC when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the Application Site boundary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Use screening intelligently where possible – e.g. locating site offices between potentially dusty activities and the receptors.
- Erect solid screens or barriers around the construction site boundary.

- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean.
- Provide enhanced screening for specific operations where there is a high potential for dust production and the site is active for an extended period
- Remove materials that have a potential to produce dust from the Application Site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Depending on the duration that stockpiles will be present and their size - cover, seed, fence or water to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- A Construction Traffic Management Plan has been prepared as part of the application (20305S-RPS-XX-XX-RP-P-9731) to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible.
- Use enclosed chutes, conveyors and covered skips, where practicable.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management

- Bonfires and burning of waste materials will not be permitted.

Measures specific to trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the Application Site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as practicable.

- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site).
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Proposed access gates are located at least 10 m from receptors.

5.1.3 The IAQM dust guidance states that with the appropriate dust mitigation measures in place the residual effect will normally be "*not significant*", and recommends the mitigation is secured by for example planning conditions, a legal obligation, or by legislation.

Measures specific to demolition

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Appropriate manual or mechanical demolition methods will be used as an alernative to explosive blasting.
- Bag and remove any biological debris or damp down such material before demolition

Measures specific to construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

5.1.4 The IAQM dust guidance states that with the appropriate dust mitigation measures in place the residual effect will normally be "*not significant*", and recommends the mitigation is secured by for example planning conditions, a legal obligation, or by legislation.

5.2 Operation

5.2.1 The key mitigation of the operational impacts is determining the optimum height for the generator stacks. The results of the stack height determination are provided in Annex B.

6 ASSESSMENT OF EFFECTS

6.1 Construction

Construction Dust

6.1.1 The type of activities that could cause fugitive dust emissions are: demolition; earthworks; handling and disposal of spoil; wind-blown particulate material from stockpiles; handling of loose construction materials; and movement of vehicles, both on and off site.

6.1.2 The level and distribution of construction dust emissions will vary according to factors such as the type of dust, duration and location of dust-generating activity, weather conditions and the effectiveness of suppression methods.

6.1.3 The main effect of any dust emissions, if not mitigated, could be annoyance due to soiling of surfaces, particularly windows and cars. However, it is normally possible, by implementation of proper control, to ensure that dust deposition does not give rise to significant adverse effects, although short-term events may occur (for example, due to technical failure or exceptional weather conditions). The following assessment, using the IAQM methodology, predicts the risk of dust impacts and the level of mitigation that is required to control the residual effects to a level that is "not significant".

Risk of Dust Impacts

Source

6.1.4 The total volume of the buildings to be demolished exceeds 50,000 m^2 and the dust emission magnitude for the demolition phase is classified as large.

6.1.5 The site area is more than 10,000 m^2 and the dust emission magnitude for the earthworks phase is classified as large.

6.1.6 The total volume of the buildings to be built exceeds 100,000 m^3 and the dust emission magnitude for the construction phase is classified as large.

6.1.7 The maximum number of outwards movements in any one day is over 50 HDVs and the dust emission magnitude for trackout would be classified as large.

Table 6.1 Dust Emission Magnitude for Demolition, Earthworks, Construction and Trackout

Demolition	Earthworks	Construction	Trackout
Large	Large	Large	Large

Pathway and Receptor - Sensitivity of the Area

6.1.8 All demolition, earthworks and construction activities are assumed to occur within the Application Site boundary. Figure 6.1**Error! Reference source not found.** shows the areas potentially affected by construction dust. The sensitivity of the area has been classified and the results are provided in Table 6.2 below.

Figure 6.1: Construction Dust Impacts

Table 6.2 Sensitivity of the Surrounding Area for Demolition, Earthworks and Construction

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	Medium	1-10 high sensitivity (residential) receptors within 350 m of the Application Site boundary (Table A.4) and Burderop Woods Site of Special Scientific Interest (SSSI) directly to the north (a medium sensitivity receptor).
Human Health	Low	1-10 high sensitivity (residential) receptors within 350 m of the Application Site boundary and background PM_{10} concentration below 24 $\mu g.m^{-3}$ (Table A.5)

6.1.9 The Dust Emission Magnitude for trackout is classified as large and trackout may occur on roads up to 500 m from the Application Site. The major route within 500 m is the B4005. The sensitivity of the area has been classified and the results are provided in Table 6.3

Table 6.3 Sensitivity of the Surrounding Area for Trackout

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	Medium	1-10 high sensitivity receptors located within 50 m of the roads (Table A.4)
Human Health	Low	1-10 high sensitivity receptors located within 50 m of the roads and PM_{10} concentrations below 24 $\mu g.m^{-3}$ (Table A.5)

Overall Dust Risk

6.1.10 The Dust Emission Magnitude has been considered in the context of the Sensitivity of the Area (Annex A - Tables A.4 and A.5) to give the Dust Impact Risk. Table 6.4 summarises the Dust Impact Risk for the four activities.

Table 6.4 Dust Impact Risk for Demolition, Earthworks, Construction and Trackout

Source	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	Medium	Medium	Medium
Human Health	Medium	Low	Low	Low
Risk	High	Medium	Medium	Medium

6.1.11 Taking the site as a whole, the overall risk is deemed to be medium. The mitigation measures appropriate to a level of risk for the site as a whole and for each of the phases are set out in Section 5.1.

6.1.12 Provided this package of mitigation measures is implemented, the residual construction dust effects will not be significant. The IAQM dust guidance states that "*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'." The IAQM dust guidance recommends that significance is only assigned to the effect after the activities are considered with mitigation in place.

6.2 Operation

Results of Stack Emissions Modelling

6.2.1 For the long-term impacts, the highest PCs predicted for scenarios 1 and 2 (added together) and the emergency scenario at sensitive receptors and at the point of maximum impact across the grid have been presented. As the operational hours for the emergency scenario (scenario 3) are the highest, the emergency scenario results have been presented for long-term impacts at human-health receptors.

6.2.2 For the short-term impacts, the highest PCs predicted for each of the three scenarios is presented as the generator testing will not occur within the same hour and an emergency will not occur every year.

Long-term Impacts

6.2.3 Table 6.5 summarises the maximum NO_2 PC and PEC values for the modelled scenarios at the selected discrete sensitive receptors. The EPUK/IAQM impact descriptors are also shown.

Table 6.5 Long-term Predicted NO_2 Concentrations at Sensitive Receptors – All Scenarios

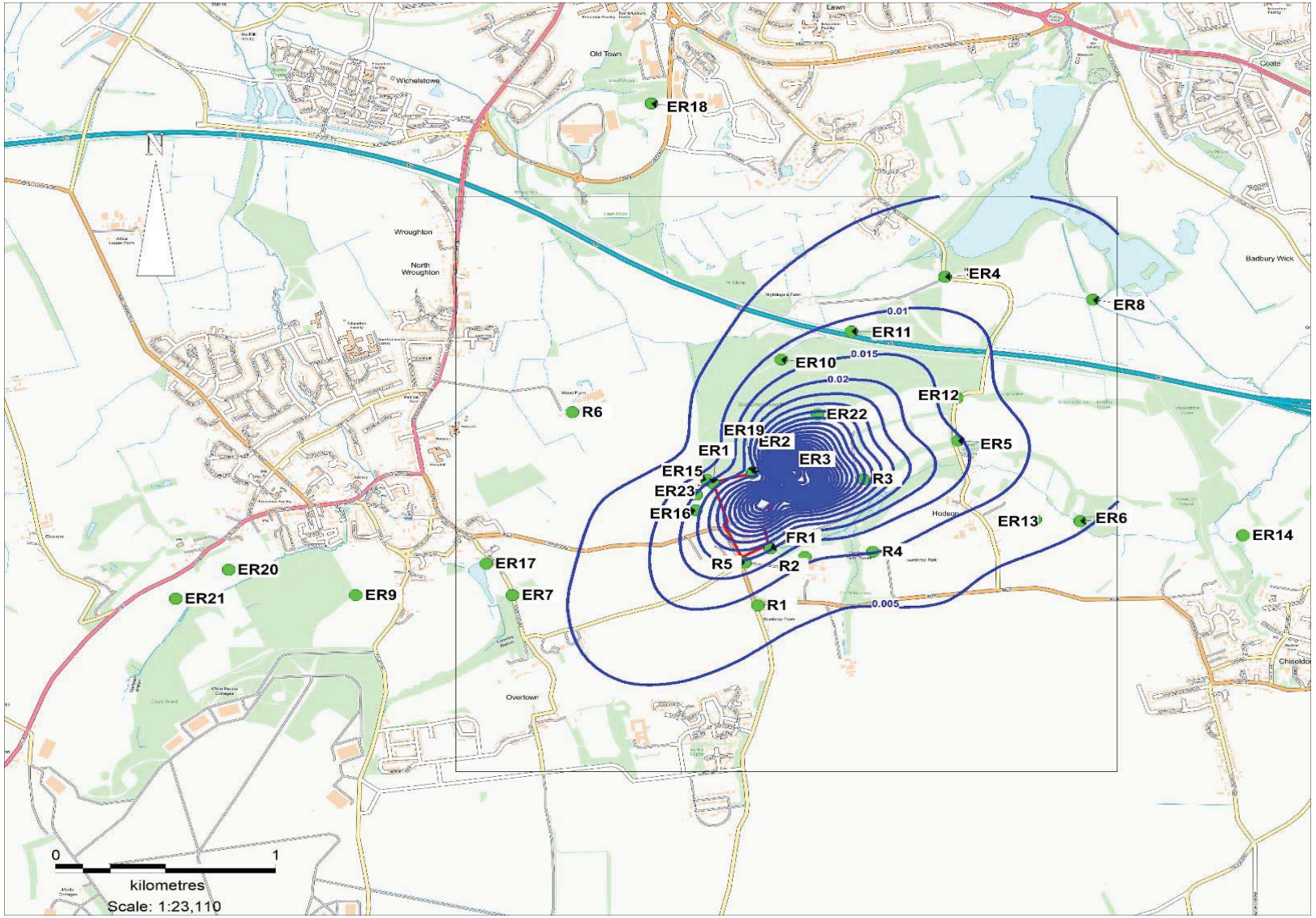
Receptors	Process Contribution (Annual mean) ($\mu g.m^{-3}$)	Process Contribution as % of AQAL	Predicted Environmental Concentration ($\mu g.m^{-3}$)	Impact Descriptor
R1	0.08	0	9.61	Negligible
R2	0.11	0	9.64	Negligible
R3	0.45	1	9.99	Negligible
R4	0.10	0	9.64	Negligible
R5	0.19	0	9.72	Negligible
R6	0.02	0	9.55	Negligible
FR1	0.18	0	9.72	Negligible
Max across grid	2.15	5	11.69	Negligible

AQAL for annual-mean NO_2 is 40 $\mu g.m^{-3}$

6.2.4 The PCs at sensitive receptors for all scenarios do not exceed 1% of the annual-mean limit value of 40 $\mu g.m^{-3}$. When the PCs are added to the background concentration, the total PECs are all below 40 $\mu g.m^{-3}$ at all receptors and across the grid. The impact descriptor at all receptors and across the grid is 'negligible'.

6.2.5 Figure 6.2 shows the long-term contour for Scenarios 1 and 2.

Figure 6.2: Annual-mean NO_2 Concentrations – Scenarios 1 and 2



Short-term Impacts

6.2.6 As the EPUK & IAQM impact descriptors only apply to long-term concentrations, the Environment Agency criterion of 10% of the short-term AQAL has been used to screen-out impacts as not having a significant effect.

6.2.7 Table 6.6 summarises the maximum PCs for each modelled scenario at the selected discrete sensitive receptors for the 11 generators.

Table 6.6 Short-term Predicted NO_2 Concentrations at Sensitive Receptors

Receptors	Scenario 1		Scenario 2		Emergency	
	PC as 99.79 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 99.79 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 99.79 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL
R1	4.19	2	10.61	5	116.7	58
R2	6.18	3	17.26	9	189.9	95
R3	6.73	3	18.27	9	201.0	101
R4	5.27	3	12.18	6	134.0	67
R5	6.12	3	16.80	8	184.8	92
R6	1.71	1	5.11	3	56.2	28
FR1	8.13	4	22.43	11	246.7	123
Max across grid	33.14	17	80.32	40	883.5	442

AQAL for NO_2 hourly-mean percentile is 200 $\mu g.m^{-3}$

6.2.8 The results show that the maximum short-term PC at all receptors for scenario 1 is below 10% of the AQAL. The PCs only exceed 10% of the AQAL at the point of maximum impact across the grid. When the PC is added to the background concentration of 19 $\mu g.m^{-3}$, the total PEC is well below 200 $\mu g.m^{-3}$.

6.2.9 The results show that the maximum short-term PC at all receptors, except FR1, for scenario 2 is below 10% of the AQAL. The PC also exceeds 10% of the AQAL at the point of maximum impact across the grid. When the PCs are added to the background concentration of 19 $\mu g.m^{-3}$, the total PEC is well below 200 $\mu g.m^{-3}$. As such, the short-term NO_2 impacts are not considered to be potentially significant for scenarios 1 and 2.

6.2.10 The results show that the maximum short-term PC at all receptors for scenario 3 is above 10% of the AQAL. The model has been run again to determine the hourly concentrations at the worst affected receptor, FR1. Analysis of the data indicates that when the PC is added to the background concentration, the maximum number of hourly concentrations above 200 $\mu g.m^{-3}$ is predicted to be 149. The cumulative hypergeometric distribution has been used to estimate the probability of there being 19 or more hours where the predicted hourly-mean NO_2 concentration exceeds 200 $\mu g.m^{-3}$ in a calendar year, coinciding with the 72 hours of operation. The probability is 4.1×10^{-18} %. When this is multiplied by 2.5, the probability is 1.0×10^{-17} %. In other words, well below 1% and extremely unlikely.

6.2.11 Figure 6.3 and Figure 6.4 show the short-term contours for Scenarios 1 and 2 respectively.

Figure 6.3: 99.79th Percentile Hourly-mean NO_2 Concentrations – Scenario 1

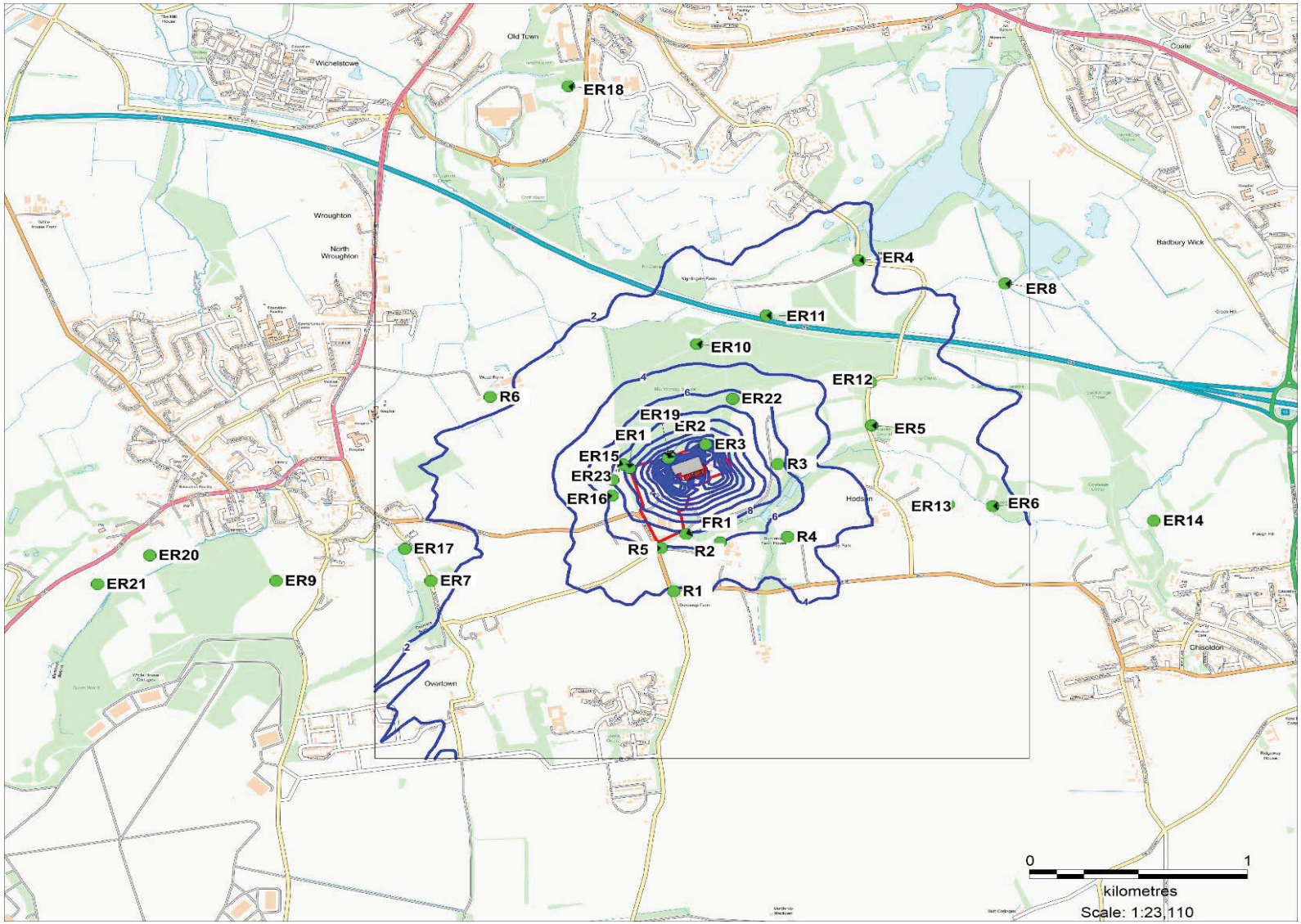
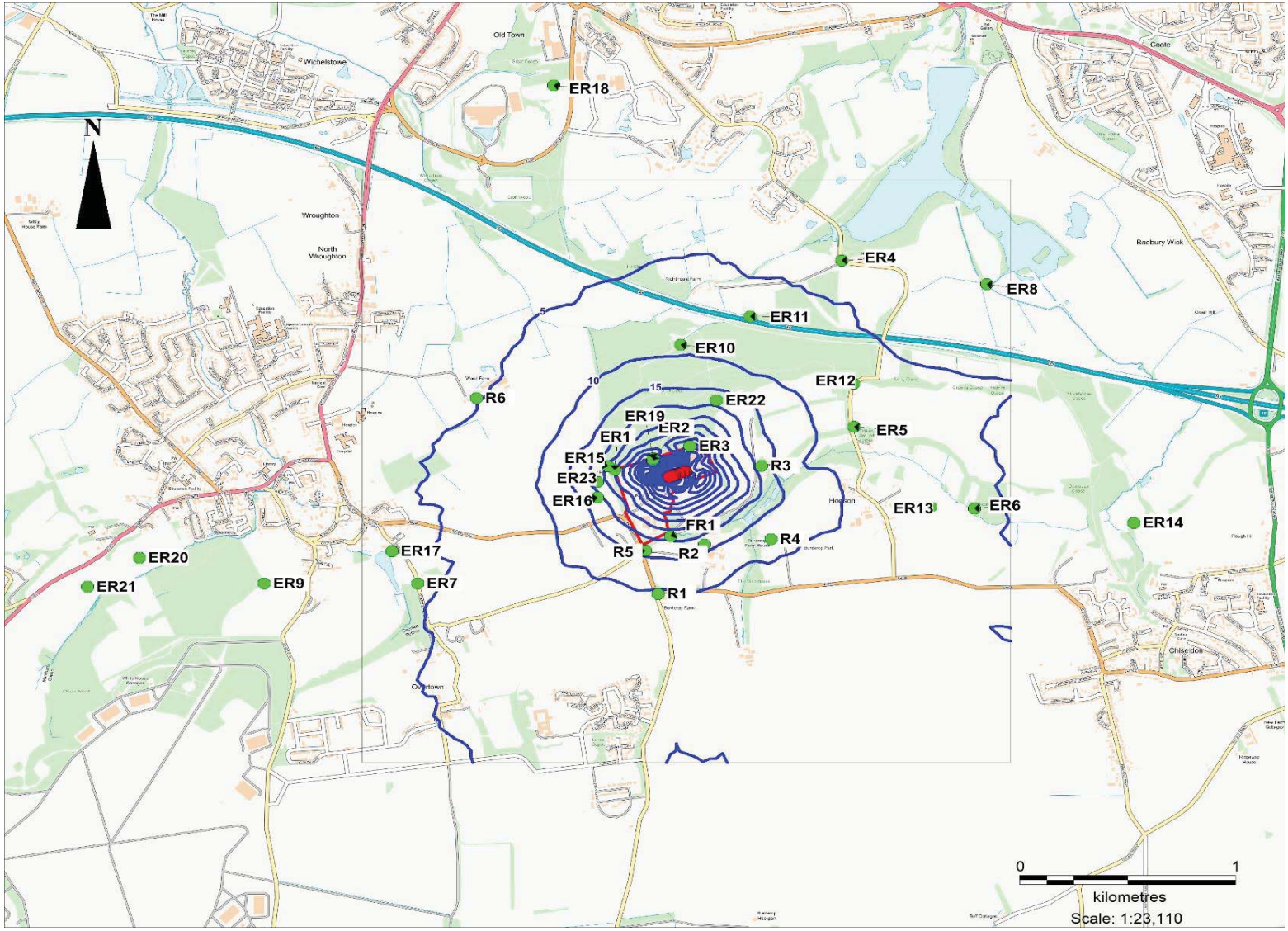


Figure 6.4: 99.79th Percentile Hourly-mean NO_2 Concentrations – Scenario 2



Particulate Matter (PM_{10} and $PM_{2.5}$) Impacts

Long-term Impacts

6.2.12 Table 6.7 summarises the maximum PM_{10} PC and PEC values for all modelled scenarios at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown.

Table 6.7 Long-term Predicted PM_{10} Concentrations at Sensitive Receptors – All Scenarios

Receptors	Process Contribution (Annual mean) ($\mu g.m^{-3}$)	Process Contribution as % of AQAL	Predicted Environmental Concentration ($\mu g.m^{-3}$)	Impact Descriptor
R1	0.002	0	13.88	Negligible
R2	0.002	0	13.88	Negligible
R3	0.009	0	13.89	Negligible
R4	0.002	0	13.88	Negligible
R5	0.004	0	13.88	Negligible
R6	<0.0005	0	13.88	Negligible
FR1	0.004	0	13.88	Negligible
Max across grid	0.043	0	13.92	Negligible

AQAL for annual-mean PM_{10} is 40 $\mu g.m^{-3}$

6.2.13 The PCs for all scenarios do not exceed 1% of the annual-mean limit value of 40 $\mu g.m^{-3}$. When the PCs are added to the background concentration, the total PECs are all below 40 $\mu g.m^{-3}$. The impact descriptor at all receptors is 'negligible'.

6.2.14 For $PM_{2.5}$, if it conservatively assumed that all PM_{10} is $PM_{2.5}$, then the maximum PC across the grid of 0.043 $\mu g.m^{-3}$ is 0.2% of the annual-mean limit value of 25 $\mu g.m^{-3}$. As this rounds to 0%, the impact descriptor is also 'negligible' at the point of maximum impact.

Short-term Impacts

6.2.15 Table 6.8 summarises the maximum PCs for scenarios 1 and 2 at the selected sensitive receptors. The emergency scenario has not been modelled as the hours of operation (72 hours, i.e. 3 days) are fewer than the number required by the objective (35 days).

Table 6.8 Short-term Predicted PM_{10} Concentrations at Sensitive Receptors

Receptors	Scenario 1		Scenario 2	
	PC as 90.41 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 90.41 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL
R1	0.07	0	0.07	0
R2	0.11	0	0.11	0
R3	0.28	1	0.29	1
R4	0.09	0	0.09	0

Receptors	Scenario 1		Scenario 2	
	PC as 90.41 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 90.41 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL
R5	0.15	0	0.16	0
R6	0.02	0	0.01	0
FR1	0.15	0	0.16	0
Max across grid	1.60	3	1.07	2

AQAL for PM_{10} 24-hour percentile is 50 $\mu g.m^{-3}$

6.2.16 The results show that the maximum short-term PC at all receptors is below 10% of the AQAL. As such, the short-term PM_{10} impacts are not considered to be potentially significant.

Sulphur Dioxide (SO_2) Impacts

Short-term Impacts

6.2.17 Table 6.9, Table 6.10 and Table 6.11 summarises the maximum PCs for each modelled scenario at the selected discrete sensitive receptors.

Table 6.9 Short-term Predicted SO_2 Concentrations at Sensitive Receptors – 15-minute mean

Receptors	Scenario 1		Scenario 2		Scenario 3 - Emergency	
	PC as 99.9 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 99.9 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 99.9 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL
R1	0.02	0	0.04	0	0.41	0
R2	0.03	0	0.05	0	0.57	0
R3	0.03	0	0.06	0	0.61	0
R4	0.02	0	0.04	0	0.43	0
R5	0.03	0	0.05	0	0.56	0
R6	0.01	0	0.02	0	0.19	0
FR1	0.03	0	0.07	0	0.73	0
Max across grid	0.14	0	0.25	0	2.70	1

AQAL for SO_2 15-minute-mean percentile is 266 $\mu g.m^{-3}$

Table 6.10 Short-term Predicted SO_2 Concentrations at Sensitive Receptors – 1-hour mean

Receptors	Scenario 1		Scenario 2		Scenario 3 - Emergency	
	PC as 99.73 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 99.73 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 99.73 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL
R1	0.01	0	0.03	0	0.30	0

Receptors	Scenario 1		Scenario 2		Scenario 3 - Emergency	
	PC as 99.73 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 99.73 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 99.73 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL
R2	0.02	0	0.04	0	0.48	0
R3	0.02	0	0.05	0	0.52	0
R4	0.02	0	0.03	0	0.35	0
R5	0.02	0	0.04	0	0.48	0
R6	0.01	0	0.01	0	0.14	0
FR1	0.03	0	0.06	0	0.64	0
Max across grid	0.11	0	0.20	0	2.18	1

AQAL for SO_2 1-hour mean percentile is 350 $\mu g.m^{-3}$

Table 6.11 Short-term Predicted SO_2 Concentrations at Sensitive Receptors – 24-hour mean

Receptors	Scenario 1		Scenario 2		Scenario 3 - Emergency	
	PC as 99.18 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 99.18 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL	PC as 99.18 Percentile ($\mu g.m^{-3}$)	PC as % of AQAL
R1	0.005	0	0.011	0	0.12	0
R2	0.010	0	0.021	0	0.23	0
R3	0.012	0	0.032	0	0.35	0
R4	0.007	0	0.013	0	0.14	0
R5	0.011	0	0.025	0	0.27	0
R6	0.002	0	0.004	0	0.05	0
FR1	0.012	0	0.032	0	0.36	0
Max across grid	0.068	0	0.124	0	1.36	1

AQAL for SO_2 24-hour mean percentile is 125 $\mu g.m^{-3}$

6.2.18 The results show that the maximum short-term PC at all receptors is below 10% of the AQAL. As such, the short-term SO_2 impacts are not considered to be potentially significant.

Carbon Monoxide (CO) Impacts

Short-term Impacts

6.2.19 Table 6.12 summarises the maximum running 8-hour PCs for all modelled scenarios at the selected sensitive receptors.

Table 6.12 Short-term Predicted CO Concentrations at Sensitive Receptors – All Scenarios

Receptors	Scenario 1		Scenario 2		Emergency	
	Process Contribution (8hr running mean) (µg.m^{-3})	Process Contribution as % of AQAL	Process Contribution (8hr running mean) (µg.m^{-3})	Process Contribution as % of AQAL	Process Contribution (8hr running mean) (µg.m^{-3})	Process Contribution as % of AQAL
R1	1.87	0	3.97	0	43.66	0
R2	3.44	0	6.58	0	72.41	1
R3	3.65	0	7.32	0	80.50	1
R4	2.22	0	4.80	0	52.83	1
R5	3.25	0	6.71	0	73.76	1
R6	0.79	0	2.07	0	22.74	0
FR1	4.08	0	9.28	0	102.04	1
Max across the grid	19.29	0	32.03	0	352.31	4

AQAL for CO as an 8-hour running mean is 10,000 µg.m^{-3}

6.2.20 The PCs for all scenarios do not exceed 10% of the 8-hr running mean limit value of 10,000 µg.m^{-3}. As such the short-term CO impacts are not considered to be potentially significant.

6.2.21 Table 6.13 summarises the maximum hourly-mean PCs for all modelled scenarios at the selected sensitive receptors.

Table 6.13 Short-term Predicted CO Concentrations at Sensitive Receptors – All Scenarios

Receptors	Scenario 1		Scenario 2		Emergency	
	Process Contribution (Maximum hourly-mean) (µg.m^{-3})	Process Contribution as % of AQAL	Process Contribution (Maximum hourly-mean) (µg.m^{-3})	Process Contribution as % of AQAL	Process Contribution (Maximum hourly-mean) (µg.m^{-3})	Process Contribution as % of AQAL
R1	4.14	0	5.56	0	61.19	0
R2	5.68	0	9.35	0	102.83	0
R3	4.94	0	9.27	0	101.92	0
R4	4.68	0	5.93	0	65.18	0
R5	4.57	0	8.87	0	97.52	0
R6	1.64	0	2.75	0	30.25	0
FR1	5.97	0	11.23	0	123.52	0
Max across the grid	53.76	0	74.50	0	819.51	3

AQAL for CO as a maximum 1-hour mean is 30,000 µg.m^{-3}

6.2.22 The PCs for all scenarios do not exceed 10% of the maximum hourly-mean limit value of 30,000 µg.m^{-3}. As such the short-term CO impacts are not considered to be potentially significant.

Hydrocarbon Impacts (Expressed as Benzene)

Long-term Impacts

6.2.23 Table 6.14 summarises the maximum PCs for all modelled scenarios at the selected sensitive receptors taking the extremely conservative approach that all the hydrocarbon emissions are benzene. The EPUK/IAQM impact descriptors are also shown.

Table 6.14 Long-term Predicted Benzene Concentrations at Sensitive Receptors – All Scenarios

Receptors	Process Contribution (Annual mean) (µg.m^{-3})	Process Contribution as % of AQAL	Predicted Environmental Concentration (µg.m^{-3})	Impact Descriptor
R1	0.002	1	0.35	Negligible
R2	0.003	1	0.35	Negligible
R3	0.013	4	0.36	Negligible
R4	0.003	1	0.35	Negligible
R5	0.005	2	0.35	Negligible
R6	0.001	0	0.34	Negligible
FR1	0.005	1	0.35	Negligible
Max across grid	0.061	18	0.40	Negligible

AQAL for annual-mean for benzene is 5 µg.m^{-3}

6.2.24 The PCs exceed 1% of the annual-mean limit value for benzene of 5 µg.m^{-3} at several receptors; however, when the PCs are added to the background concentration, the total PECs are all well below 5 µg.m^{-3}. The impact descriptor at all receptors is 'negligible'.

Short-term Impacts

6.2.25 Table 6.15 summarises the maximum PCs for all modelled scenarios at the selected sensitive receptors.

Table 6.15 Short-term Predicted Benzene Concentrations at Sensitive Receptors – All Scenarios

Receptors	Scenario 1		Scenario 2		Emergency	
	Process Contribution (Maximum hourly-mean) (µg.m^{-3})	Process Contribution as % of AQAL	Process Contribution (Maximum hourly-mean) (µg.m^{-3})	Process Contribution as % of AQAL	Process Contribution (Maximum hourly-mean) (µg.m^{-3})	Process Contribution as % of AQAL
R1	1.86	1	0.71	0	7.78	4

Receptors	Scenario 1		Scenario 2		Emergency	
	Process Contribution (Maximum hourly-mean) ($\mu g.m^{-3}$)	Process Contribution as % of AQAL	Process Contribution (Maximum hourly-mean) ($\mu g.m^{-3}$)	Process Contribution as % of AQAL	Process Contribution (Maximum hourly-mean) ($\mu g.m^{-3}$)	Process Contribution as % of AQAL
R2	2.56	1	1.19	1	13.08	7
R3	2.23	1	1.18	1	12.97	7
R4	2.11	1	0.75	0	8.29	4
R5	2.06	1	1.13	1	12.41	6
R6	0.74	0	0.35	0	3.85	2
FR1	2.69	1	1.43	1	15.71	8
Max across the grid	24.21	12	9.48	5	104.26	53

AQAL for CO as an 8-hour running mean is 10,000 $\mu g.m^{-3}$

6.2.26 The PCs only exceed 10% of the maximum hourly mean of 195 $\mu g.m^{-3}$ at the point of maximum impact across the grid. When the PCs are added to twice the existing concentration of 0.3 $\mu g.m^{-3}$, all PECs are well below 195 $\mu g.m^{-3}$. As such the short-term benzene impacts are not considered to be potentially significant.

Significance of Effects

6.2.27 It is generally considered good practice that, where possible, an assessment should communicate effects both numerically and descriptively. Professional judgement by a competent, suitably qualified professional is required to establish the significance associated with the consequence of the impacts.

6.2.28 The impacts predicted at individual receptors and the geographical extent over which such impacts occur, can be used to inform the judgement on the impact on the surrounding area as a whole, and whether the resulting overall effect is significant or not. The IAQM guidance states, *"Whilst it may be that there are 'slight', 'moderate', or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances."* and *"…a 'moderate' or 'substantial' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health."*

6.2.29 Using professional judgement, the resulting air quality effect is considered to be 'not significant' overall.

Sensitivity and Uncertainty

6.2.30 Section 3 provided an analysis of the sources of uncertainty in the results of the assessment. The conclusion of that analysis was that, overall, the predicted total concentration is likely to be towards the top of the uncertainty range rather than being a central estimate. The actual concentrations that will be found when the development is operational are unlikely to be higher than those presented within this report and are more likely to be lower.

6.2.31 The impacts at existing receptors are shown to be not significant even for this conservative scenario. Consequently, further sensitivity analysis has not been undertaken and, in practice,

the impacts at sensitive receptors are likely to be lower than those reported in this conservative assessment.

6.3 Cumulative

6.3.1 There are two developments in the vicinity of the site:

- S/17/0128: demolition of existing pavilions; change of use of offices and ancillary buildings to apartments/dwellings; the erection of 52 dwellings; and the construction of new access and associated works. Granted planning permission, subject to conditions, on 18 December 2019
- S/19/1892: erection of six additional dwellings. Granted planning permission, subject to conditions, on 17 July 2020.

6.3.2 Both developments are immediately to the south of the Application Site. Neither application was accompanied by an air quality assessment.

6.3.3 Proposed infrastructure upgrades to the Application Site are summarised in Appendix 4.3.

Construction

6.3.4 The risk of dust impacts is best mitigated at source. Assuming that developments S/17/0128 and S/19/1892 implement dust mitigation and controls proportionate to the level of risk, there should be no residual cumulative air quality effect.

6.3.5 The main potential air quality impacts associated with infrastructure upgrade works would be related to the construction period for such works; no air quality impacts are predicted once the upgraded infrastructure is operational.

6.3.6 Works to install the upgrades would be undertaken by the utility providers and would follow standard construction methodologies. Construction would include the implementation of appropriate dust mitigation and controls as those set out by the Institute of Air Quality Management and in this report. With the implementation of these measures there would be no residual cumulative air quality effect from the construction of trenches, infrastructure improvements and upgrades to the substations associated with the future electrical infrastructure upgrades. Operation

6.3.7 The Transport Assessment submitted with application S/17/0128 states that the *"trip generation resulting from the proposed development is less than the existing position".* Application S/19/1892 is for six dwellings and is highly unlikely to generate significant vehicle movements. The use of the existing background concentrations should therefore be conservative for traffic-related pollutants.

6.3.8 The suitability of the sites S/17/0128 and S/19/1892 to the south is already accounted for in the assessment as receptor 'FR1 – Future Residential Property' and the modelling of a grid of receptors surrounding the site.

7 SUMMARY

7.1.1 This air quality assessment has been undertaken to support the planning application for the proposed data centre at Burderop Park, Swindon.

7.1.2 Impacts during construction, such as dust generation and plant vehicle emissions, are predicted to be of short duration and only relevant during the construction phase. The results of the risk assessment of construction dust impacts undertaken using the IAQM dust guidance, indicates that before the implementation of mitigation and controls, the risk of dust impacts will be medium. Implementation of the highly-recommended mitigation measures described in the IAQM construction dust guidance should reduce the residual dust effects to a level categorised as "*not significant*".

7.1.3 Once operational, the key sources of emissions to air are the 11 diesel-powered generators. Concentrations of NO_2, PM_{10}, SO_2, CO and benzene have been predicted at selected sensitive receptors using a detailed atmospheric dispersion model and compared with the relevant long and short-term AQS objectives.

7.1.4 The long-term operational impacts for all pollutants are predicted to be 'negligible', considering the changes in pollutant concentrations and absolute levels.

7.1.5 The short-term operational impacts for all pollutants have been screened-out as being insignificant at all receptors.

7.1.6 Using professional judgement, the resulting air quality effect is considered 'not significant'.

ANNEXES

Annex A

Detailed Construction Dust Assessment Methodology

Source

The IAQM dust guidance gives examples of the dust emission magnitudes for demolition, earthworks and construction activities and trackout. These example dust emission magnitudes are based on the site area, building volume, number of HDV movements generated by the activities and the materials used. These example magnitudes have been combined with details of the period of construction activities to provide the ranking for the source magnitude that is set out in Table A.1.

Table A.1 Risk Allocation – Source (Dust Emission Magnitude)

Features of the Source of Dust Emissions	Dust Emission Magnitude
Demolition - building over 50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities > 20 m above ground level. **Earthworks** – total site area over 10,000 m^2, potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved > 100,000 tonnes. **Construction** - total building volume over 100,000 m^3, activities include piling, on-site concrete batching, sand blasting. Period of activities more than two years. **Trackout** – 50 HDV outwards movements in any one day, potentially dusty surface material (e.g. High clay content), unpaved road length > 100 m.	Large
Demolition - building between 20,000 to 50,000 m^3, potentially dusty construction material and demolition activities 10 - 20 m above ground level. **Earthworks** – total site area between 2,500 to 10,000 m^2, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 - 8 m in height, total material moved 20,000 to 100,000 tonnes. **Construction** - total building volume between 25,000 and 100,000 m^3, use of construction materials with high potential for dust release (e.g. concrete), activities include piling, on-site concrete batching. Period of construction activities between one and two years. **Trackout** – 10 - 50 HDV outwards movements in any one day, moderately dusty surface material (e.g. High clay content), unpaved road length 50 – 100 m.	Medium
Demolition - building less than 20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities < 10 m above ground, demolition during winter months. **Earthworks** – total site area less than 2,500 m^2. Soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 10,000 tonnes earthworks during winter months. **Construction** - total building volume below 25,000 m^3, use of construction materials with low potential for dust release (e.g. metal cladding or timber). Period of construction activities less than one year. **Trackout** – < 10 HDV outwards movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.	Small

Pathway and Receptor - Sensitivity of the Area

Pathway means the route by which dust and particulate matter may be carried from the source to a receptor. The main factor affecting the pathway effectiveness is the distance from the receptor to the source. The orientation of the receptors to the source compared to the prevailing wind direction is a relevant risk factor for long-duration construction projects; however, short-term construction projects may be limited to a few months when the most frequent wind direction might be quite different, so adverse effects can potentially occur in any direction from the site.

As set out in the IAQM dust guidance, a number of attempts have been made to categorise receptors into high, medium and low sensitivity categories; however there is no unified sensitivity classification scheme that covers the quite different potential effects on property, human health and ecological receptors.

Table A.2 Table A.3 and Table A.4 sets out the IAQM basis for categorising the sensitivity of people and property to dust and PM_{10} respectively.

Table A.2 Sensitivities of People and Property Receptors to Dust

Receptor	Sensitivity
Principles:- 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:- Dwellings. Museums and other culturally important collections. Medium and long-term car parks and car showrooms.	High
Principles:- Users would expect 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:- Parks. Places of work.	Medium
Principles:- the enjoyment of amenity would not reasonably be expected; or there is property that 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 to be present only for limited periods of time as part of the normal pattern of use of the land. Indicative Examples:- Playing fields, farmland (unless commercially-sensitive horticultural). Footpaths and roads. Short-term car parks.	Low

Table A.3 Sensitivities of People and Property Receptors to PM_{10}

Receptor	Sensitivity
Principles:- Locations where members of the public are exposed over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM_{10}, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative Examples:- • Residential properties. • Schools, hospitals and residential care homes.	High

Principles:- Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM_{10}, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative Examples:- • Office and shop workers (but generally excludes workers occupationally exposed to PM_{10} as protection is covered by Health and Safety at Work legislation).	Medium
Principles:- Locations where human exposure is transient exposure. Indicative Examples:- Public footpaths. Playing fields, parks. Shopping streets.	Low

Table A.4 Sensitivities of Ecological Receptors to Dust

Receptor	Sensitivity
Principles:- • 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:- • Special Area of Conservation (SAC) designated for acid heathlands adjacent to the demolition of a large site containing concrete (alkali) buildings or for the presence of lichen.	High
Principles:- • 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 Examples:- • Site of Special Scientific Interest (SSSI) with dust sensitive features.	Medium
Principles:- • Locations with a local designation where the features may be affected by dust deposition. Indicative Examples:- • A Local Nature Reserve with dust sensitive features	Low

The IAQM methodology combines consideration of the pathway and receptor to derive the 'sensitivity of the area'. Table A.5, Table A.6, Table A.7 show how the sensitivity of the area has been derived for this assessment.

Table A.5 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors [a]	Distance from the Source (m) [b]			
		<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

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout.
a The total number of receptors within the stated distance has been estimated. Only the highest level of area sensitivity from the table has been recorded.
b For trackout, the distances have been measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and trackout impacts have only been considered up to 50 m from the edge of the road.

Table A.6 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration [a]	Number of Receptors [b, c]	Distance from the Source (m) [d]				
			<20	<50	<100	<200	<350
High	> 32 µg.m^{-3}	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28 - 32 µg.m^{-3}	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24 - 28 µg.m^{-3}	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	< 24 µg.m^{-3}	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	> 32 µg.m^{-3}	>10	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	28 – 32 µg.m^{-3}	> 10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	< 28 µg.m^{-3}	>1	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout.
a This refers to the background concentration derived from the assessment of baseline conditions later in this report. The concentration categories listed in this column apply to England, Wales and Northern Ireland but not to Scotland.

b The total number of receptors within the stated distance has been estimated. Only the highest level of area sensitivity from the table has been recorded.
c For high sensitivity receptors with high occupancy (such as schools or hospitals), the approximate number of occupants has been used to derive an equivalent number of receptors.
d For trackout, the distances have been measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and trackout impacts have only been considered up to 50 m from the edge of the road.

Table A.7 Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m) [a]	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout and for each designated site.
a Only the highest level of area sensitivity has been recorded.

The IAQM dust guidance lists the following additional factors that can potentially affect the sensitivity of the area and, where necessary, professional judgement has been used to adjust the sensitivity allocated to a particular 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 are considered go beyond the classifications given in the table above.

The matrices in Table A.8, Table A.9, Table A.10 and Table A.11 have been used to assign the risk for each activity to determine the level of mitigation that should be applied. For those cases where the risk category is 'negligible', no mitigation measures are required beyond those mandated by legislation.

Table A.8 Risk of Dust Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table A.9 Risk of Dust Impacts – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table A.10 Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table A.11 Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Annex B

Stack Height Determination

A stack height determination has been undertaken to establish the height at which there is minimal additional environmental benefit associated with the cost of further increasing the generator stacks. The Environment Agency removed their detailed guidance, Horizontal Guidance Note EPR H1 (EA, 2010), for undertaking risk assessments on 1 February 2016; however, the approach used here by RPS is consistent with that EA guidance which required the identification of *"an option that gives acceptable environmental performance but balances costs and benefits of implementing it."*

The emissions data used in the stack height determination are summarised in Section 3 of the report. Simulations have been run using ADMS 5 to determine what stack height is required to provide adequate dispersion/dilution and to overcome local building wake effects.

The stack height determination considers ground level concentrations over the averaging periods relevant to the air quality assessment, together with the full range of all likely meteorological conditions using three years of hourly sequential meteorological data from Lyneham. As only one generator will be operated at a time during testing, the model was run for a single stack. The modelling included a range of stack heights between 14 m to 18 m at 1 m intervals.

The dispersion modelling for the purposes of stack height determination assumed a domain of 3 km by 3 km centred on the proposed development and with a grid spacing of 100 m.

The maximum predicted contributions have been plotted against height to determine if there is a height at which no benefit is gained from increases in stack heights in Graph B.1 below.

Graph B.1 Variation in Concentration (as µg.m^{-3} per g.s^{-1}) with Stack Height (m)

The graph does not indicate that there would be any appreciable improvement in an increase in the stack height above the 15 m modelled.

Annex C

Stack Coordinates

Table C.1 Stack Coordinates

Stack	x	Y
1	416506	180574
2	416505	180574
3	416496	180571
4	416495	180571
5	416476	180563
6	416475	180563
7	416456	180555
8	416455	180555
9	416446	180551
10	416445	180551
11	416431	180545

Annex D

Ecological Impacts

Scope

The Environment Agency guidance on 'Screening for protected conservations areas' (EA, 2020b) requires identification of:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites (protected wetlands) within 10 km of the proposed development; and
- Sites of Special Scientific Interest (SSSIs) and Local Nature sites (ancient woods, local wildlife sites (LWSs) and national and local nature reserves) within 2 km of the proposed development.

The relevant sites have been identified by the project's ecologists and are listed in Table D.1. No SPAs, SACs or Ramsar sites within 10 km have been identified.

Critical Levels

Critical levels are maximum atmospheric concentrations of pollutants for the protection of vegetation and ecosystems and are specified within relevant European air quality directives and corresponding UK air quality regulations. Annual-mean PCs and PECs of NO_x have been calculated for comparison with the 30 $\mu g.m^{-3}$ critical level. The maximum daily-mean PCs and PECs of NO_x have been calculated for comparison with the 75 $\mu g.m^{-3}$ critical level. Annual-mean PCs and PECs of SO_2 have been calculated for comparison with the 20 $\mu g.m^{-3}$ critical level. Where relevant, background concentrations at each designated site have been derived from the UK Air Pollution Information System (APIS) database (APIS, 2020).

Critical Loads

Critical loads refer to the quantity of pollutant deposited, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge.

Critical Loads – Nutrient Nitrogen Deposition

Percentage contributions to nutrient nitrogen deposition have been derived from the results of the ADMS dispersion modelling. Deposition rates have been calculated using empirical methods recommended by the Environment Agency, as follows:

- The dry deposition flux ($\mu g.m^{-2}.s^{-1}$) has been calculated by multiplying the ground level NO_2 concentrations ($\mu g.m^{-3}$) by the deposition velocity. The Environment Agency guidance provides deposition velocities of 0.0015 $m.s^{-1}$ for short habitats and 0.003 $m.s^{-1}$ for tall habitats.
- Units of $\mu g.m^{-2}.s^{-1}$ have been converted to units of $kg.ha^{-1}.year^{-1}$ by multiplying the dry deposition flux by the standard conversion factor of 96 for NO_X.
- Predicted contributions to nitrogen deposition have been calculated and compared with the relevant critical load range for the habitat types associated with the designated site. These have been derived from the APIS database.

Critical Loads – Acidification

The dry deposition flux ($\mu g.m^{-2}.s^{-1}$) has been calculated by multiplying the ground level SO_2 concentrations ($\mu g.m^{-3}$) by the deposition velocity. The Environment Agency guidance provides deposition velocities of 0.012 $m.s^{-1}$ for short habitats and 0.024 $m.s^{-1}$ for tall habitats. Units of $\mu g.m^{-2}.s^{-1}$ have been converted to units of $kg.ha^{-1}.year^{-1}$ by multiplying the dry deposition flux by the standard conversion factor of 157.7 for SO_2.

The acid deposition rate, in equivalents keq.ha^{-1}.year^{-1}, has been calculated by multiplying the dry deposition flux (kg.ha^{-1}.year^{-1}) by a conversion factor of 0.071428 for N and 0.0625 for S. This takes into account the degree to which a chemical species is acidifying, calculated as the proportion of N within the molecule.

Wet deposition in the near field is not significant compared with dry deposition for N (CEH, 2011) and therefore for the purposes of this assessment, wet deposition has not been considered.

Predicted contributions to acid deposition have been calculated and compared with the minimum critical load function for the habitat types associated with the designated site as derived from the APIS database.

Significance Criteria

The PC and PEC of NO_x and N/acid deposition have been compared against the relevant critical level/load, for the relevant habitat type/interest feature.

For SACs, SPAs, Ramsars and SSSIs, the Environment Agency guidelines (EA, 2020b) state that:

> *"To screen out a PC for any substance so that you don't need to do any further assessment of it, the PC must meet both of the following criteria:*
>
> *the short-term PC is less than 10% of the short-term environmental standard*
>
> *the long-term PC is less than 1% of the long-term environmental standard*
>
> *If you meet both of these criteria you don't need to do any further assessment of the substance.*
>
> *If you don't meet them you need to carry out a second stage of screening to determine the impact of the PEC."*

It continues by stating that:

> *"If your long-term PC is greater than 1% and your PEC is less than 70% of the long-term environmental standard, the emissions are insignificant – you don't need to assess them any further. If your PEC is greater than 70% of the long-term environmental standard, you need to do detailed modelling."*

For LWSs, it states:

> *If your emissions meet both of the following criteria they're insignificant – you don't need to assess them any further:*
>
> *the short-term PC is less than 100% of the short-term environmental standard*
>
> *the long-term PC is less than 100% of the long-term environmental standard*
>
> *You don't need to calculate PEC for local nature sites. If your PC exceeds the screening criteria you need to do detailed modelling."*

Results

The relevant sites have been identified by the project's ecologists and are listed in Table D.1. The receptors modelled (pre-fixed with ER) are shown in Figure 3.2. The ambient NO_x concentrations and

existing deposition rates have been obtained from APIS. The deposition rates have been obtained for the various habitats across the sites. These are provided in Table D.1.

The predicted annual-mean NO_X concentrations are compared with the critical level in Table D.2.

The predicted maximum daily-mean NO_X concentrations are compared with the critical level in Table D.3.

The predicted annual-mean SO_2 concentrations are compared with the critical level in Table D.4.

The predicted nutrient N deposition rates are compared with the critical load in Table D.5. The lowest critical loads for nitrogen deposition have been also obtained from APIS.

The maximum predicted acid deposition rates are compared with the critical load function in Tables D.6 and D.7. The critical loads for the nitrogen and sulphur component for acid deposition have been also obtained from APIS.

Table D.1 Average Background Concentrations

Site	Designation	Habitat	NOx ($\mu g.m^{-3}$)	SO_2 ($\mu g.m^{-3}$)	Nitrogen Deposition Rate ($kgN.ha^{-1}.yr^{-1}$)	Acid Deposition Nitrogen ($keq.ha^{-1}.yr^{-1}$)	Acid Deposition Sulphur ($keq.ha^{-1}.yr^{-1}$)
Burderop Wood	SSSI	Extensive ash/oak woodland	18.98	0.82	33.7	2.4	0.2
Coate Water	SSSI, LNR	Mixed: Lowland open water, Woodland	21.45	0.88	10.6	0.8	0.2
Burderop Coombe	LWS	Calcareous grassland	14.99	0.96	19.88	1.42	0.16
River Ray & Burderop Plantations	LWS	Woodland with river passing through it	21.47	0.96	33.6	2.4	0.2
Oaken Ground Copse	LWS	Ancient Woodland	14.94	0.96	33.6	2.4	0.2
Burderop Wood North	LWS	Ancient Woodland	22.77	0.96	33.6	2.4	0.2
Long Copse & Crook's Copse	LWS	Ancient Woodland	22.77	0.96	33.6	2.4	0.2
Hodson Scrap	LWS	Calcareous grassland	14.94	0.96	19.88	1.42	0.16
Coombe Bottom	LWS	Ancient Woodland	13.59	0.64	33.04	2.36	0.2
Pinkcombe Wood	LWS	Ancient Woodland	14.94	0.96	33.6	2.4	0.2
Wroughton Resevoir	LWS	Water body bordered predominantly by grassland	15.18	0.96	19.88	1.42	0.16
King's Farm Wood Wiltshire Wildlife Trust (WWT) Reserve	LWS	Ancient Woodland	16.61	0.9	35.98	2.57	0.18
Great Copse	LWS	Ancient Woodland	23.99	0.96	33.6	2.4	0.2

Cow Hill Bank	LWS	Calcareous grassland	14.81	0.64	19.74	1.41	0.15
Diocese Land WWT Reserve	LWS	Calcareous grassland	14.27	0.9	20.72	1.48	0.15
Church Hill Pastures WWT Reserve	LWS	Calcareous grassland	13.43	0.67	21.56	1.54	0.15
Fen	HPIE	Fen	14.99	0.96	19.88	1.42	0.16
Marsh Fritillary	UKBAP	Fen/Grazed Marsh, Calcareous grassland	14.99	0.96	19.88	1.42	0.16

Table D.2 Predicted Annual-Mean NOx Concentrations at Designated Habitat Sites

Site	PC Scenarios 1 and 2 (µg.m^{-3})	PC/Critical Level (%)	PC Scenario 3 (µg.m^{-3})	PC/Critical Level (%)
ER1 Burderop Wood SSSI AW	0.03	0	0.22	1
ER2 Burderop Wood SSSI AW	0.04	0	0.25	1
ER3 Burderop Wood SSSI AW	0.16	0	1.03	3
ER4 Coates Water SSSI	0.01	0	0.08	0
ER5 Oaken Ground Copse AW	0.02	0	0.22	1
ER6 Pinkcombe Wood	0.01	0	0.08	0
ER7 Coombe Bottom Wood AW	0.01	0	0.06	0
ER8 Coate Water LNR	0.01	0	0.07	0
ER9 King's Farm WWT	0.00	0	0.03	0
ER10 River Ray & Burderop Plant	0.02	0	0.14	0

ER11 Burderop Wood North	0.02	0	0.12	0
ER12 Long Copse & Crooks Copse	0.02	0	0.15	1
ER13 Hodson Scarp	0.01	0	0.10	0
ER14 Cow Hill Bank	0.00	0	0.04	0
ER15 Burderop Coombe	0.03	0	0.19	1
ER16 Burderop Coombe	0.03	0	0.26	1
ER17 Wroughton Reservoir	0.00	0	0.04	0
ER18 Great Copse	0.00	0	0.02	0
ER19 Burderop Wood SSSI & AW	0.04	0	0.25	1
ER20 Diocese Land WWT Reserve	0.00	0	0.01	0
ER21 Church Hill Pastures WWT Reserve	0.00	0	0.01	0
ER22 Fen	0.05	0	0.41	1
ER23 Marsh Fritillary	0.02	0	0.19	1

Critical level = 30 µg.m^{-3}

Table D.3 Predicted Daily-Mean NOx Concentrations at Designated Habitat Sites

	Scenario 1				Scenario 2				Scenario 3			
Site	**PC (µg.m^{-3})**	**PC/Critical Level (%)**	**PEC (µg.m^{-3})**	**PEC/ Critical Level (%)**	**PC (µg.m^{-3})**	**PC/Critical Level (%)**	**PEC (µg.m^{-3})**	**PEC/ Critical Level (%)**	**PC (µg.m^{-3})**	**PC/ Critical Level (%)**	**PEC (µg.m^{-3})**	**PEC/ Critical Level (%)**
ER1 Burderop Wood SSSI AW	20.7	10	58.6	29	65.1	33	103.1	52	716	358	754.2	377

ER2 Burderop Wood SSSI AW	25.4	13	63.4	32	75.9	38	113.9	57	835	418	873.3	437
ER3 Burderop Wood SSSI AW	37.0	18	75.0	37	107.8	54	145.7	73	1185	593	1223.4	612
ER4 Coates Water SSSI	1.9	1	44.8	22	7.3	4	50.2	25	80	40	123.0	62
ER5 Oaken Ground Copse AW	4.0	2	33.9	17	13.1	7	43.0	21	144	72	174.0	87
ER6 Pinkcombe Wood	2.6	1	32.5	16	8.2	4	38.1	19	90	45	119.9	60
ER7 Coombe Bottom Wood AW	2.1	1	29.3	15	7.8	4	35.0	17	85	43	112.7	56
ER8 Coate Water LNR	1.5	1	44.4	22	4.5	2	47.4	24	50	25	92.7	46
ER9 King's Farm WWT	1.1	1	34.3	17	5.9	3	39.1	20	65	32	98.1	49
ER10 River Ray & Burderop Plant	5.4	3	48.3	24	15.9	8	58.9	29	175	88	218.4	109
ER11 Burderop Wood North	3.9	2	49.5	25	10.9	5	56.5	28	120	60	165.7	83
ER12 Long Copse & Crooks Copse	3.0	2	48.6	24	11.3	6	56.9	28	125	62	170.1	85
ER13 Hodson Scarp	3.0	2	32.9	16	9.8	5	39.6	20	107	54	137.3	69
ER14 Cow Hill Bank	1.3	1	31.0	15	4.6	2	34.3	17	51	25	80.6	40
ER15 Burderop Coombe	15.9	8	45.9	23	50.3	25	80.3	40	553	277	583.0	292
ER16 Burderop Coombe	11.4	6	41.4	21	40.1	20	70.1	35	441	221	471.4	236
ER17 Wroughton Reservoir	1.9	1	32.3	16	9.8	5	40.2	20	108	54	138.5	69
ER18 Great Copse	0.9	0	48.8	24	3.7	2	51.6	26	40	20	88.3	44

ER19 Burderop Wood SSSI & AW	25.8	13	63.7	32	72.6	36	110.5	55	798	399	836.4	418
ER20 Diocese Land WWT Reserve	0.9	0	29.4	15	3.8	2	32.3	16	41	21	69.9	35
ER21 Church Hill Pastures WWT Reserve	0.7	0	27.6	14	3.7	2	30.5	15	40	20	67.2	34
ER22 Fen	10.8	5	40.8	20	35.2	18	65.2	33	388	194	417.5	209
ER23 Marsh Fritillary	14.4	7	44.4	22	48.6	24	78.5	39	534	267	564.1	282

Critical level used = 200 µg.m^{-3} (see comments below)

Table D.4 Predicted Annual-Mean SO_2 Concentrations at Designated Habitat Sites

Site	PC Scenarios 1 and 2 (µg.m^{-3})	PC/Critical Level (%)	PC Scenario 3 (µg.m^{-3})	PC/Critical Level (%)
ER1 Burderop Wood SSSI AW	3.36E-05	0	2.1E-04	0
ER2 Burderop Wood SSSI AW	4.70E-05	0	2.3E-04	0
ER3 Burderop Wood SSSI AW	1.86E-04	0	9.4E-04	0
ER4 Coates Water SSSI	1.27E-05	0	7.7E-05	0
ER5 Oaken Ground Copse AW	2.62E-05	0	2.0E-04	0
ER6 Pinkcombe Wood	9.28E-06	0	7.4E-05	0
ER7 Coombe Bottom Wood AW	6.12E-06	0	5.2E-05	0
ER8 Coate Water LNR	9.75E-06	0	6.3E-05	0
ER9 King's Farm WWT	2.71E-06	0	2.4E-05	0
ER10 River Ray & Burderop Plant	2.12E-05	0	1.3E-04	0
ER11 Burderop Wood North	1.90E-05	0	1.1E-04	0

ER12 Long Copse & Crooks Copse	2.09E-05	0	1.4E-04	0
ER13 Hodson Scarp	1.13E-05	0	8.8E-05	0
ER14 Cow Hill Bank	4.71E-06	0	3.9E-05	0
ER15 Burderop Coombe	2.82E-05	0	1.7E-04	0
ER16 Burderop Coombe	3.07E-05	0	2.3E-04	0
ER17 Wroughton Reservoir	4.94E-06	0	4.1E-05	0
ER18 Great Copse	2.84E-06	0	1.9E-05	0
ER19 Burderop Wood SSSI & AW	4.79E-05	0	2.3E-04	0
ER20 Diocese Land WWT Reserve	1.71E-06	0	1.3E-05	0
ER21 Church Hill Pastures WWT Reserve	1.54E-06	0	1.2E-05	0
ER22 Fen	5.90E-05	0	3.7E-04	0
ER23 Marsh Fritillary	2.63E-05	0	1.8E-04	0

Critical level used = 10 µg.m^{-3} at Burderop Woods SSSI and 20 µg.m^{-3} at all other sites.

Table D.5 Predicted Annual-Mean N Deposition at Designated Habitat Sites

				Scenarios 1 and 2			Scenario 3		
Site	**Tall or Short**	**Lower**	**Upper**	**PC (kgN.ha^{-1}.yr^{-1})**	**PC/ Critical Load (%) - Lower**	**PC/Critical Load (%) - Upper**	**PC (kgN.ha^{-1}.yr^{-1})**	**PC/ Critical Load (%) - Lower**	**PC/Critical Load (%) - Upper**
ER1 Burderop Wood SSSI AW	Tall	15	20	0.006	0	0	0.045	0	0
ER2 Burderop Wood SSSI AW	Tall	15	20	0.008	0	0	0.051	0	0
ER3 Burderop Wood SSSI AW	Tall	15	20	0.033	0	0	0.207	1	1
ER4 Coates Water SSSI	Tall	N/A							
ER5 Oaken Ground Copse AW	Tall	10	20	0.005	0	0	0.044	0	0

ER6 Pinkcombe Wood	Tall	10	20	0.002	0	0	0.016	0	0
ER7 Coombe Bottom Wood AW	Tall	10	20	0.001	0	0	0.011	0	0
ER8 Coate Water LNR	Tall	N/A							
ER9 King's Farm WWT	Tall	10	20	0.001	0	0	0.005	0	0
ER10 River Ray & Burderop Plant	Tall	10	20	0.004	0	0	0.029	0	0
ER11 Burderop Wood North	Tall	10	20	0.003	0	0	0.024	0	0
ER12 Long Copse & Crooks Copse	Tall	10	20	0.004	0	0	0.031	0	0
ER13 Hodson Scarp	Short	15	25	0.001	0	0	0.010	0	0
ER14 Cow Hill Bank	Short	15	25	0.000	0	0	0.004	0	0
ER15 Burderop Coombe	Short	15	25	0.003	0	0	0.019	0	0
ER16 Burderop Coombe	Short	15	25	0.003	0	0	0.026	0	0
ER17 Wroughton Reservoir	Short	20	30	0.000	0	0	0.005	0	0
ER18 Great Copse	Tall	10	20	0.001	0	0	0.004	0	0
ER19 Burderop Wood SSSI & AW	Tall	15	20	0.008	0	0	0.051	0	0
ER20 Diocese Land WWT Reserve	Short	15	25	0.000	0	0	0.001	0	0
ER21 Church Hill Pastures WWT Reserve	Short	15	25	0.000	0	0	0.001	0	0
ER22 Fen	Short	10	15	0.005	0	0	0.041	0	0
ER23 Marsh Fritillary	Short	10	15	0.002	0	0	0.019	0	0

N/A = No critical load for habitat

Table D.6 Predicted Acid Deposition at Designated Habitat Sites – Scenarios 1 and 2

	Critical Load ((eq.ha^{-1}.yr^{-1})			Existing Deposition (keq.ha^{-1}.yr^{-1})		PC (keq.ha^{-1}.yr^{-1})			PEC (keq.ha^{-1}.yr^{-1})
Habitat Site	**Min N**	**Max N**	**Max S**	**N**	**S**	**N**	**S**	**PC/CL (%)**	**N**
ER1 Burderop Wood SSSI AW	0.142	1.902	1.545	2.4	0.2	4.3E-04	8.0E-06	0	2.40

ER2 Burderop Wood SSSI AW	0.142	1.902	1.545	2.4	0.2	6.0E-04	1.1E-05	0	2.40
ER3 Burderop Wood SSSI AW	0.142	1.902	1.545	2.4	0.2	2.4E-03	4.4E-05	0	2.40
ER4 Coates Water SSSI	N/A	N/A	N/A						
ER5 Oaken Ground Copse AW	0.142	11.047	10.905	2.4	0.2	3.4E-04	6.2E-06	0	2.40
ER6 Pinkcombe Wood	0.142	11.047	10.905	2.4	0.2	1.2E-04	2.2E-06	0	2.40
ER7 Coombe Bottom Wood AW	0.142	11.168	11.026	2.36	0.2	8.1E-05	1.4E-06	0	2.36
ER8 Coate Water LNR	N/A	N/A	N/A						
ER9 King's Farm WWT	0.142	11.008	10.866	2.57	0.18	3.6E-05	6.4E-07	0	2.57
ER10 River Ray & Burderop Plant	0.357	1.904	1.547	2.4	0.2	2.7E-04	5.0E-06	0	2.40
ER11 Burderop Wood North	0.357	1.902	1.545	2.4	0.2	2.4E-04	4.5E-06	0	2.40
ER12 Long Copse & Crooks Copse	0.357	1.902	1.545	2.4	0.2	2.7E-04	4.9E-06	0	2.40
ER13 Hodson Scarp	0.856	4.856	4	1.42	0.16	7.4E-05	1.3E-06	0	1.42
ER14 Cow Hill Bank	0.856	4.856	4	1.41	0.15	3.1E-05	5.6E-07	0	1.41
ER15 Burderop Coombe	0.856	4.856	4	1.42	0.16	1.8E-04	3.3E-06	0	1.42
ER16 Burderop Coombe	0.856	4.856	4	1.42	0.16	2.0E-04	3.6E-06	0	1.42
ER17 Wroughton Reservoir	0.856	4.856	4	1.42	0.16	3.3E-05	5.8E-07	0	1.42
ER18 Great Copse	0.357	3.01	2.653	2.4	0.2	3.7E-05	6.7E-07	0	2.40
ER19 Burderop Wood SSSI & AW	0.142	1.902	1.545	2.4	0.2	6.1E-04	1.1E-05	0	2.40
ER20 Diocese Land WWT Reserve	0.856	4.856	4	1.48	0.15	1.1E-05	2.0E-07	0	1.48
ER21 Church Hill Pastures WWT Reserve	0.856	4.856	4	1.54	0.15	1.0E-05	1.8E-07	0	1.54
ER22 Fen	Not sensitive to acidity								
ER23 Marsh Fritillary	0.856	4.856	4	1.42	0.16	1.7E-04	3.1E-06	0	1.42

Table D.7 Predicted Acid Deposition at Designated Habitat Sites – Scenario 3

	Critical Load (keq.ha^{-1}.yr^{-1})			Existing Deposition (keq.ha^{-1}.yr^{-1})		PC (keq.ha^{-1}.yr^{-1})			PEC (keq.ha^{-1}.yr^{-1})
Habitat Site	**Min N**	**Max N**	**Max S**	**N**	**S**	**N**	**S**	**PC/CL (%)**	**N**
ER1 Burderop Wood SSSI AW	0.142	1.902	1.545	2.4	0.2	3.2E-03	4.9E-05	0	2.4E+00
ER2 Burderop Wood SSSI AW	0.142	1.902	1.545	2.4	0.2	3.6E-03	5.4E-05	0	2.4E+00
ER3 Burderop Wood SSSI AW	0.142	1.902	1.545	2.4	0.2	1.5E-02	2.2E-04	1	2.4E+00
ER4 Coates Water SSSI	N/A	N/A	N/A	0.8	0.2				0.0E+00
ER5 Oaken Ground Copse AW	0.142	11.047	10.905	2.4	0.2	3.2E-03	4.8E-05	0	2.4E+00
ER6 Pinkcombe Wood	0.142	11.047	10.905	2.4	0.2	1.2E-03	1.8E-05	0	2.4E+00
ER7 Coombe Bottom Wood AW	0.142	11.168	11.026	2.36	0.2	8.1E-04	1.2E-05	0	2.4E+00
ER8 Coate Water LNR	N/A	N/A	N/A						0.0E+00
ER9 King's Farm WWT	0.142	11.008	10.866	2.57	0.18	3.7E-04	5.6E-06	0	2.6E+00
ER10 River Ray & Burderop Plant	0.357	1.904	1.547	2.4	0.2	2.1E-03	3.1E-05	0	2.4E+00
ER11 Burderop Wood North	0.357	1.902	1.545	2.4	0.2	1.7E-03	2.6E-05	0	2.4E+00
ER12 Long Copse & Crooks Copse	0.357	1.902	1.545	2.4	0.2	2.2E-03	3.4E-05	0	2.4E+00
ER13 Hodson Scarp	0.856	4.856	4	1.42	0.16	6.9E-04	1.0E-05	0	1.4E+00
ER14 Cow Hill Bank	0.856	4.856	4	1.41	0.15	3.0E-04	4.6E-06	0	1.4E+00
ER15 Burderop Coombe	0.856	4.856	4	1.42	0.16	1.4E-03	2.1E-05	0	1.4E+00
ER16 Burderop Coombe	0.856	4.856	4	1.42	0.16	1.8E-03	2.8E-05	0	1.4E+00
ER17 Wroughton Reservoir	0.856	4.856	4	1.42	0.16	3.2E-04	4.9E-06	0	1.4E+00
ER18 Great Copse	0.357	3.01	2.653	2.4	0.2	3.0E-04	4.6E-06	0	2.4E+00
ER19 Burderop Wood SSSI & AW	0.142	1.902	1.545	2.4	0.2	3.7E-03	5.5E-05	0	2.4E+00
ER20 Diocese Land WWT Reserve	0.856	4.856	4	1.48	0.15	1.0E-04	1.5E-06	0	1.5E+00

ER21 Church Hill Pastures WWT Reserve	0.856	4.856	4	1.54	0.15	9.8E-05	1.5E-06	0	1.5E+00
ER22 Fen	Not sensitive to acidity								
ER23 Marsh Fritillary	0.856	4.856	4	1.42	0.16	1.4E-03	2.1E-05	0	1.4E+00

Interpretation of Results

Table D.2 shows that the maximum annual-mean NO_X PC is less than 1% of the critical level at all receptors for scenarios 1 and 2. In the emergency scenario (scenario 3), the PC exceeds 1% (or 0.3 $\mu g.m^{-3}$) at ER3. When the PC at ER3 is added to the ambient concentration of 18.98 $\mu g.m^{-3}$, the PEC is below the critical level of 30 $\mu g.m^{-3}$. As such, the impact is not likely to have a significant effect.

Table D.3 shows the maximum daily-mean NO_X PC as a percentage of a critical level of 200 $\mu g.m^{-3}$. The IAQM 2019 *'Guide to the assessment of air quality impacts on designated nature conservation sites guidance' says: "The critical level is generally considered to be 75 µg/m³; but this only applies where there are high concentrations of SO_2 and ozone, which is not generally the current situation in the UK…. If a regulator does require the use of the short term NOx critical level, given the low UK SO_2 concentrations IAQM consider it is most appropriate to use 200 µg/m³ as the short term critical load (sic)."* For the testing scenarios (scenarios 1 and 2), the PC is above 10% of 200 $\mu g.m^{-3}$at the SSSI and 100% at the other sites; however, the PEC is below 200 $\mu g.m^{-3}$ at all sites. As such, the impact during testing is not likely to have a significant effect.

In the emergency scenario (scenario 3), the PEC exceeds 200 $\mu g.m^{-3}$ at several habitat sites close to the Application Site. The emergency scenario assumes that all 11 engines run at the same time for a period of 72 hrs. The critical level would only be exceeded should an emergency occur. It is highly unlikely that any grid outage requiring the operation of all engines simultaneously will last longer than 24 hours. In the rare event of a loss of utility power to the site, an outage is expected to be significantly less than 24 hours and therefore the modelled results for the emergency scenario are likely to be highly conservative due to the very low probability of an emergency event of such a long duration.

At ER3, for the worst meteorological year:

- The model predicts 68 daily-mean NO_x concentrations above 200 $\mu g.m^{-3}$. Using the cumulative hypergeometric distribution, the probability of an emergency occurring on one of those 68 days, when randomly selecting 3 days, is 0.46%. When this is multiplied by the safety factor of 2.5, the probability is 1.2%.
- The model predicts 133 daily-mean NO_x concentrations above 75 $\mu g.m^{-3}$. Using the cumulative hypergeometric distribution, the probability of the emergency occurring on one of those 133 days, when randomly selecting 3 days, is 0.74%. When this is multiplied by the safety factor of 2.5, the probability is 1.9%.

As both, probabilities are below 5%, an exceedance is considered unlikely. Furthermore, these probabilities reduce to 0.5% and 0.9% respectively, when randomly selecting a single day. For probabilities below 1%, an exceedance is considered highly unlikely.

Table D.4 shows that the maximum annual-mean SO_2 PC is below 1% of the critical level at all sites for all and for all scenarios. As such, the impact is not likely to have a significant effect.

Table D.5 shows that the maximum nitrogen deposition PC is below 1% of the critical load at all receptors, except ER3 in scenario 3. At ER3, the PC is 1.0% of the upper end of the critical load range. On that basis, the impact is not likely to have a significant effect.

Table D.6 and D.7 show that the maximum acid deposition PC is below 1% of the critical load at all sites. (Before rounding the PC at ER3 in scenario 3 is 0.8% of the critical load.) On that basis, the impact is not likely to have a significant effect.

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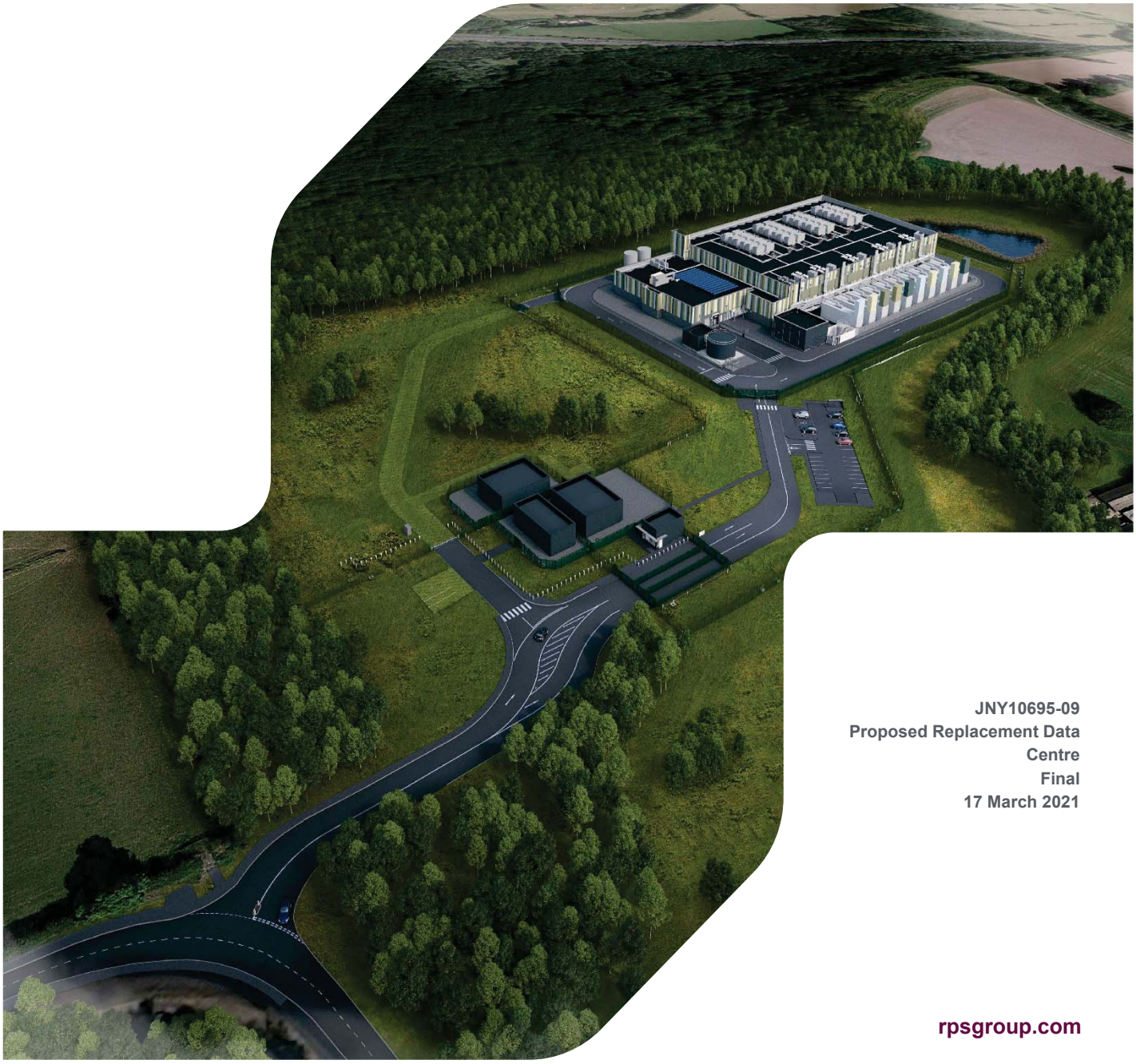
PROPOSED REPLACEMENT DATA CENTRE

TRANSPORT ASSESSMENT

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton, Swindon

20305S-RPS-00-XX-RP-P-9724



JNY10695-09
Proposed Replacement Data Centre
Final
17 March 2021

rpsgroup.com

Quality Management

Version	Status	Authored by	Reviewed by	Approved by	Review date
Final	Planning Application	Joanna Gunn	David Archibald	David Archibald	17 March 2021

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1 INTRODUCTION

1.1 Background

1.1.1 This Transport Assessment (TA) has been prepared to support a planning application for a replacement date centre at the National Data Centre, located at the Old Burderop Hospital site, Brimble Hill, Wroughton (the Application Site) This TA accompanies the Environmental Statement (ES) and a suite of technical reports forming part of the application for a replacement data centre and associated infrastructure (the proposed development).

1.2 Development Proposals

1.2.1 The application seeks consent for a replacement data centre building (containing data halls, associated electrical and AHU Plant Rooms, loading bay, maintenance and storage space, office administration areas and plant at roof level), emergency generators and emission stacks, diesel tanks and filling area, electrical switchroom, a water sprinkler pump room and storage tank, a gate house, site access, internal access roads, associated drainage infrastructure, hard and soft landscaping.

1.2.2 The operational vehicle access to the site is to be taken from the existing access on the south-western corner of the proposed site, onto the B4005, which connects the site to the wider highway network. This is shown on the proposed site masterplan reference 20305S-RPS-00-XX-DR-A-9501 at **Annex A.**

1.3 Scope of Assessment

1.3.1 This TA has been prepared in line with the National Planning Policy Framework (NPPF), published by the Ministry of Housing, Communities and Local Government in 2019, Planning Practice Guidance (PPG): Travel Plans, Transport Assessments and Statements in Decision-Taking, published by the Department of Communities and Local Government (now Ministry of Housing, Communities and Local Government) in 2014 and the Department for Transport (DfT) publication Circular 02/2013: 'The Strategic Road Network and the Delivery of Sustainable Development', 2013. National and local planning policies have also been considered.

1.3.2 The TA has also been prepared in accordance with scoping comments received from both Highways England (HE) and Swindon Borough Council (SBC).

1.3.3 This report details the transport considerations of the proposed development and is divided into the following sections:

- **Section 2** – Existing Situation - describes the existing conditions at the site and surrounding transport network. It focuses on the accessibility of the site by non-car modes and also describes the surrounding highway network;
- **Section 3** – Project Proposals - outlines the proposed development;
- **Section 4** – Planning Policy - reviews the local and national transport planning policy;
- **Section 5** – Trip Generation - outlines the number of peak hour trips generated by the proposed development and the extant development;
- **Section 6** – Transport Impact - assesses the net trip generation generated by the proposed development; and
- **Section 7** – Summary - summarises and concludes on the findings of the TA.

1.3.4 The report concludes that there are no transport related reasons for not permitting the proposed development.

2 EXISTING SITUATION

2.1 Introduction

2.1.1 This section of the TA describes the transport network of the Application Site in terms of opportunities for walking, cycling and accessibility to public transport and describes the local highway network.

2.1.2 This section also considers traffic impacts from committed developments.

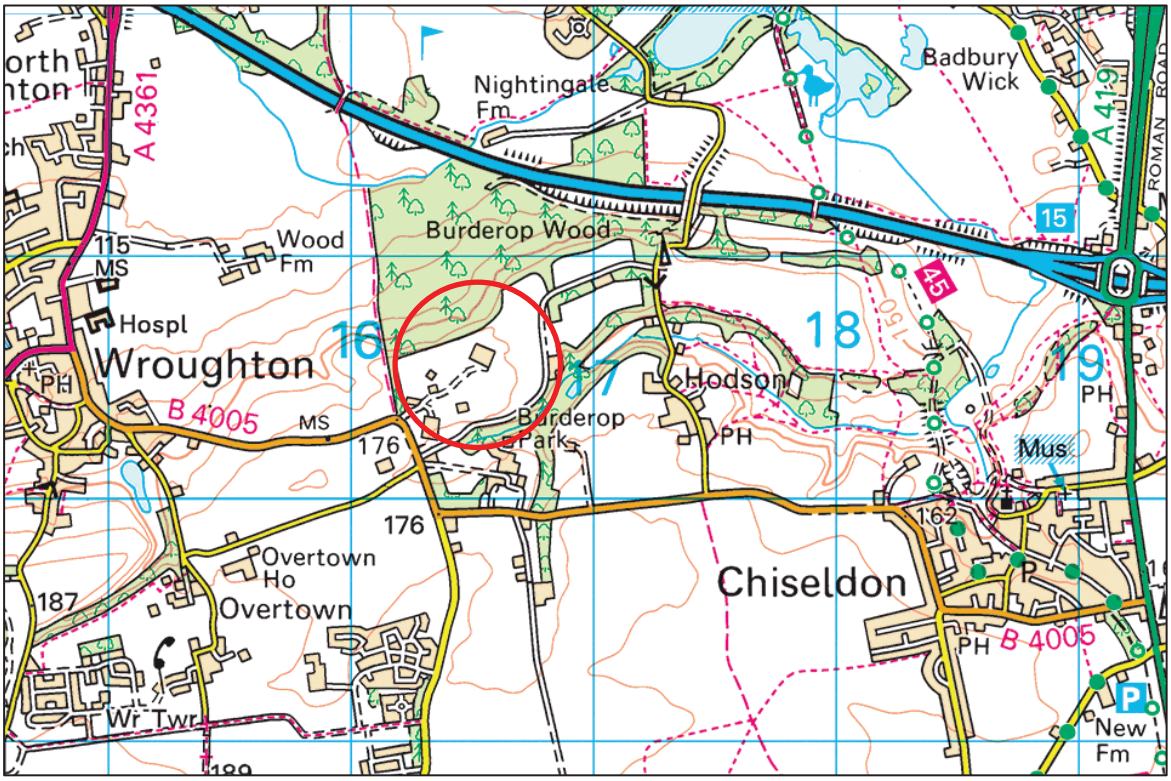
2.2 Site and Surroundings

2.2.1 The Application Site location is shown on **Figure 1** and is to the south of Swindon, to the east of Wroughton and to the north-west of the hamlet of Burderop. The site is surrounded predominantly by countryside/recreational land, with some residential and industrial businesses located to the south and west.

2.2.2 The Application Site lies within the administrative area of Swindon Borough Council (SBC). Swindon is located approximately 1.2km to the north of the site. The site is currently accessed via the existing access on the western boundary of the site leading onto the B4005 Brimble Hill.

2.2.3 The Application Site access junction is a simple priority junction onto the B4005 Brimble Hill with a wide bellmouth within which is a pedestrian refuge. The access junctions' geometries are suitable for accommodating cars and HGVs. The access is on the outside of a bend and visibility for vehicles arriving and departing is good.

Figure 1: Site Location Plan



2.3 Site History

2.3.1 The whole site extends to approximately 11.3 hectares (ha) however, the development area is approximately 5.53 ha. The Application Site is currently used as a data centre comprising three buildings: two buildings in the north east (known as Gamma and Beta) and one in the south (known as Alpha). The western area of the site is currently undeveloped.

2.3.2 The existing data centre campus was in use up until July 2020 when the previous owners closed their operations at the site. Prior to the construction of these buildings, the Application Site was formerly occupied by a military hospital, telephone exchange and office building. These buildings were demolished in the 1980s and early 1990s and replaced by the existing data centre buildings.

2.3.3 The site has a number of previous planning permissions relating to its existing use as a data centre and proposed office development in the western area, summarised below:

- Construction of 30 no. car parking spaces, insertion of 1 no. window to east elevation and erection of access gate. Application Reference S/04/2960;
- Extension of Beta complex and associated works. Extension of existing access road. Relocation of existing embankment. Application Reference S/03/1738;
- Renewal of outline permission for class B1 Use granted through application reference T97/549RJ. Application Reference S/02/2954;
- Erection of a new covered loading bay, new pump room and new oil tank enclosure. Application Reference S/02/1157;
- Proposed extension of the Beta Complex. Application Reference S/PRE/03/00976;
- Outline application for Class B1 and/or B8 industrial use. Application Reference T//97/00549;
- Erection of 2 no. single storey buildings. Application Reference T//95/00217;
- Renewal of outline permission for class B1 Use - reference T97/549RJ. Application Reference S//02/02954;
- Renewal of outline permission for Class B1 Use - reference T97/549RJ. Application Reference S/99/2691;
- New office buildings and ancillary works (outline). Application Reference T/91/1522;
- Outline application for Class B1 and/or B8 industrial use. Application Reference T/97/0549;
- Erection of 2 no. single storey buildings. Application Reference T/95/0217; and
- Demolition of existing buildings and two new computer centre buildings and ancillary works. Application Reference T/91/1523.

2.4 Highway Network

B4005

2.4.1 The proposed development will be accessed from the existing site access taken from the B4005 Brimble Hill. The B4005 is a single carriageway road subject to the national speed limit within the vicinity of the Application Site. The B4005 is rural in nature and the conditions are reflective of this; there is no street lighting within the vicinity of the access and there are narrow footways on both sides of the carriageway.

2.4.2 The B4005 routes broadly west to east between Wroughton and Chiseldon respectively. At its western end it forms a three arm roundabout with the A4361 Devizes Road / High Street and the

A4361 Moormead Road / Swindon Road whilst at its eastern end it forms the minor arm of a ghost island right turn lane priority junction with the A346 Marlborough Road. To the north west of Wroughton, the B4005 continues west to join junction 16 of the M4, via a grade separate roundabout where it meets with the A3102 Swindon Road.

2.4.3 As the B4005 enters Wroughton, the speed limit reduces to 30mph and the footway is retained on the southern side of the carriageway, with intermittent street lighting. The B4005 becomes Marlborough Road and provides direct access to dwellings, retaining its narrow footways on both sides of the carriageway.

A4361 Moormead Road

2.4.4 The A4361 Moormead Road routes from the B4005 Marlborough Road via a three-arm mini-roundabout, routeing north towards Swindon town centre. The A4361 Moormead Road provides access to dwellings and The Ridgeway Hospital in the village of Wroughton, routeing north to North Wroughton where it retains its footways on both sides of the carriageway and becomes Swindon Road.

2.4.5 The A4361 routes to the B4006, A4289 and B4289 in south Swindon; therefore, it provides a suitable access route for staff accessing the proposed development.

A346 Marlborough Road

2.4.6 The A346 Marlborough Road is accessed from the B4005 via a wide bellmouth ghost island right turn land priority junction suitable for accommodating HGV movements. Within the vicinity of the B4005 junction, the A346 Marlborough Road is subject to a 40mph speed limit.

2.4.7 The A346 has street lighting and footways on both sides of the carriageway within the vicinity of the village of Chiseldon. To the north of Chiseldon, the A346 routes north to join junction 15 of the M4, via a grade separate roundabout with the A419, over which there is a narrow footway on the western side of the carriageway.

2.4.8 To the south of Chiseldon, the A346 routes to the town of Marlborough. There are few dwellings within the vicinity of the A346 and the road conditions are reflective of this, with no footways or street lighting, and the speed limit increases to 60mph.

M4

2.4.9 The M4 routes broadly east-west between London and South Wales, also providing access to cities such as Bristol and Reading. Junction 15 of the M4 provides access to south east Swindon, with junction 16 accessible to the west / south west of Swindon.

2.4.10 The M4 is constructed to modern design standards with three running lanes in each direction plus a hard shoulder for emergency use.

M4 Junction 15 Improvements

2.4.11 Improvements to the M4 junction 15 are currently being constructed by HE and SBC as critical infrastructure. The improvements scheme is required for the delivery of planned strategic developments, including the New Eastern Villages (NEV), and comprises residential and employment development and local facilities such as retail and education provision.

2.4.12 SBC stated that the M4 junction 15 was operating near capacity, and the developments planned in the vicinity of the junction will generate additional traffic flow. Measures to mitigate the impact of these new developments on the road network are set out below and include:

- A dedicated left turn lane on the southbound A419 entry to the roundabout for eastbound traffic (towards London);
- the widening of the A419 southbound approach to the junction and the northbound exit from the junction;
- the widening of the A346 northbound entry;
- the widening of the M4 eastbound off-slip road;
- the widening of the junction's southern circulatory road; and
- the proposed prohibition of vehicular access under the A419 bridge on Day House Lane and its conversion to a quiet route for pedestrians, cyclists and equestrian users.

2.4.13 Construction of the M4 improvements started in June 2020 and completion is planned for Summer 2021; therefore, the construction works will be completed prior to the construction and occupation of the proposed development.

2.4.14 The improvement schemes are designed to accommodate all new traffic flows generated by the new developments plus suitable allowance for background traffic growth. The improved M4 Junction 15, when completed in Summer 2021, will operate satisfactorily with no highway capacity or road safety concerns.

2.5 Pedestrians

2.5.1 The proposed development site will connect to the local pedestrian network via the B4005 Brimble Hill, which provides a footway on its southern side. The footway connects to the pedestrian network within Wroughton to the west and to Chiseldon to the east.

2.5.2 As the B4005 Brimble Hill routes west towards Wroughton there is a slight downward gradient over a distance of approximately 420m. It should be noted that there are no gradient warning signs present, therefore the gradient is not sufficiently steep to require advanced warning. Moreover, the majority of the residential areas of Wroughton are between 2-3km of the Application Site, which is considered to be a reasonable, or within the upper limits of a reasonable walking distance. For staff who are able to consider walking this distance as their commute, they typically would not be affected by the gradient of the B4005 Brimble Hill.

2.5.3 Public bridleway WR36 is located adjacent to the western border of the Application Site, as shown on **Figure 2**. The public bridleway routes from the B4005 to the south, routeing north to the B4006 Pipers Way in south Swindon.

Figure 2: Public Rights of Way

2.5.4 In terms of crossing facilities, the B4005 benefits from dropped kerb pedestrian crossing points to the immediate west of the site access, located south of the public right of way.

2.5.5 Given the existing pedestrian infrastructure, it is considered that the Application Site is accessible to pedestrians, and there are good opportunities for pedestrians to walk between the site, public transport services and the local facilities within Swindon, Wroughton and Chiseldon.

2.6 Cycling

2.6.1 Cycling is considered an important mode of sustainable travel and is generally considered suitable for distances of up to 3 miles (4.8km) (source: LTN 2/08, Cycle Infrastructure Design).

2.6.2 Nevertheless, as with walking distances, other guidance documents state contrasting cycling distances. The Design Manual for Roads and Bridges document TA91/05 Provision for Non-Motorised users for example states acceptable cycling up to 5 miles (8km). Therefore, 4.8km is concluded to be a reasonable cycling distance with 8km as a reasonable maximum for most individuals.

2.6.3 There are no national cycle routes within the immediate vicinity of the Application Site, however, National Cycle Route 45 routes through the village of Chiseldon and is accessible approximately 3km cycle from the site. Route 45 routes along the southern suburban boundary of Swindon, through west Swindon and continues north towards Cirencester. Route 45 also continues broadly south to join national cycle routes 482 and 403.

2.6.4 The entirety of Chiseldon, Wroughton and the southern areas of Swindon are within cycling distance of the site (8km) and the topography of the local area suggests that this would not be a limiting factor in people choosing to cycle. Thus, the Application Site is considered accessible to cyclists in the local area.

2.7 Public Transport

2.7.1 The nearest bus stops to the site are located approximately 100m west of the Application Site access on the B4005 Brimble Hill. These stops provide access to the 82 and 83 bus services, as shown at **Annex B.**

2.7.2 **Table 2.1** summarises the service, route and frequencies of bus services nearest to the Application Site.

Table 2.1: Local Bus Services

Service	Operator	Route	Weekday				
			Frequency (per hour)			Time	
			AM Peak	Off Peak	PM Peak	First Service	Last Service
81	Stagecoach	Thorney Park – Chiseldon – Swindon town centre	1	1	0	09:33	15:53
82	Stagecoach	Thorney Park – Wroughton – Swindon town centre	1	0	1	06:51	18:16

Source: Traveline (accessed October 2020)

2.8 Air Quality Management Areas

2.8.1 The Department for Environment, Food and Rural Affairs website (https://uk-air.defra.gov.uk/aqma/maps/) confirms that there are no Air Quality Management Areas (AQMAs within the vicinity of the Application Site.

2.9 Committed Developments

2.9.1 Traffic levels from committed and cumulative development sites are also considered in the TA.

2.9.2 Developments that already have planning consent have identified any highway and transport improvements that may or may not be necessary to mitigate their impact. There is no further opportunity for these developments to provide additional highway or transport mitigation and so these developments and their highway and transport schemes are treated as committed within future year scenarios.

2.9.3 For this reason, those developments (traffic flows and their highway and transport mitigation schemes) form part of a future transport baseline scenario for any other developments that follow. In doing that, the impact of development proposals that follow consented developments is able to be determined in the knowledge of what has already been consented in transport and highways terms along with the need for any additional highway and transport improvements that may be necessary.

2.9.4 Other developments that emerge at the same time are treated together and are cumulatively assessed against the baseline scenario described above to determine their cumulative impact and their cumulative highway and transport mitigation requirements (if required).

2.9.5 A detailed assessment has been undertaken of all planning applications in the surrounding area. From a transport perspective, their status (i.e. consented, awaiting determination or allocated), traffic generation, their study area and the study area of this TA have all been analysed to determine how they have been considered within this TA.

2.9.6 There are several planning applications within the vicinity of the site as summarised below.

Burderop Park, Wroughton, Swindon

2.9.7 Burderop Park (planning references S/17/1028, S/19/0441, S/19/1765, S/19/1892, S/20/0924, S/20/0926, S/20/1234.) is located adjacent to the Application Site, obtaining planning permission on 2017 to convert a former stately home, turned into offices in the 1970s, into residential dwellings.

2.9.8 The original planning application sought a total of 77 dwellings located on the Burderop Park site, of which 25 would be apartments and a further 52 houses. In July 2020, planning consent was obtained for a further six dwellings.

2.9.9 The Transport Assessment associated with the planning application stated that the extant use of the site as an office operating within the B1 use class was a material consideration when assessing the net traffic impact. As a result, the proposed development would have a net benefit on the highway network, as the offices on site currently generate traffic, and historically has generated far higher volumes. The Transport Assessment concluded that the trip generation resulting from the proposed development is less than the existing position and the change in trip generation (comparing the proposal against the consented baseline) is considered an improvement on the existing situation.

2.9.10 The response of the Local Highways Authority (dated 21 August 2017) states the following:

"The existing lawful use of the site as B1 offices generates a total of 203 vehicle trips in the AM highway network peak hour with 195 vehicles using the western access and 8 vehicles using the southern access. During the PM highway network peak hour 144 vehicles used the western site access and 2 used the southern access, totalling 146 vehicle trips. Sensitivity tests have been undertaken by means of a parking accumulation survey and a TRICS assessment which support the existing trip generation as described above.

The industry recognised TRICS database has been interrogated to predicted the trip generation for the proposed 79 units using representative characteristics of the site location. 45 vehicle trips are predicted in the AM peak hour and 40 in the PM peak hour, this is considerably less than the existing lawful use on the site therefore in terms of the impact of vehicular traffic the proposals are a betterment with the reduction of 158 vehicular trips in the AM peak hour and 106 vehicular trips in the PM peak hour. The Transport Assessment continues to undertake junction capacity assessment but given the significant reduction in vehicular traffic this was not required and has subsequently not been reviewed by the LHA."

2.9.11 Based on the above, the development of Burderop Park will result in a reduction in vehicle trips on the local highway network in relation to its previous office use.

2.9.12 It should be noted that ATC data was obtained from the adjacent planning application, Land at Burderop Park, Wroughton, Swindon (planning reference S/17/0128). ATC data for 2016 for two links were obtained:

- B4005 Brimble Hill between the site and Burderop Barns; and
- B4005 south of Burderop Park.

2.9.13 The Transport Assessment stated that the site was currently occupied by CH2M and used as B1 office. As the traffic surveys undertaken for the purposes of their Transport Assessment will have counted these vehicular movements, and the change of use of Burderop Park will result in a net reduction in vehicle trips, this site has not been considered as part of the assessment.

Land East of Berkeley Farm, Swindon Road, Wroughton

2.9.14 Land East of Berkeley Farm sought planning permission for 100 dwellings. Planning reference S/OUT/14/1005 was an outline application for the erection of up to 100no. dwellings and associated works. (Means of access not reserved).

2.9.15 Planning permission was refused in November 2014. The decision notice quoted the following:

"This refusal is in respect of drawing numbers: 4201A Rev A, 1002 Rev A and 5000 and the following supporting documents: Planning Statement, Transport Statement, Flood Risk Assessment (plus revision), Ecological Assessment, Landscape Assessment, Arboricultural Impact Assessment, Statement of Community Involvement and Noise Impact Assessment received by the Local Planning Authority on the 17th June 2014 and revised access drawing (TS Figure 2.2 (1) received on 17th September 2014."

2.9.16 This was appealed and planning permission was granted 15 January 2016 for the residential development of up to 100 dwellings, vehicular access from Swindon Road, open space, landscaping and other associated infrastructure at Land at Berkeley Farm, Swindon Road, Wroughton SN4 9BZ in accordance with the terms of the application, S/OUT/14/1005/TB.

2.9.17 Paragraph 4 of the appeal decision stated the following:

"The proposal is for outline planning permission with access only to be determined at this stage and with appearance, landscaping, layout and scale reserved for future approval. Whilst not formally part of the scheme, I have treated the details relating to these reserved matters submitted with the application as a guide as to how the site might be developed."

2.9.18 Paragraph 50 of the appeal decision states the following:

"Regarding the environmental dimension, the development offers potential for the incorporation of energy efficiency measures as well as additional planting and habitat enhancement. Due to its location and accessibility by alternative modes of transport the development would also be likely to reduce reliance on use of the private car. Although the development would result in the loss of countryside, I have also found that it need not have a significant effect in terms of landscape character and the setting of Wroughton."

2.9.19 Planning reference S/RES/17/0635 was a Reserved Matters application following outline permission S/OUT/14/1005 for the proposed development of 100 residential dwellings, with open space, landscaping, internal roads and footpaths, parking including garages and other associated infrastructure. This was granted 19 October 2017.

2.9.20 Planning reference S/18/1403 was for the erection of up to 100no. dwellings and associated works without compliance with condition 11 of consent S/OUT/14/1005. Condition 11 of the appeal states the following:

"Prior to the commencement of works on site, details of all works to be carried out on the public highway within the vicinity of the site, including the setting back of the southbound bus stop and the provision of a pedestrian crossing shall be submitted to and approved in writing by the Local Planning Authority and shall be fully implemented prior to the occupation of the development."

2.9.21 The above was granted consent in November 2019.

2.9.22 The Transport Assessment submitted for S/OUT/14/1005 sets out that the vehicle trip generation was calculated using the TRICS database version 7.1.1. The full TRICS output report attached at Appendix C of its Transport Assessment states a daily vehicle trip rate of 5.673. Based on a development of 100 dwellings, this would equate to 567 daily two-way vehicle movements.

2.9.23 To calculate the trip distribution, the Transport Assessment undertook the following:

"Directional ATC data recorded on Swindon Road has been used to calculate the distribution of vehicle movements. This indicates that in the AM peak hour 66% of departures from the development will be to the north with 34% to the south. It is proposed that the arrivals distribution will also reflect this. During the PM peak hour some 59% of arrivals will be from the north with the remaining 41% from the south. The proposed departure distribution also reflects this.

The proposed distribution reflects a typical commuting profile where residents will depart from and return to the same location."

2.9.24 Based on the above, the majority of development traffic was estimated to route to and from the north, via the A4361 Swindon Road; However, it acknowledged there was the potential for some development traffic to route along the B4005:

- Residents travelling eastbound on the M4 from the site will likely take the B4005 route to junction 15 of the M4 junction 15; and
- For residents travelling westbound on the M4 from the site, they will route to junction 16 of the M4 to the southwest of Swindon.

2.9.25 For assessment purposes, the following was assumed:

- 40% of development traffic will route south of the site, along the A4361 Swindon Road;
- 20% of all traffic will route towards the M4 junction 16; and
- 20% of all development traffic will route along the B4005 to M4 junction 15.

2.9.26 The northern section of the site was developed by Lindon Homes, and is fully occupied, and the southern section of the site, also developed by Linden Homes, has 85% of its units sold as of January 2021. Although not all of these development traffic flows may be generated at the point of opening for this proposed data centre, the committed development traffic flows as set out above have been incorporated into the assessment.

Land East of Marlborough Road, Wroughton

2.9.27 Land East of Marlborough Road (planning reference S/RES/19/1852) sought planning permission for 103 dwellings:

- Planning reference S/OUT/15/0912 was an outline application for up to 103 dwellings, including up to 30% affordable housing units, landscaping and a new access from Marlborough Road. This was refused on October 2015 due to the following:

"The proposed development is likely to generate an increase in pedestrian traffic on a highway lacking adequate footway with consequent additional hazards to all users of the road. As such the proposal is contrary to Policies TR1 and TR2 of the adopted Swindon Borough Local Plan (2026) and the National Planning Policy Framework (NPPF) 2012.

The proposed development would result in an increased use by vehicles turning right into the site from the B4005 Marlborough Road, at a point where forward visibility from and of such vehicles is inadequate, which would create additional hazards to all road users. As such the proposal is contrary to Policies TR1 and TR2 of the adopted Swindon Borough Local Plan (2026) and the National Planning Policy Framework (NPPF) 2012.

The proposed development would be likely to encourage the inappropriate parking of vehicles on the public highway, which would interrupt the free flow of traffic and prejudice the safety of road

users at this point. As such the proposal is contrary to Policies TR1 and TR2 of the adopted Swindon Borough Local Plan (2026) and the National Planning Policy Framework (NPPF) 2012.

The proposal would result in the loss of on-street vehicle parking facilities and would therefore encourage parking on the highway with consequent risk of additional hazards to all users of the road. As such the proposal is contrary to Policies TR1 and TR2 of the emerging Swindon Borough Local Plan (2026) and the National Planning Policy Framework (NPPF) 2012."

2.9.28 The appeal decision, dated 13 July 2017, stated that the Secretary of State agreed with the Inspector's conclusions, and agrees with his recommendation. The decision allowed the appeal and granted planning permission, subject to conditions:

- To overcome the refusal, pedestrian infrastructure improvement works were proposed and subsequently conditioned; and
- Condition 10 required that the area between the nearside carriageway edge, and lines drawn between a point 2.4m back from the carriageway edge along the centre line of the access, and points on the carriageway edge 43m from and on both sides of the centre line of the access, shall be cleared of obstruction to visibility at and above a height of 1.05m above the nearside carriageway level, and thereafter retained free of obstruction at all times.

2.9.29 Planning application S/RES/19/1852, for the erection of 103no. dwellings and associated works - reserved matters pursuant to planning permission S/OUT/15/0912, was approved on the 8th October 2020.

2.9.30 The Transport Assessment did not derive its trip estimations from an interrogation from the TRICS database. Instead, an independent manual classified turning count was undertaken at the junction of the B4005 Brimble Hill and Wanshot Close for the AM and PM peak hour periods on Wednesday 3rd July 2013. The recorded vehicle flows were used to produce a trip rate per dwelling; however, this only included the AM and PM peak hours and did not include a daily vehicle trip rate per dwelling.

2.9.31 In the absence of daily trip generation information, the daily vehicle trip rate derived from a TRICS database interrogation for Land East of Berkeley Farm, Swindon Road Wroughton (planning reference S/OUT/14/1005) will be applied to the residential dwellings.

2.9.32 The majority of development traffic will route to and from the north, via the A4361 Swindon Road; However, there is the potential for some development traffic to route along the B4005:

- Residents travelling eastbound on the M4 from the site will likely take the B4005 route to junction 15 of the M4 junction 15; and
- For residents travelling westbound on the M4 from the site, they will route to junction 16 of the M4 to the southwest of Swindon.

2.9.33 Traffic distribution was based on the existing traffic flows on Marlborough Road and on the turning counts recorded at the Marlborough Road/Devizes Road mini roundabout junction.

- During the AM peak hour, 45% of departures would route south east onto the B4005 and 55% of arrivals would route via the B4005; and
- During the PM peak hour, 47% of departures would route south east onto the B4005 and 53% of arrivals would route via the B4005.

2.9.34 Although the Transport Assessment only assumed traffic flows during the peak hours, based on the above for the purposes of this assessment, it is assumed that 50% of daily traffic will route along the B4005. As a committed development, this has been included in the baseline scenario.

Land to the Rear of Woodland View, Wroughton, Swindon

2.9.35 Planning application S/15/1750 was granted in February 2018 for an outline application for the erection of 104 dwellings, traffic roundabout, roads and associated works - (Means of Access, Layout and Scale not reserved).

2.9.36 Planning application S/OUT/20/0556 was submitted in mid-2020 for the erection of 104 dwellings, traffic roundabout, roads and associated works - Means of Access, Layout and Scale not reserved - (without compliance with condition 29 of permission S/15/1750 regarding substitute drawings).

2.9.37 This site is located on the outskirts of Wroughton, between Wroughton and the M4. As the site is located to the north of Wroughton, residents are able to utilise the B4006 to route to the A419 and junction 15 of the M4 and traffic to be generated onto the links considered for this TA is negligible and thus not considered further.

Land at Marlborough Park, Swindon

2.9.38 Planning application reference S/OUT/15/2051 was a hybrid application for a mix of residential development to include - full details of the erection of 91no. dwellings and 74no. age-restricted retirement dwellings and associated works and an outline proposal for up to 313 dwellings, public open space and play area (Means of Access not reserved). Planning permission was granted in April 2017.

2.9.39 As the site is located off the B4006 in south Swindon, residents will utilise the B4006 to route to the A419 and junction 15 of the M4 and traffic to be generated onto the links considered for this TA is negligible and thus not considered further.

2.10 Traffic Flow Data

2.10.1 In order to establish baseline traffic flows, traffic flow data has been obtained from Department for Transport traffic counts at the following locations:

- A346 between the M4 and B4005;
- A419 between the M4 and A4259;
- M4 between J15 and J16;
- M4 between J14 and J15; and
- M4 between J16 and J17.

2.10.2 These datasets provide year on year Annual Average Daily Flow figures, with the most recent years' worth of data being 2019.

2.10.3 Additional traffic flow data was obtained from the adjacent planning application, Land at Burderop Park, Wroughton, Swindon (planning reference S/17/0128). Automatic Traffic Count (ATC) data for 2016 for the following two links were obtained:

- B4005 Brimble Hill between the site and Burderop Barns; and
- B4005 south of Burderop Park.

2.10.4 The ATC traffic flows from the ATC located at B4005 Brimble Hill between the site and Burderop Barns has been used as a link flow for the B4005 west of the site, as the Application Site is the only access located where traffic could be added or removed onto the highway network between these locations. The AADT flows are summarised in **Table 2.2**.

Table 2.2: Traffic Flows

Location	Source	Year	AADT	HGVs
A346 between M4 and B4005	DfT	2019	18102	1073
A419 between the M4 and A4259	DfT	2019	63903	5864
M4 between J15 and J16	DfT	2019	87934	9275
M4 between J14 and J15	DfT	2019	95761	9439
B4005 Brimble Hill between the site and Burderop Barns	ATC	2016	5093	64
B4005 south of Burderop Park	ATC	2016	4450	56
B4005 west of the site	Factored	2016	5093	64
M4 between J16 and J17	DfT	2019	94496	9814

2.11 Road Safety

2.11.1 Personal Injury Accident (PIA) data has been obtained from Crashmap for the latest available five-year period, for the period between 1 January 2015 and 31 December 2019. The study area includes the B4005 from the Overtown Hill junction in south Wroughton, to the A346 to the east. In total there were 12 injury accidents, of which nine were slight injury accidents, and a further three were serious injury accidents. There were no fatal injury accidents.

2.11.2 There were three slight injury accidents recorded on the B4005 Brimble Hill between Overtown Hill and the Burderop Barns junctions during the five-year analysis period:

- One injury accident occurred approximately 500m west of the site access;
- One injury accident occurred to the immediate south of the access junction; and
- One injury accident occurred approximately 200m south of the access junction, at the Burderop Park junction.

2.11.3 These all occurred at different locations, do not represent a cluster and as such appear to have no common contributory factors.

2.11.4 There were eight injury accidents between the Burderop Barns and New Road junctions; however, these all occurred at different locations and are not considered a cluster and as such appear to have no common contributory factors.

2.11.5 One serious injury accident occurred on New Road in February 2016, involving two vehicles and resulting in one casualty.

2.11.6 All of the injury accidents occurred at different locations and there were no clusters of injury accidents. This combined with the low number of injury accidents suggests there are no aspects with the local highway network that contributes to an existing road safety issue.

2.12 Summary

2.12.1 This section has demonstrated that the Application Site has access to a range of sustainable travel options, as well as links to public transport services to the wider area. This section has also shown

that there are no road safety issues within the vicinity of the site and that traffic flows on the B4005 Brimble Hill are low.

3 PROJECT PROPOSALS

3.1 Introduction

3.1.1 This section describes the project and access arrangements for the site, as shown on the site masterplan (reference 20305S-RPS-00-XX-DR-A-9501) at **Annex A.**

3.1.2 The project consists of a replacement data centre building at the National Data Centre, Old Brimble Hospital Site, Brimble Hill.

3.2 Proposed Development

3.2.1 The Application Site is currently used as a data centre comprising three buildings: two buildings in the north east (known as Gamma and Beta) and one in the south west (known as Alpha). The western area of the site is currently undeveloped. Buildings Beta/Gamma and Alpha will be demolished in order to accommodate the proposed development.

3.2.2 The development proposals are for a data centre comprising of the following elements:

- data hall;
- loading bay;
- maintenance and storage space;
- office administration areas and plant at roof level;
- diesel tanks and filling area;
- security gate house;
- site access;
- internal access roads;
- hard and soft landscaping;
- cycle shelter; and
- waste bin store.

3.2.3 A Delivery and Servicing Management Plan has been prepared in support of the application, as attached at **Annex C**.

3.3 Access Arrangements

3.3.1 The Application Site is currently served by one access point via a private road leading from the B4005 Brimble Hill which is adjacent to the part of the site's western boundary. A footway exists along the eastbound carriageway of the B4005 Brimble Hill leading into the site, and the footway extends along the length of the internal road network.

3.3.2 The private road has entry barriers restricting access into the site. The entry barrier is approximately 55m within the site and thus it would require approximately 10 queuing cars to result in any queuing back onto the public highway. We understand that no such queuing occurred whilst the site was occupied by the previous owner and the barrier works well in its existing arrangements. The access junction onto the B4005 Brimble Hill will remain unchanged in its existing form and layout.

3.3.3 The Application Site will include a controlled access enclosure involving a series of secure barriers, electronic bi-fold gates and an intercom system linked to the Security Gatehouse. This will replace the existing entry barrier and it will be located approximately 150m within the site with two entry lanes. Thus, it would require approximately 26 queuing cars in one lane to result in any queuing back onto the public highway. As set out in Section 5, the predicted traffic generation of the data centre is not at a level that would create any such queuing. Furthermore, given the approximate three-fold increase in the stacking capacity behind the barrier, this arrangement is considered to represent a net benefit over the existing arrangements.

3.3.4 Vehicles accepted onto the site will pass through the security gates and past the security gatehouse. Vehicles rejected from site will turn inside the gates and back out onto the private internal access road, onto the B4005 Brimble Hill.

3.4 Car Parking Provision

3.4.1 The proposed parking quantum has been established based on the projected vehicle accumulations at the data centre, based on the estimated trip generation.

3.4.2 A total of 35 staff car parking spaces are proposed on-site within the main car park, of which three are disabled car parking bays. There would be a further two parking spaces adjacent to the MV compound, with a total of 37 parking spaces across the site. There would be zero HGV parking spaces on site, other than the service yard areas, which is also reflective of the very low level of HGV activity that would be generated.

3.4.3 Of the total staff car parking provision, five car parking spaces (14.2%) would also be provided with active electric vehicle charging infrastructure. 100% of car parking spaces would be provided with passive electric vehicle charging infrastructure (i.e. the cabling) for future implementation.

3.4.4 Of the total staff car parking provision, two spaces (5.7% of the total car parking provision) would also be assigned for car share users with appropriate signage in place to encourage the use of car sharing.

3.4.5 The relevant local parking standards do not include any specific parking standards for data centre uses. As such, first principles have been used to calculate the number of car parking spaces required.

3.4.6 The proposed car parking is provided within the Application Site which is private and secure via a gated access. Parking will only be utilised by staff and visitors to the site. As such restricting / charging for car parking is not proposed.

3.5 Cycle Parking Provision

3.5.1 In accordance with SBC cycle parking standards for employment developments, four cycle spaces (two ‘Sheffield’ racks) plus two spaces per each 500sqm above 1000sqm gross floor area should be provided.

3.5.2 The data hall and office accommodation consists of:

- Data Hall 7.267 m^2 GEA and
- Other Associated Function Area 1,425 m^2.

3.5.3 However, it should be noted that the site will employ up to 50 staff; therefore, a provision of 20 cycle spaces would make an allowance for 40% of staff cycling to work. It is therefore proposed to incorporate 10 cycle parking spaces, allowing for up to 20% of staff to cycle to work. This in itself represents a relatively high proportion.

3.6 Construction

3.6.1 The construction period is anticipated to last for up to 12 months. Construction (including demolition) will consist of a mixture of construction staff vehicle movements, LGVs and HGVs. Using data derived from a similar data centre construction as received from the prospective operator, the following numbers have been derived:

- an average of 275 construction staff on site per day;
- a peak (first three months of construction) of 400 construction staff per day;
- an average of 50% of staff as car drivers with the remaining 50% car sharing and arriving by sustainable means of transport;
- taking into account 50% of construction staff will car share of arrive by sustainable means of transport, an average of 138 construction staff vehicles on site, equating to 275 vehicle movements per day (accounting for one arrival and one departure);
- taking into account 50% of construction staff will car share of arrive by sustainable means of transport, a peak (during first three months of construction) of 200 construction staff vehicles on site, equating to 400 vehicle movements per day (accounting for one arrival and one departure);
- an average of 75 HGVs on site per day, equating to 150 HGV movements per day;
- a peak (during first three months of construction) of 110 HGVs on site per day, equating to 220 HGV movements per day; and
- a peak (during first three months of construction) of 30 LGVs on site per day, equating to 60 LGV movements per day.

3.6.2 The construction period is estimated to last up to 12 months (with a peak in the first three months), with deliveries fluctuating within this period. It is envisaged that the majority of movements would be Monday to Friday with only a limited number of movements on a Saturday morning.

3.6.3 During construction, there is a balance to be made between the intensity of on-site activity and duration of activity. It has been advised by the Applicant, using data from the construction of another data centre, that the average number of construction staff on site will be approximately 275, with a peak of 400 staff on site. Experience of similar developments elsewhere suggests that car sharing promotion by the contractor will reduce the number of cars.

3.6.4 Provision will be made to ensure that all vehicles are able to park on site, or on land designated for construction staff, to avoid obstruction to the operation of the public highway. This shall be strictly enforced.

3.6.5 Construction access to the proposed development will be taken from the existing access from the B4005 Brimble Hill.

3.6.6 A Construction Traffic Management Plan (CTMP) has been prepared in support of the application, as attached at **Annex D**.

4 PLANNING POLICY

4.1 Context

4.1.1 This section summarises the relevant national and local transport policy which sets the policy context for the report.

4.2 National Policy

National Planning Policy Framework (NPPF)

4.2.1 The National Planning Policy Framework (NPPF) was updated in June 2019 and sets out national policy for delivering sustainable growth and development. The updated NPPF replaces the previous National Planning Framework published in March 2012, revised in July 2018 and updated in February 2019. The NPPF aims to make the planning system less complex and more accessible. The NPPF sets out the Government's planning policies for England and how these are expected to be applied. In terms of transport the objectives outlined in NPPF are set out in paragraph 102:

'*Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:*

the potential impacts of development on transport networks can be addressed;

opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;

opportunities to promote walking, cycling and public transport use are identified and pursued;

the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and

patterns of movement, streets, parking and other transport considerations are integral to the design of schemes and contribute to making high quality places.'

4.2.2 When determining planning applications, Paragraph 108 of the NPPF states it should be ensured that:

'appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

safe and suitable access to the site can be achieved for all users; and

any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.'

4.2.3 Paragraph 109 states:

'Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.'

4.2.4 Having regard to the above objectives, the proposed development's access and movement will ensure that the development is connected to the adjacent community and sustainable travel network.

Planning Practice Guidance: Travel Plans, Transport Assessments and Statements in Decision-Taking

4.2.5 Planning Practice Guidance – Travel Plans, Transport Assessments and Statements in Decision-Taking (PPG) was published in March 2014 and provides a concise report on the use and importance of Transport Assessments / Statements and Travel Plans. With regard to whether to provide a Transport Assessment, Transport Statement or no assessment, the guidance states:

'Local planning authorities, developers, relevant transport authorities, and neighbourhood planning organisations should agree what evaluation is needed in each instance.'

4.2.6 The guidance states that Transport Assessments / Statements and Travel Plans can positively contribute to:

'encouraging sustainable travel;

lessening traffic generation and its detrimental impacts;

reducing carbon emissions and climate impacts;

creating accessible, connected, inclusive communities;

improving health outcomes and quality of life;

improving road safety; and

reducing the need for new development to increase existing road capacity or provide new roads.'

4.2.7 The guidance states that Transport Assessments / Statements and Travel Plans should be proportionate to the size and scope of the proposed development, be tailored to particular local circumstances and be established at the earliest practicable possible stage of a development proposal.

4.2.8 The guidance continues by stating that these reports should be brought forward through collaborative ongoing working between the Local Planning Authority / Transport Authority, transport operators, Rail Network Operators, Highways Agency and other relevant bodies.

4.2.9 As the PPG states that Transport Assessments / Statements and Travel Plans should be proportionate to the size and scope of the proposed development, a Transport Assessment has been prepared to consider the transport related effects associated with the proposed development.

Circular 02/13: The Strategic Road Network and the Delivery of Sustainable Development

4.2.10 Circular 02/2013: The Strategic Road Network and the Delivery of Sustainable Development was released in September 2013. The Circular sets out the way in which the Highways Agency will engage with communities and the development industry to deliver sustainable development and economic growth whilst safeguarding the primary function and purpose of the Strategic Road Network (SRN). Circular 02/2013 states that "the Highways Agency supports the economy through the provision of a safe and reliable strategic road network, which allows for the efficient movement

of people and goods". Similarly, to the NPPF, Circular 02/2013 states that "development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe".

4.3 Local Policy

Swindon Borough Local Plan 2026

4.3.1 The Swindon Local Plan is the principal planning policy document for the Borough, providing the development strategy to deliver sustainable growth to the year 2026. It sets out how much development the Borough needs and identifies where, when, and how development will take place. It also includes a set of more detailed development management policies used to assess planning applications in the Borough.

4.3.2 The Swindon Local Plan was formally adopted by Swindon Borough Council on 26 March 2015. Theme 4: Transport, is covered in the Local Plan.

The Transport theme's policies flow directly from and help to implement the following Strategic Objectives set out in Part 2 of the Local Plan:

SO4: Transport; and

SO6: Community and Health.

4.3.3 It should be noted that Part 2 of the Local Plan states that Strategic Objective 6 relates to Community and Health, whereas Strategic Objective 7 related to Transport. The quote above is from the Local Plan, however, it appears that the Local Plan includes a referencing error and actually references to Strategic Objective 7: Transport.

Theme 4 sets out policies to:

Improve key transport gateways and corridors;

Provide good access to Swindon Central Area and key destinations;

Reduce severance caused by transport corridors and the dominance of the car on the streetscene;

Minimise the environmental impact from transport (for example, vehicle emissions);

Minimise congestion and therefore journey time, noise and air quality;

Promote healthy lifestyles and travel choices and maximise opportunities to walk and cycle;

Support good public transport provision; and

Encourage innovative transport initiatives for rural areas.

4.3.4 Paragraph 4.177 of the Local Plan states the following:

"Effective accessibility is important in all modes of transport, from walking and cycling to public transport to the private car and transportation of goods, to all ages and across all parts of the economy. Therefore, there remains a need to improve the transport network to improve accessibility and reduce journey times, but also to improve air quality and reduce transport

emissions. Whilst maintaining and improving the existing network, being able to provide the opportunity for more people to take their shorter trips by foot or bicycle, and to do this safely, is still a key issue."

Swindon Local Transport Plan 2011 to 2026 (adopted April 2011)

4.3.5 Swindon's third Local Transport Plan (LTP) has been prepared in accordance with the statutory guidance issued by the Department for Transport in July 2009. It comprises an over-arching strategy document and a separate implementation plan setting out the proposals for the delivery of the policies contained in the strategy.

4.3.6 The overarching Strategy document is supported with a number of supplementary documents covering specific transport topics. The supplementary documents can be reviewed and updated as appropriate during the term of the wider LTP.

4.3.7 The site is located within The South Locality Cluster, which covers the Wards of Old Town and Lawn, Ridgeway, Wroughton and Chiseldon.

4.3.8 The LTP states the following:

"Those without access to a car in rural areas can feel far more isolated than those in urban areas. Opportunities for walking, cycling and public transport are less because of the distances involved and the lower level of service provision. There are often fewer facilities locally available and many public services are now concentrated in urban locations. Providing transport facilities in rural areas is often significantly more expensive than in urban areas because of the greater distances and lower population density.

For this theme our strategy is based on:

Working with partners to safeguard and promote local services such as health and education in order to reduce the need to travel;

Support conventional public transport services in rural areas while examining opportunities for cost effective demand responsive and community-based transport schemes;

Through the Rights of Way Improvement Plan continue to enhance the provision, maintenance and legibility of walking and cycling routes in rural areas;

Use the Development Management process to ensure access provision is considered in all new rural developments;

Considering the needs of rural residents who have limited availability of public transport when providing facilities for the private car (including car parking) in the town centre and at other major destinations."

Swindon Borough Council Parking Standards

4.3.9 The SBC document 'Technical guidance on parking standards' was prepared to provide more detail on the requirements for car parking, cycle facilities and other forms of transport associated with new developments within SBC. The parking standards are proposed for use in the development management of proposals for both residential, commercial and mixed development.

4.3.10 Paragraph 1.3 of the document states the following:

"It is the aim of the Government to reduce vehicle movements nationally and this includes private vehicle trips, and there are a number of mechanisms that can be implemented to try and achieve such a reduction. One method is to reduce the availability of car parking spaces especially in areas where there are good alternative modes of transport, such as town or city centres. However, it is understood that long or short term parking spaces will continue to be required in many rural areas, where access to alternative transport choices is often poor, or in centres of employment, shopping and community facilities that attract vehicles."

Cycle Parking Provision

4.3.11 Regarding cycle parking, the guidance states the following:

"The provision of convenient, secure cycle parking facilities, as well as additional facilities, i.e. showers, lockers etc, is fundamental to encouraging increased cycling. This is particularly relevant for those journeys that would normally be undertaken on a regular basis over shorter distance, as a single occupant of a private vehicle. "Manual for Streets" recommends that the design of a scheme is based on a user hierarchy whereby the needs of pedestrians and cyclists takes precedence over that of motor vehicles. This strongly suggests that cycle facilities should be an integral part of any application and should not be dealt with solely by conditions.

All developments should therefore take into account the requirement of the cyclist, from safe and convenient access routes onto the existing surrounding cycle network, to the facility proposed within the site for the storing of such vehicles.

Cycle parking should be located in areas that are convenient to use, and close to main entrances. Surveillance of such areas should be good, however, the facility should also be secure, under cover and well lit. Developers should also consider the additional needs of cyclists such as lockers, changing and shower facilities, especially where it is anticipated that there will be longer stay cycle parking, for example where it is provided for employees in association with a Travel Plan, or in residential developments where flats are proposed."

4.3.12 For employment developments, four cycle spaces (two 'Sheffield' racks) plus two spaces per each 500sqm above 1000sqm gross floor area should be provided.

Motorcycle Parking Provision

4.3.13 All motorcycle parking spaces are to be easily accessible and provided with a securing device. An area 2.0m x 0.8m should be provided for each motorcycle required.

4.3.14 For employment development, a minimum of one space for car parks with up to 20 spaces and one additional space for every 20 extra spaces or part thereof should be provided.

4.3.15 The car parking spaces have been calculated on a first principles basis; however, if a member of staff requires the use of a motorcycle space, they will be able to utilise a car parking space. Since the number of car parking spaces is based upon a first principles basis, any subsequent motorcycle parking within a car parking space would not result in any absolute loss in car parking availability.

Car Parking Provision

4.3.16 There are no specific car parking standards for data centres, although, car parking bays should be 4.8m in length and 2.4m in width.

Disabled Parking Provision

4.3.17 With regard to disabled parking provision, the guidance states the following:

"Where such parking is provided it should be in accordance with Disability Discrimination Act (DDA) standards, that is an additional 6% of the proposed parking allocation (ie, over and above the parking requirement based on the parking standards), for the proposed development. The spaces shall be designed and marked out appropriately (see Figures 2&3). As can be seen from the diagrams these bays will be larger than the normal car parking space, in both width and length, therefore this must be taken into account when designing car parking areas. Disabled parking bays should be located in the proposed car park so that they can be easily accessed by wheelchair users, ideally they should be positioned close to any main entrance."

4.3.18 Figures 2 and 3 of the guidance document state that a disabled parking bay must be 3.6m in width of which 1.2m is a marked access zone between designated parking spaces. Disabled parking bays must also be 6m in length, with a 1.2m access zone.

4.3.19 Disabled parking should be:

- located no more than 50m from the appropriate accessible building entrance;
- linked to the main entrance by a safe and level route; and
- suitably marked and sign posted.

4.4 Policy Summary

4.4.1 It is considered that the proposals are generally in accordance with policies relating to transport and highways at the national and local levels since there are walking and cycling facilities to the site as well as public transport services nearby. Additionally, the site is well located in respect to the strategic highway network.

5 TRIP GENERATION AND DISTRIBUTION

5.1 Introduction

5.1.1 This section of the report considers the trip generation of the proposed development and the extant consent on the site with regards to only the area upon which the proposed development will be situated.

5.1.2 The trip generation has been derived from first principles from knowledge of the likely shift patterns and hours of operation, provided by the project team.

5.1.3 These sections are summarised below:

- Proposed Development Trip Generation – sets out the vehicular trip generation for the proposed development prior to calculating the net change in vehicle movements;
- Cumulative Impact – sets out the nearby applications and how they have been considered within the assessment; and
- Extant Consent Vehicle Movements – sets out the vehicle movements currently consented at the area of the site, which will be considered against the proposed development trip generation.

5.2 Proposed Development Trip Generation

5.2.1 The operational trip generation for the proposed development is detailed below. These vehicle movements form part of the net change calculations in relation to the new vehicle movements the proposed development will generate onto the public highway network.

Staff

5.2.2 Up to 50 staff will be employed across a 24-hour period and will be separated by day and night shifts. Up to 30 full time staff will be on site during a typical weekday with up to seven full time staff on site during the night, including security staff. Up to 13 external staff / maintenance staff / visitors are also included as part of standard operation of the data centre. The number of staff is shown in **Table 5.1**.

Table 5.1: Numbers of Staff

Staff	Day	Night	Total
Security Staff	3-4	3-4	6-8
General Staff	5-26	2-3	7-29
Visiting and Maintenance Staff	2-13	0	2-13
Total	**10-43**	**5-7**	**15-50**

5.2.3 It should be noted that whilst a maximum of up to 13 external staff / maintenance staff / visitors may attend the development on a given day this would be a seldom occurrence, with typically five external staff / maintenance staff / visitors per day.

Staff Operational Temporal Distribution

5.2.4 Staff arrivals and departures have been based upon estimates from the project team. The staff will operate in shifts throughout the day and night. The shift work pattern will be in operation over 24 hours a day, a typical weekday is shown in **Table 5.2**.

Table 5.2: Staff Shifts

Staff	Day		Night	
	Shift Times	Staff	Shift Times	Staff
Security Staff	08:00-17:00	3-4	17:00-08:00	3-4
General Staff	07:00-19:00	5-26	19:00-07:00	2-3
Visiting and Maintenance Staff	08:00-15:00	2-13	N/A	0
Total	**Day Shift**	**10-43**	**Night Shift**	**5-7**

5.2.5 Based upon the information set out above, a breakdown of the daily person trip movements associated with the proposed development is shown in **Annex E**. For the purposes of trip generation, it has been assumed that all employees will arrive during the hour before their shift begins and depart during the hour their shift ends.

Operational Mode Share

5.2.6 To estimate the likely mode of transport that employees would use to travel to and from the site, the 2011 Census Journey to Work data has been analysed for the Workplace Population Workplace Zone in which the site lies, E02003236: Swindon 025.

5.2.7 The Workplace Population Census data is set out in **Table 5.3** and has been applied to the level of staff to predict the level of vehicle trip generation for the site.

Table 5.3: Staff Mode Share

Mode	% Mode Share	Staff Numbers
Car Driver	73.4	11-37
Car Passenger	5.4	1-3
Bus	5.5	1-3
Train	0.7	0
Motorcycle	1.1	0-1
Pedal Cycle	2.6	0-1
Walk	10.2	2-5
Taxi	0.6	0
Other	0.5	0
Total	**100**	**15-50**

5.2.8 The Census data predicts that 73.4% of staff will arrive at the site as a car driver, 5.4% would arrive as a car passenger, 2.6% would arrive by bicycle, 10.2% would arrive on foot and 6.2% would arrive by train and bus.

5.2.9 On the basis of the above, it is estimated that there would be up to 37 staff cars arriving and departing per day to the proposed development, equating to up to 74 vehicle movements per day.

For the purposes of a robust assessment, these upper vehicle movements have been assumed as being the daily vehicle movements.

5.2.10 Based upon the information set out above, a breakdown of the operational traffic flows associated with the vehicle movements of the proposed development is shown in **Annex F.**

HGVs

5.2.11 There will typically be six HGVs arriving and departing per day, equating to 12 daily HGV movements. For assessment purposes only, two HGVs have been assessed during the AM peak hour. No HGV movements are predicted during the PM peak hour.

Proposed Operational Trip Generation

5.2.12 The total proposed typical weekday peak hour vehicle movements of both total vehicles and HGVs, are summarised in **Table 5.4**. The movements shown are not the additional vehicle movements onto the highway network and are prior to the net change calculations.

Table 5.4: Peak Hour Vehicle Trip Generation

Vehicle Trip Generation

Time	Total Vehicles			HGVs		
	Arrival	Departure	Two-way	Arrival	Departure	Two-way
08:00-09:00	2	5	7	2	2	4
17:00-18:00	0	3	3	0	0	0
00:00-00:00	43	43	86	6	6	12

5.2.13 **Table 5.4** shows that on a typical weekday, there would be seven total vehicle movements during the AM peak hour (two arrivals plus five departures), four of which would be HGV movements. In terms of during the PM peak hour, there would be three total vehicle movements (zero arrivals plus three departures).

5.3 Distribution and Assignment

5.3.1 Census 2011 Journey to Work data has formed the basis of the assumptions of staff vehicle routeing. An analysis of the MSOAs in terms of mode share is set out above and the same MSOAs have been used to estimate the distribution of staff, as attached at **Annex G** and as summarised in **Table 5.5.**

Table 5.5: Staff Vehicle Distribution

	M4 East of J15	M4 between J16 and J17	M4 between J15 and J16	A419	A346 South	B4005 North (to Swindon)	B4005 South (to A4361)
Distribution	4.8%	5.0%	0.0%	26.3%	7.8%	46.8%	9.4

5.3.2 Staff movements have been assigned onto the network in accordance with the above distribution, shown in **Table 5.6**.

Table 5.6: Staff Vehicle Assignment of Daily Vehicle Movements

	M4 between J14 and J15	M4 between J16 and J17	M4 between J15 and J16	A419	A346 South	B4005 North (to Swindon)	B4005 South (to A4361)
Arrivals	2	2	0	10	3	17	3
Departures	2	2	0	10	3	17	3
Total	**4**	**4**	**0**	**19**	**6**	**35**	**7**

HGV Distribution

5.3.3 It is anticipated that the majority of HGV movements will route to and from the M4 Junction 15 and the A419. For assessment purposes, 33.3% of HGVs will arrive to the site via the M4 east, with 33.3% arriving to the site via the M4 west and a further 33.3% routeing via the A419.

5.4 Traffic Flow Scenarios

5.4.1 The operational proposed development traffic flows have been added to the 2021 base traffic flows to create the scenarios shown below, all of the scenarios are summarised below and the traffic flow tables are shown attached at **Annex H:**

- 2022 Base;
- 2022 Baseline; and
- 2022 Baseline + Project Development.

5.4.2 As 2022 is anticipated to be the opening year, this has been included as the opening year assessment scenario.

5.4.3 The traffic flows are based upon the growth of 2019 AADT flows derived from DfT traffic counts for the following:

- A346 between M4 and B4005;
- A419 between the M4 and A4259;
- M4 between J15 and J16;
- M4 between J14 and J15; and
- M4 between J16 and J17.

5.4.4 The traffic flows are based upon the growth of ATC data for 2016 for the B4005:

- B4005 Brimble Hill between the site and Burderop Barns;
- B4005 south of Burderop Park; and
- B4005 west of the Application site.

5.4.5 TEMPro software presents the output of the DfT's National Trip End Model which forms part of the National Transport Model (NTM). The DfT's Webtag guidance Unit 3.15.2 advises the use of NTM in preference to the National Road Traffic Forecasts (NRTF) as the NTM data is based on a more up-to-date model.

5.4.6 It should be noted that growth rates include allowances for background traffic growth as well as development growth and, in some instances, the application of growth rates and the addition of traffic flows from committed developments and cumulative developments (i.e. emerging developments that do not yet have planning consent) can result in double counting of traffic flows.

5.4.7 The growth rates are set out in **Table 5.7.**

Table 5.7: TEMPro Growth Rates

TEMPro Growth Rates		
	Growth Rate 2016-2022	Growth Rate 2018-2022
All road types	1.106	1.070

5.5 Extant Vehicular Trip Generation

5.5.1 As aforementioned, the existing data centre on the development site was formerly used by Hewlett Packard but the buildings are currently unoccupied. Prior to the construction of these buildings, the site was formerly occupied by a military hospital, telephone exchange and office building. These buildings were demolished in the 1980s and early 1990s and replaced by the existing data centre buildings.

5.5.2 The site has a number of previous planning permissions relating to its existing use as a data centre and proposed office development in the western area, detailed in **Section 2** of this report.

5.5.3 SBC does not list the planning documents submitted for each planning application prior to 1998; therefore, the details of the original planning application and its associated trip generation are not readily available. However, additional information was obtained from the following planning applications:

- Construction of 30 no. car parking spaces, insertion of 1 no. window to east elevation and erection of access gate. Application Reference S/04/2960;
- Renewal of outline permission for Class B1 Use - reference T97/549RJ. Application Reference S/99/2691;
- Outline application for Class B1 and/or B8 industrial use. Application Reference T/97/0549; and
- Demolition of existing buildings and two new computer centre buildings and ancillary works. Application Reference T/91/1523;

5.5.4 SBC does not detail all documents associated with submitted planning applications, particularly for historic planning applications, however, Condition 11 of the decision notice associated with planning application T/91/1523 states that "*no more than fifteen people shall be employed within the buildings hereby permitted at any time*."

5.5.5 As part of planning application T/97/0549, documents associated with the decision notice state that "*the two buildings put up by the Company have a very low traffic generation and staffing on site rarely exceeds 7 or 8 people at any one time.*"

5.5.6 Renewal of outline permission for class B1 Use - reference T97/549RJ. Application Reference S//02/02954, was for the extension of the Beta complex, with the extension of the existing access road. However, although the decision notice is available from SBC, there is no information available regarding the vehicular trip generation associated with the proposals.

5.5.7 Application Reference S/04/2960 was for the construction of 30 parking spaces along the edge of the estate road. Following submission of additional details regarding the GFA of the existing premises, no objections were raised by the local highway authority. Within the application for planning permission completed on behalf of Hewlett Packard (HP), the document states that there are between 45 to 60 HP staff complied on the site as a result of the development, and that the new car parking spaces for staff and visitors are to overcome congestion on the existing designated car parking areas.

5.5.8 Within the decision notice, a letter by Watkins Gray International LLP Architects states that the gross total area of all the buildings on site was 9334sqm, with a total of between 30 and 60 staff on site at any time. The car parking area outside the main entrance had 24 spaces and was used by visitors to the centre.

"HP employees attending the site regularly are currently parking their vehicles in the area around the buildings that are used for storage of machinery and goods. These buildings require clean and constant access. The current arrangement is causing problems hence the need to have a designated parking area which will clear the surrounding of the store buildings from congestion. "

"The car park that our client intends to build onsite is temporary and will be replaced, as we understand it, by permanent facilities with the B1 unit development has been carried out. The area, as you may recall, was used as contractors parking for the construction stage of Gamma."

"The reasoning behind this application was no more than to simply retain some of the spaces (30 spaces) then top up the existing gravel with finer aggregate to make the area look tidier. It was never the intention to dig into the ground and create permanent facilities."

5.5.9 Based on the above application, there were previously a maximum of 60 staff on site at any time within the HP offices with the minimum number of staff between 30 and 45. It is therefore assumed that on a typical day, there would have been 45 on staff on site occupying the buildings to be replaced as part of the development proposals.

5.5.10 To estimate the likely mode of transport that employees associated with the extant consent use to travel to and from the site, the 2011 Census Journey to Work data has been applied to the 45 extant staff, set out in **Table 5.5.**

Table 5.5: Extant Staff Mode Share and Trip Generation

Mode	% Mode Share	Staff Numbers
Car Driver	73.4	33
Car Passenger	5.4	2
Bus	5.5	2
Train	0.7	0
Motorcycle	1.1	1
Pedal Cycle	2.6	1

Mode	% Mode Share	Staff Numbers
Walk	10.2	5
Taxi	0.6	0
Other	0.5	0
Total	**100**	**45***

*Totals may not sum due to rounding

5.5.11 The Census data predicts that 73.4% of staff arrived at the site as a car driver, 5.4% arrived as a car passenger, 2.6% arrived by bicycle, 10.2% arrived on foot and 6.2% arrived by train and bus.

5.5.12 On the basis of the above, it is estimated that there were 33 staff cars arriving and then departing per day to the extant development, equating to 66 total vehicle movements per day.

5.6 Summary

5.6.1 The trip generation for the proposed development prior to the net change calculations, has been detailed in terms of the peak hours as seven total vehicle movements during the AM peak hour and three total movements during the PM peak hour. It is important to note that this figure is not the number of new additional vehicle movements generated by the proposed development.

5.6.2 In order to assess the net change in vehicles generated by the proposed development, the extant consent trip generation has also been calculated, details of which are set out in Section 6.

6 TRANSPORT IMPACT

6.4 Introduction

6.4.1 This TA assesses the effects of the development proposals on the transport network.

6.4.2 To consider the effects of the traffic generated, an assessment of net change in traffic flows has been undertaken to provide a context of the net change in traffic considering the extant consent against the proposed development.

6.5 Vehicle Movement Net Change (Operational Phase)

6.5.1 Section **5** detailed the trip generation of the new additional vehicles generated by the proposed development as well as those generated by the extant site operations.

6.5.2 The application site is not currently in use however the site could be occupied at any time. Thus, the vehicle movements of the proposed development must be considered against the vehicle movements permitted at the application site as part of the extant consent.

6.5.3 Therefore, the extant consent, in relation to the area of the application site, are vehicle movements already permitted on the public highway network. The net change in vehicle movements is thus to be calculated in order to assess the vehicle movements generated by the proposed development compared to those vehicle movements already permitted.

6.5.4 Table 5.4 in Section 5 shows that the previous use of the site would generate 66 daily vehicle movements

6.5.5 Table **6.1** summarises the extant consent vehicle movements and the proposed development vehicle movements.

Table 6.1: Net Change in Daily Vehicular Trip Generation

	Total Daily Vehicle Movements		
Time Period	Extant Operation	Proposed Operation	Net Change
Daily	66	86	20

6.5.6 Table **6.1** shows that during a typical day, there would be a net increase of 20 vehicle movements. Of these, the net change of 20 vehicle movements consists of an increase of eight two-way staff vehicle movements and 12 two-way HV movements.

6.6 Link Assessment (Operational Phase)

6.6.1 The net change in traffic flows have been assessed against the 2022 baseline traffic flows in **Table 6.2**.

Table 6.2: Proposed Development Percentage Impact in Daily Traffic Flows (Net Change)

Location	2022 Baseline AADT	2022 Baseline HGVs	Net Change (operational)	HGVs Net Change (operational)	Total Vehicles %age Impact
A346 between M4 and B4005	19778	1148	14	12	0.1%
A419 between the M4 and A4259	68387	6275	6	4	0.0%
M4 between J15 and J16	94104	9926	4	4	0.0%
M4 between J14 and J15	102886	10101	4	4	0.0%
B4005 Brimble Hill between the site and Burderop Barns	5856	68	15	12	0.3%
B4005 south of Burderop Park	5168	60	15	12	0.3%
B4005 West of the site	5856	68	5	0	0.1%
M4 between J16 and J17	101240	10503	4	4	0.0%
All traffic through M4 J15 junction	-	-	14	12	-
All traffic through M4 J16 junction	-	-	8	4	-

6.6.2 The net impact of the proposed development upon base traffic flows on the B4005 to the west of the site is 0.1%, and 0.3% along the B4005 to the south of the site. These increases will have a negligible effect upon link performance, particularly given that there are no highway capacity issues on the B4005. Furthermore, they are well within what would typically be considered to be day-to-day variations in traffic flows and thus would not be noticeable to road users. It is thus considered that the net traffic flows generated by the proposals would not result in a cumulative impact upon the local highway network that was severe and the impact would be negligible.

6.6.3 It should be noted that the Application Site is currently unoccupied and the observed traffic flows used within this assessment are derived from ATC data collected in 2016, and DfT data collected in 2019. Based on this, it is possible the entirety of the extant traffic flows are not contained within the 2022 baseline flows. However, if their entirety was to be included, this would result in a lower percentage impact to that calculated in Table 6.2. Notwithstanding, whether they are included in the baseline flows or not, the impact would remain negligible.

Strategic Road Network

6.6.4 As set out in Section 2, the improvements to the M4 Junction 15, and A419, have been undertaken to ensure that the junction will operate within capacity, taking into account the increased demand over the forthcoming years. As the net changes in traffic flows are so low and the improvements to the M4 junction 15 will have been undertaken upon the data centres' opening, it is considered that the proposed development would have a negligible impact on highway capacity and the operation of the strategic road network.

6.7 Road Safety (Operational Phase)

6.7.1 Section 2 sets out that there are no existing road safety issues within the vicinity of the site on the B4005 Brimble Hill.

6.7.2 The proposed development would generate cars and HGVs in a similar way to the current road users in the vicinity and would use the B4005 Brimble Hill to access the wider highway network.

6.7.3 Therefore, there is nothing to suggest that the proposed development would alter the injury accident rates within the vicinity of the site. It is therefore considered that the proposed development would not result in an unacceptable impact on road safety.

6.8 Net Change in Multi Modal Travel

6.8.1 The above sets out the net change in vehicle movements at the site, but there will also be a net change in other modes of travel. As calculated from the mode share data, there will be a net increase of one daily public transport trips at the site with no net change in pedestrian and cyclist trips.

6.8.2 This net change in public transport trips is low and is commensurable with current facilities for this mode of travel. Given there is no net change in pedestrian and cyclist trips, there is no net impact upon these modes.

6.9 Construction Period (Incorporating Cumulative Assessment)

6.9.1 The construction period for the data centre is anticipated to last for up to 12 months, commencing in Q3 2021. It is anticipated that the site will be operational in 2022.

6.9.2 In accordance with good practice, a Construction Traffic Management Plan (CTMP) has been prepared and is attached at **Annex D**. The measures to manage and control the construction vehicle movements, as well seeking to reduce their numbers and organise their timings such that they are sympathetic to the local environs and to minimise any impact, are included with the report. The management measures will be implemented for the duration of the construction period.

6.9.3 Section 2 sets out the description of committed developments and cumulative developments and all sites identified were classified as committed developments. Although there were no cumulative development sites, it is recognised that the construction of the Burderop Park residential development (original Planning Reference: S/17/0128) may overlap with the construction of the proposed data centre. To consider a robust assessment, this has been considered further. The Transport Assessment submitted for Burderop Park states that

"Two assessment years have been selected - 2017 as the year of the planning submission, and a future year of 2022, which is anticipated to be when the residential dwellings will be fully built out and occupied."

6.9.4 Planning consent for planning application S/17/0128 was granted in April 2018, with the condition of a Construction Method Statement, detailing the construction access, parking arrangements, provision for loading / unloading of vehicles, and additional measures to control the emissions of dust and dirt during construction. The final revision of the Construction Method Statement, submitted in October 2019, was sufficient to discharge the condition.

6.9.5 Regarding construction, the Construction Method Statement stated the following:

- Assessments of resource levels of each Construction Phase indicate the number of operatives ranging between 40 and 130 per day on the general site activities. Due to the nature of the work there will not be a requirement for night working or beyond that which is typically consented as a typical construction working week;
- Other associated construction deliveries to occur throughout the build duration at an expected average of two per hour between 08:00 and 18:00hrs Monday to Friday and 08:00 and 13:00hrs on Saturdays. These will typically be either HGV, LGV or cars; and
- A phasing strategy has been developed which will spread the construction activity over 3 to 3.5 years.

6.9.6 There have been subsequent planning applications submitted:

- Application S/19/1765 presented revised proposals for the site layout of the new build development;
- Application S/19/1892 proposed the provision of 6 additional new-build dwellings; and
- Application S/20/1324, registered in October 2020, proposed the change of use of the mansion, tudor wing and north wing from offices (Use Class B1(a)) to a dwelling (Use Class C3), erection of a detached garage and associated works.

6.9.7 Application S/19/1892 was granted planning permission in July 2020, with Condition 10 stating that the approved Construction Method Statement shall be adhered to throughout the construction period unless otherwise agreed in writing by the Local Planning Authority.

6.9.8 Although the Burderop Park Construction Method Statement does not set out when construction is due to commence, a phasing plan has been implemented and the construction period will occur over a period of 36 to 42 months; therefore, there is potential for the construction of the data centre to overlap with the construction of the adjacent residential development.

6.9.9 The vehicular trip generation associated with the construction of the data centre and Burderop Park is temporary, with construction staff arriving to and departing the site outside of the typical network commuter peak hours of 08:00-09:00 and 17:00-18:00. HGV movements will be spread across the day between 08:00 and 18:00, equating to a combined average of 19 HGV movements per hour if there were to be any overlap of the two construction processes.

6.9.10 From an analysis of the surrounding highway network, all construction HGVs and the majority of construction staff will route via Junction 15 of the M4 via the A346 and the B4005; therefore, the vast majority of all construction vehicles associated with the data centre and Burderop Park will not route along the B4005 through Wroughton.

6.9.11 The majority of construction traffic generated by the data centre and Burderop Park will route to their respective sites via the M4 east and west of Junction 15; however, based on the construction vehicle movements set out above, it is clear that the impact of construction HGVs in the context of the existing HGV traffic within the vicinity of the site considered to be negligible.

6.9.12 Notwithstanding, a CTMP has been prepared to minimise the impact of the construction traffic flows generated by the data centre, attached at Appendix D. Similarly, a Construction Method Statement has been submitted in association with the Burderop Park development in order to minimise its impact.

6.9.13 Proposed infrastructure upgrades to the Application Site are described in Appendix 4.3. The main potential traffic and transport impacts associated with infrastructure upgrade works would be related to traffic movements during the construction period for such works; no traffic-related impacts are predicted one the upgraded infrastructure have been completed. During construction, vehicles would access the location of the works; transporting construction staff, construction materials, plant item and components of the required infrastructure.

6.9.14 Any such works would generate only a negligible amount of traffic that would be imperceptible in the context of background traffic flows and cumulative traffic flows. In such instances, there is no requirement to consider the detailed breakdown of such traffic flows because they would not alter any assessment or conclusion.

6.9.15 Given that any such works may are likely to be installed within part of the public highway or adjacent to part of the public highway, the safety aspects of the works are more appropriate to consider than traffic effects. To ensure contractors enact their duty of care with regards to the Health and Safety at Work etc Act, 1974, all works that may affect the public highway is undertaken by contractors in accordance with Chapter 8 of the Traffic Signs Manual 'Traffic Safety Measures and Signs for Road Works and Temporary Situations', published by the Department for Transport. The Chapter 8 Regulations are codes of practice that are intended to help contractors to safely carry out signing, lighting and guarding of street works and road works on all highways. Any such works would be no different to any other utility installation or repair/replacement work etc on the public highway, for which the focus is on the safety of contractors and users of the public highway. As such, safety would be maintained throughout the works and does not need to be considered any further.

6.10 Summary

6.10.1 The above has set out that the development proposals will result in a net increase of only 20 daily vehicle movements per day. This is well within what would typically be considered to be day-to-day variations in traffic flows.

6.10.2 The base traffic flows have no capacity issues and this would remain the case with the inclusion of the proposed development traffic flows.

6.10.3 The vehicle movements would thus not create a severe impact upon the highway network.

6.10.4 The NPFF states in paragraph 109:

"Developments should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."

6.10.5 The analysis based on the assessment work has demonstrated that the proposed development would not result in a severe residual cumulative impact on the road network or an unacceptable impact on highway safety.

7 CONCLUSIONS

7.4.1 This Transport Assessment has been prepared by RPS, on behalf of the Applicant in support of a full planning application for the proposed replacement data centre on land at the National Data Centre, Old Burderop Hospital site, Brimble Hill, Wroughton.

7.4.2 This Transport Assessment has been prepared in accordance with the National Planning Policy Framework (2019), Planning Practice Guidance 'Travel Plans, Transport Assessments and Transport Statements' and the Department for Transport (DfT) publication Circular 02/2013: 'The Strategic Road Network and the Delivery of Sustainable Development'. The TA has also been prepared in accordance with scoping comments received from both Highways England and Swindon Borough Council.

7.4.3 The proposed development seeks consent for a replacement data centre building (containing data halls, associated electrical and AHU Plant Rooms, loading bay, maintenance and storage space, office administration areas and screened plant at roof level), emergency generators and emission stacks, diesel tanks and filling area, electrical switchroom, a water sprinkler pump room and storage tank, a gate house, site access, internal access roads, associated drainage infrastructure, hard and soft landscaping.

7.4.4 The Application Site is located to the south of Swindon, to the east of Wroughton and to the north west of the hamlet of Burderop. The site is surrounded predominantly by countryside/recreational land, with some residential and industrial businesses located to the south and west. Burderop Park is located directly south of the site.

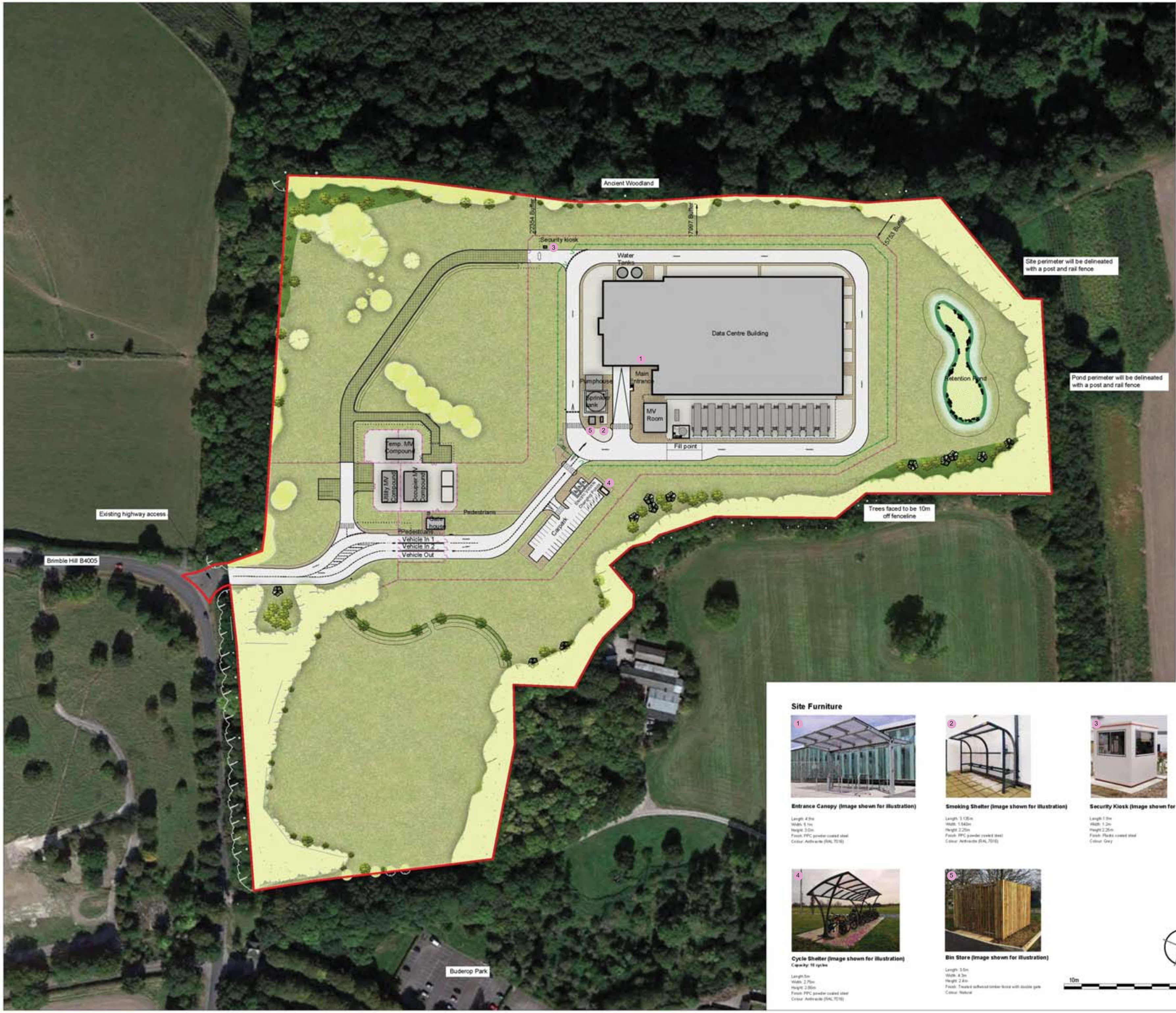
7.4.5 The operational vehicle access to the Application Site is to be taken from the existing access on the south-western corner of the proposed site, onto the B4005, which connects the site to the wider highway network.

7.4.6 From the analysis of the traffic volumes and impact it is considered that the vehicle movements generated by the proposed development would not result in an unacceptable impact on highway safety or result in a residual cumulative impact on the road network that is severe. The Application Site can achieve a safe and suitable means of access for all modes and it is considered that there are no transport or highways reasons for not permitting the development.

ANNEXES

Annex A

Site Masterplan



NOTES

1. This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided.
2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

Key

- Development boundary
- Outer perimeter fence
- Inner perimeter fence
- Existing tree to be retained

For details of Proposed landscaping refer to drawings:

20305S-RPS-00-XX-DR-A-9530
20305S-RPS-00-XX-DR-A-9531
20305S-RPS-00-XX-DR-A-9532

Building Dimensions

	Length	Width	Height	Total Area (GEA)			Drawing references
Data Centre	[illegible]	[illegible]	[illegible]	[illegible]	Break Area		[illegible]
					Office and Personnel Space	[illegible]	
					Technical Space	[illegible]	

Ancillary Structures					Drawing references
Water Tanks	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sprinkler Tank	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pumphouse	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Gatehouse	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MV Room	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fuel Tank	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Temporary MV Building	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Permanent Utility MV Building	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Permanent Occupier MV Building	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Site Furniture

1

Entrance Canopy (Image shown for illustration)

Length: 4.9m
Width: 6.1m
Height: 3.0m
Finish: PPC powder coated steel
Colour: Anthracite (RAL 7016)

2

Smoking Shelter (Image shown for illustration)

Length: 3.135m
Width: 1.540m
Height: 2.25m
Finish: PPC powder coated steel
Colour: Anthracite (RAL 7016)

3

Security Kiosk (Image shown for illustration)

Length: 1.9m
Width: 1.2m
Height: 2.25m
Finish: Plastic coated steel
Colour: Grey

4

Cycle Shelter (Image shown for illustration)
Capacity: 10 cycles

Length: 5m
Width: 2.75m
Height: 2.86m
Finish: PPC powder coated steel
Colour: Anthracite (RAL 7016)

5

Bin Store (Image shown for illustration)

Length: 3.6m
Width: 4.3m
Height: 2.4m
Finish: Treated softwood timber fence with double gate
Colour: Natural

N

10m SCALE 1:1000

Rev	Description	By	Ckd	Date
P02	Updated to suit Natural England Comments	LTS	KF	05.02.21
P01	Planning Issue	AE	LS	05.02.21

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Client

Project: Swindon Data Centre

Title: Master Site Plan

Status	Scale	Date Created
Preliminary	1:1000 @ A1	10/09/20
Task Team Manager	Information Author	Task Information Manager
KF	JS	SM

Document Number
20305S-RPS-00-XX-DR-A-9501
Project Code - Originator - Zone - Level - Type - Role - Drawing Number

RPS Project Number: NK020305S
Revision: P02

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Annex B

Public Transport Provision


51, 51A, 52 to Cricklade, Cirencester, Cheltenham and Stroud
Great Western Academy
Tadpole Garden Village
Broad Blunsdon
St. Andrew's Ridge
Redhouse
Ash Brake
Haydon Wick
Abbey Meads
Greenmeadow
Penhill
Groundwell
Wood Hall
Moredon
Pinehurst
Kembrey Park
Elgin
Kingsdown
Upper Stratton
Lower Stratton
Highworth
South Marston Park
SWINDON URBAN AREA
Common Platt
Sparcells
Cheney Manor
Nine Elms
Shaw
Westmead
Ramleaze
Middleleaze
Eastleaze
Grange Park
Link Centre
Rodbourne
Designer Outlet
Swindon Town Centre
Bridgemead
Toothill
Freshbrook
Windmill Hill
Lydiard Fields
Blagrove
Okus
Kingshill
Victoria Hospital
Old Town
Walcot East
Walcot West
Park North
Park South
Eldene
Nythe
Covingham
Greenbridge
Coleview
Liden
Lawn
Wichelstowe
Broome Manor
Coate
Coate Water
Great Western Hospital
Chiseldon
Wroughton
Thorney Park
Brimble Hill
Royal Wootton Bassett
Woodshaw
to Wootton Bassett and Chippenham
to Swindon
to Lyneham, Calne and Chippenham
to Devizes and Trowbridge
to Marlborough and Ludgershall
to Faringdon and Oxford
Produced by FWT 12.1.18 www.fwt.co.uk

Annex C

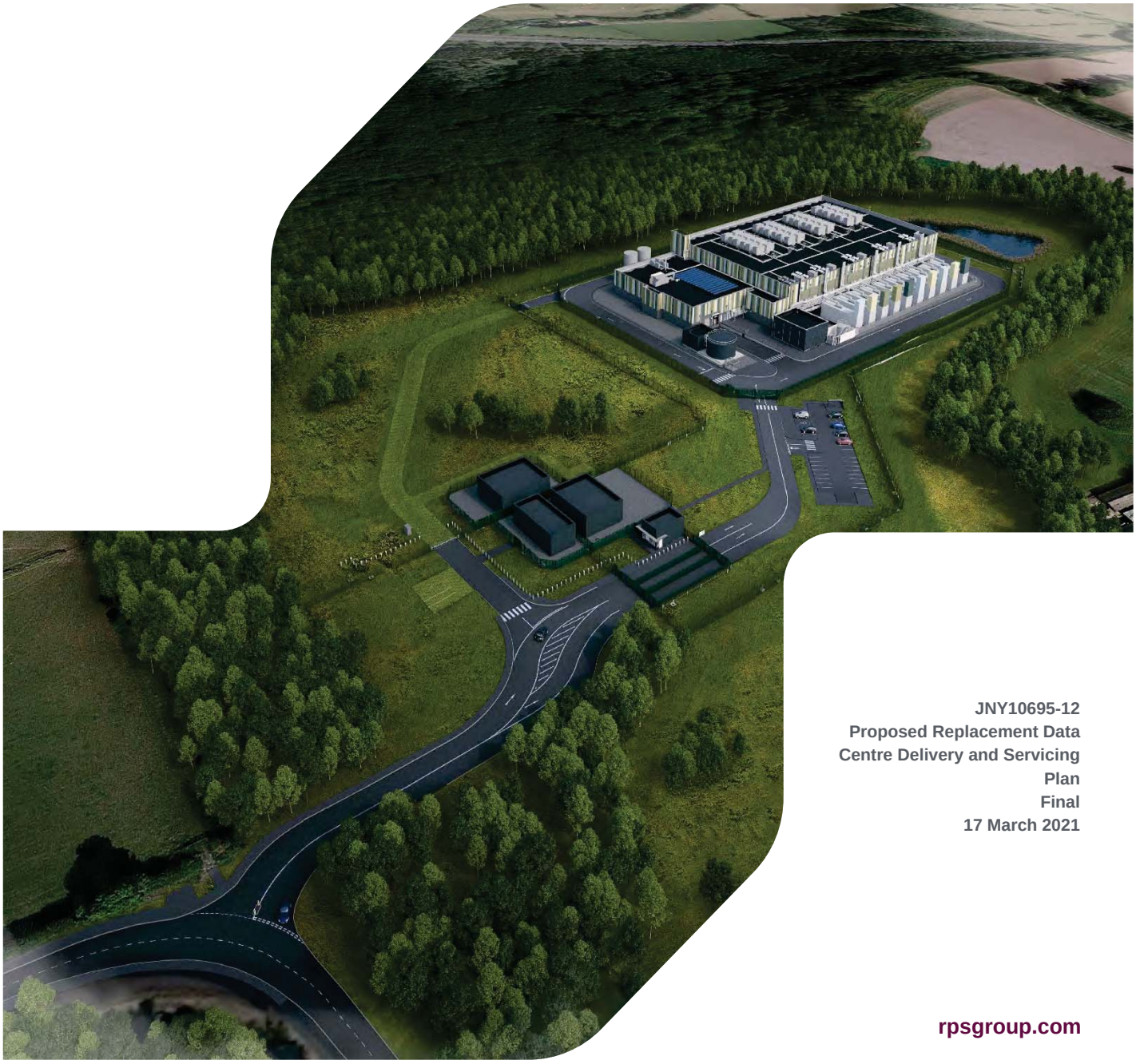
Delivery and Servicing Plan

PROPOSED REPLACEMENT DATA CENTRE

DELIVERY AND SERVICING PLAN

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton, Swindon

20305S-RPS-XX-XX-RP-P-9732



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17 March 2021

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Final	Submission	Joanna Gunn	David Archibald	David Archibald	17 March 2021

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Prepared for:

Mullhaven Properties LLC

Contents

Figures

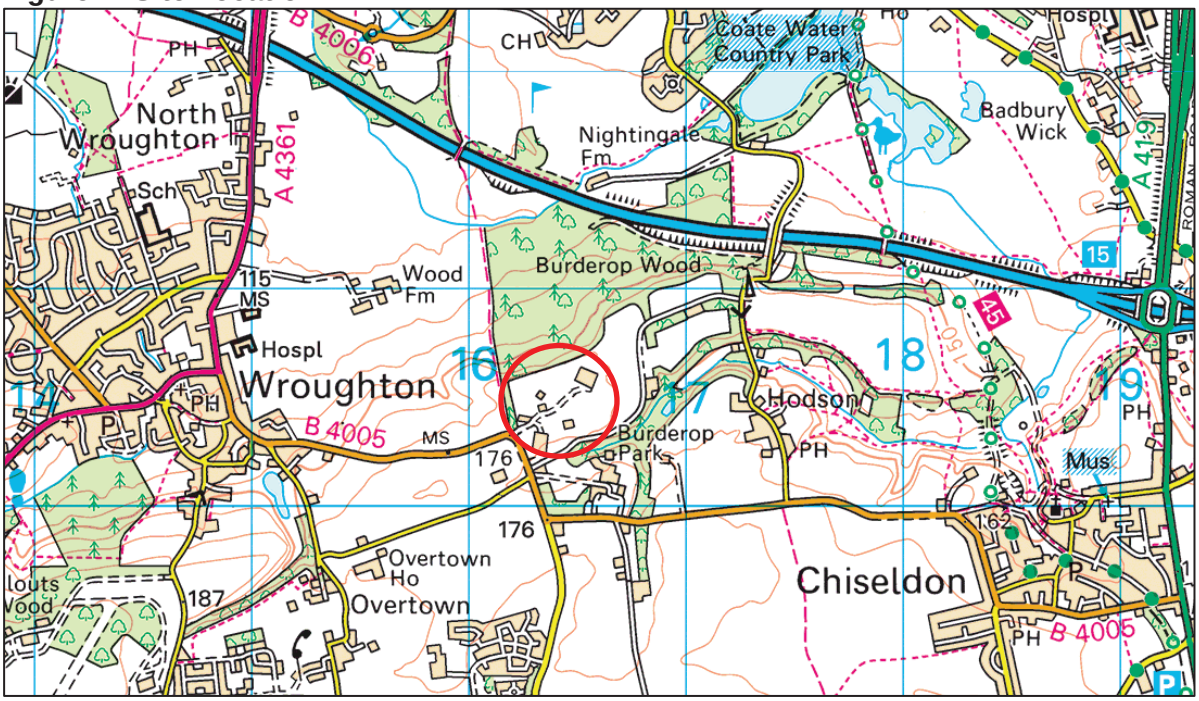
1 INTRODUCTION

1.1.1 This Delivery and Servicing Plan (DSP) has been prepared to support the planning application for the redevelopment of land at the National Data Centre, located at the Old Burderop Hospital site, Brimble Hill, Wroughton (the Application Site) This DSP accompanies the Environmental Statement (ES) and a suite of technical reports forming part of the application for a replacement data centre and associated infrastructure (the proposed development).

1.1.2 The Application Site is shown on Figure 1 and is located to the south of Swindon, to the east of Wroughton and to the north-west of the hamlet of Burderop. The Application Site is surrounded predominantly by countryside/recreational land, with some residential and industrial businesses located to the south and west. Burderop Park is located directly south of the Application Site.

1.1.3 The Application Site lies within the administrative area of Swindon Borough Council (SBC). Swindon is located approximately 1.2km to the north of the Application Site. The Application Site is currently accessed via the existing access on the western boundary of the site leading onto the B4005 Brimble Hill.

Figure 1: Site Location



1.1.4 The Application Site is currently served by one access point via a private road leading from Brimble Hill Road (B4005) which is adjacent to the part of the Application Site's western boundary. The private road has entry barriers restricting access into the site. This vehicular access will remain unchanged.

1.2 What is a Delivery and Servicing Plan?

1.2.1 A DSP details how deliveries and servicing will be undertaken and managed at a new or redeveloped site, or at existing sites to optimise and minimise the impacts associated with such movements. These are often submitted to accompany planning applications.

1.2.2 A DSP is a travel plan that aims to improve the sustainability of freight and servicing. They are produced jointly by suppliers, clients and the freight industry, and seek to reduce the number of deliveries required while ensuring remaining deliveries are made as safely as possible and in an environmentally friendly way. A DSP will also aid in reducing CO2 emissions, congestion and road collisions by improving relationships between building operators and their supply chain.

1.2.3 The implementation of measures set out within a DSP will assist in minimising the number of trips made by freight; target deliveries during off peak periods; and promote the use of viable routes to mitigate the impact of servicing and deliveries on the local highway network.

1.3 Report Structure

1.3.1 The DSP is structured as follows:

- **Section 2** – Policy Context;
- **Section 3** – Local Context and Access;
- **Section 4** – Delivery and Servicing Strategy;
- **Section 5** – Supplier Contractual Obligations.

2 POLICY AND GUIDANCE CONTEXT

2.1.1 This section summarises the relevant national and local guidance from which the proposed delivery and servicing arrangements have evolved.

2.2 Planning Policy Context

National Planning Policy Framework (February 2019)

2.2.1 National policy in relation to the transport planning of developments is set out in the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, (MHCLG) 2019).

2.2.2 When considering development proposals, paragraph 108 of the guidance states that in assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that safe and suitable access to the site can be achieved for all users.

2.2.3 Paragraph 110 states that within this context, applications for development should allow for the efficient delivery of goods, and access by service and emergency vehicles.

2.3 Guidance

Transport for London: Delivery and Servicing Plans: Making Freight Work for You

2.3.1 Guidance on DSPs is limited, and Transport for London (TfL) are one of the only Local Highway Authorities (LHA) to produce comprehensive guidance on DSPs. The TfL document 'Delivery and Servicing Plans: Making Freight Work for You' provides guidance on preparing and implementing DSPs. The document states that DSPs can benefit any site that receives deliveries and servicing activity and will specifically help sites to:

> 'Proactively manage deliveries to reduce the number of delivery and servicing trips, particularly in the morning peak; identify and promote areas where safe and legal loading can take place; select delivery companies who can demonstrate their commitment to following best practice – for example, the Freight Operator Recognition Scheme'.

2.3.2 The guidance recognises DSPs help to proactively manage deliveries to reduce the number of delivery and servicing trips, identify and promote areas where safe and legal loading can take place, and select delivery companies who can demonstrate their commitment to following best practice.

2.3.3 It sets out the benefits of a DSP, how to gather data and how to review and manage the supply chain. By completing an initial data collection exercise to better understand their current situation, the guidance gives the following benefits:

- Save time and money;
- Improve reliability;
- Improve safety;
- Reduce the impact on the environment;
- Benefits to suppliers/freight operators; and

- Benefits to local authorities and residents.

2.3.4 The guidance states that improvements can be made by:

- Engaging facilities management to consider sustainable freight practices within the overall management of the building;
- Working with procurement, suppliers and contracts management to embed sustainable freight practices within your procurement process;
- Changing behaviour within a business, to reduce the frequency of stationery orders, for example Co-ordinating and managing delivery and servicing activities more effectively;
- Encouraging safe and lawful loading, by providing legal loading areas or by scheduling deliveries when it is safe and legal to do so; and
- Adopting sustainable procurement practices.

2.3.5 All DSP-related activity should be captured in a central DSP document.

3 LOCAL CONTEXT AND ACCESS

3.1 Introduction

3.1.1 This section of the DSP provides a description of the existing site conditions, the surrounding highway network and the existing waste collection arrangements employed at the Application Site.

3.2 Site Description and Location

3.2.1 The Application Site is located to the south of Swindon, to the east of Wroughton and to the north-west of the hamlet of Burderop. The site is surrounded predominantly by countryside/recreational land, with some residential and industrial businesses located to the south and west. Burderop Park is located directly south of the Application Site.

3.3 Local Highway Network

3.3.1 The proposed development will be accessed from the existing site access taken from the B4005 Brimble Hill. The B4005 is a single carriageway road subject to the national speed limit within the vicinity of the Application site. The B4005 is rural in nature and the conditions are reflective of this; there is no street lighting within the vicinity of the access and there are narrow footways on both the northern and southern sides of the carriageway.

3.3.2 The B4005 routes broadly west to east between Wroughton and Chiseldon respectively. At its western end, it forms a three arm roundabout with the A4361 Devizes Road / High Street and the A4361 Moormead Road / Swindon Road. At its eastern end, it forms the minor arm of a ghost island right turn lane priority junction with the A346 Marlborough Road. To the north-west of Wroughton, the B4005 continues west to join junction 16 of the M4, via a grade separate roundabout where it meets with the A3102 Swindon Road.

3.3.3 As the B4005 enters Wroughton, the speed limit reduces to 30mph and the footway is retained on the southern side of the carriageway, with intermittent street lighting. The B4005 becomes Marlborough Road and provides direct access to dwellings, retaining its narrow footways on both sides of the carriageway.

3.4 Development Proposals

3.4.1 The Application Site is currently used as a data centre comprising three buildings: two buildings in the north east (known as Gamma and Beta) and one in the south (known as Alpha). The western area of the site is currently undeveloped. Buildings Beta/Gamma and Alpha will be demolished in order to accommodate the proposed development.

3.4.2 The development proposals are for a data centre comprising of the following elements:

- Data hall;
- Loading bay;
- Maintenance and storage space;
- Office administration areas and plant at roof level;
- Diesel tanks and filling area;
- Security gate house;
- Site access;

- Internal access roads;
- Hard and soft landscaping;
- Cycle shelter; and
- Waste bin store.

3.4.3 The Application Site is currently served by one access point via a private road leading from Brimble Hill Road (B4005) which is adjacent to the part of the Application Site's western boundary. The private road has entry barriers restricting access into the site. This vehicular access will remain unchanged.

3.4.4 The Application Site will include a controlled access enclosure involving a series of secure barriers, electronic bi-fold gates and an intercom system linked to the Security Gatehouse.

3.5 Summary

3.5.1 This section provides an overview of the existing site context regarding the local highway network from which the proposed servicing / delivery route and arrangements will be taken.

4 DELIVERY AND SERVICING STRATEGY

4.1.1 The objective of this DSP is to develop through the planning process a document that will seek to support a sustainable and well managed development with regards to deliveries and servicing. This report has been produced in accordance with the guidance documents and best practice, and SBC local policy / requirements.

4.1.2 This DSP will seek to achieve the following objectives:

- Demonstrate that goods and services can be delivered, and waste removed, in a safe, efficient and environmentally-friendly way;
- Identify deliveries that could be reduced, re-timed or even consolidated, particularly during busy periods;
- Improve the reliability of deliveries to and collections from the Application Site; and
- Reduce the impact of freight activity on the local highway network and the environment.

4.2 Servicing and Delivery Trips

4.2.1 During operation, there will typically be six HGVs arriving and departing per day, equating to 12 HGV movements. HGVs will typically arrive and depart in the morning.

4.2.2 There will also be up to 13 external staff / maintenance staff / visitors as part of standard operations of the data centre. It should be noted that whilst a maximum of up to 13 external staff / maintenance staff / visitors may attend the data centre on a given day this would be a seldom occurrence, with typically 5 external staff / maintenance staff / visitors per day.

4.2.3 Maintenance staff will consist of staff conducting routine inspections and checks, and staff will most likely arrive and depart from the Application Site within an hour or two, early in the day. Maintenance vehicles will consist of cars and light goods vehicles (LGVs).

4.3 Refuse and Recycling Collection

4.3.1 Refuse and recycling collection will be undertaken from a ground floor level collection point. A suitable dropped kerb will be included in the design to allow bins to be safely transitioned from the collection points to road level at the rear of the collection vehicle.

4.3.2 Refuse vehicles will access the Application Site in forward gear. The site layout has been designed to accommodate the manoeuvre of articulated HGVs within the Application Site, and a refuse vehicle will be able to navigate through the Application Site to the refuse collection point. The vehicle will then exit in a forward gear once collection has been undertaken.

4.3.3 In order to reduce the time spent on site by refuse collectors, the waste bins will be pre-positioned at ground floor level ready for collection. The building manager will liaise with the refuse collection operator to confirm the time period within which refuse and recycling collection would take place.

4.3.4 The proposals provide for a waste and recycling strategy that accords with guidance and good practice in terms of storage and collection. It is also noted that the proposed strategy will co-ordinate the collections and minimise the time refuse vehicles will remain on the Application Site.

4.4 Proposed Delivery / Servicing Route

4.4.1 Servicing and deliveries associated with the operation of the data centre would primarily comprise refuse vehicles and deliveries. All deliveries and servicing will be pre-booked in advance. Where

possible, deliveries and servicing should be undertaken during off peak hours where feasible to ensure that the impact on the local highway network is minimised.

4.4.2 When two or more HGVs are on site on the same day, delivery and servicing vehicles will be scheduled to, where possible, be staggered to minimise the impact of deliveries on the local highway network.

4.4.3 The Application site is currently served by one access point via a private road leading from the B4005 Brimble Hill, which is adjacent to the part of the site's western boundary. The private road has entry barriers restricting access into the site. This vehicular access will remain unchanged.

4.4.4 The Application site will include a controlled access enclosure involving a series of secure barriers, electronic bi-fold gates and an intercom system linked to the Security Gatehouse. The gatehouse will be manned 24 hours a day.

4.4.5 Vehicles accepted onto the site will pass through the security gates and past the security gatehouse. Vehicles rejected from site will turn inside the gates and back out onto the private internal access road, onto Brimble Hill.

4.4.6 Access will be from the east from the B4005 and the A346 wherever possible (unless the delivery / service vehicle is already on the B4005 to the west as part of its other activities).

4.5 Measures for Reducing Freight Trips

4.5.1 Details are provided of measures for reducing the number of trips required for servicing and deliveries to the Application Site. These have been worked up from available guidance documents and will ensure the development contributes towards sustainable freight deliveries.

4.5.2 The available guidance states that less frequent visits by companies that deliver to and / or collect from a business means that fewer journeys, and therefore less mileage and CO2, will be associated with the Application Site.

4.5.3 In order to reduce the number of goods vehicles visiting the Application Site, the following measures will be considered:

- Appropriate interior design to allow the provision of suitable storage space to maximise the size of deliveries;
- Awareness of all vehicle activity associated with the procurement process, its impacts and appropriate measures to reduce it and optimise the delivery process;
- Commitment to safer, more efficient and more environmentally friendly distribution by contracting operators registered with a best practice scheme, such as Fleet Operator Recognition Scheme;
- Move deliveries outside of peak and normal commuting hours, and provide onsite staff to receive the deliveries;
- Implement a vehicle booking / management system, which will manage deliveries away from peak hours and minimise congestion by giving each delivery a timeslot;
- Establish a central ordering system, where feasible, to reduce the likelihood of different suppliers being used for the same products, or of numerous orders being made to the same company; and
- Ongoing review of delivery and collection frequencies; and
- Ensuring that local suppliers are considered where feasible and cost effective.

4.6 Summary

4.6.1 The proposed replacement data centre is not expected to have a significant number of daily servicing and delivery trips. The proposed delivery route has been devised to minimise the impact of the development on the local highway network. A number of measures will be implemented to further minimise the impact on the local highway network.

5 SUPPLIER CONTRACTUAL OBLIGATIONS

5.1.1 Contracts with relevant suppliers will be reviewed and monitored on a regular basis to ensure that they are contributing towards reducing the number of freight trips.

6 REFERENCES

Ministry of Housing, Communities and Local Government, 2019. National Planning Policy Framework (NPPF)

Transport for London, 2011. Delivery and Servicing Plans: Making Freight Work for You

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Annex D

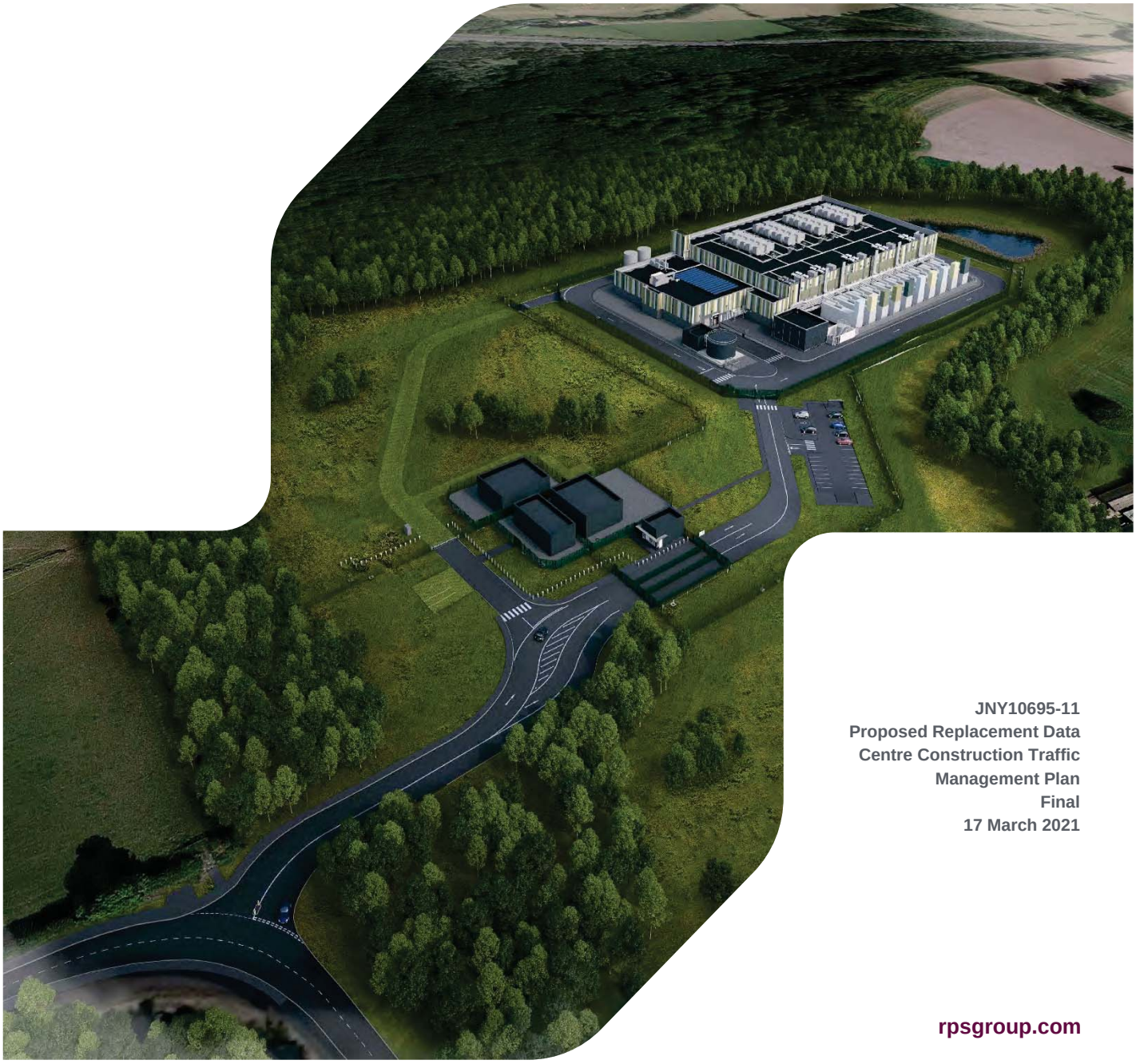
Construction Traffic Management Plan

PROPOSED REPLACEMENT DATA CENTRE

CONSTRUCTION TRAFFIC MANAGEMENT PLAN

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton, Swindon

20305S-RPS-XX-XX-RP-P-9731



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Prepared for:

Mullhaven Properties LLC

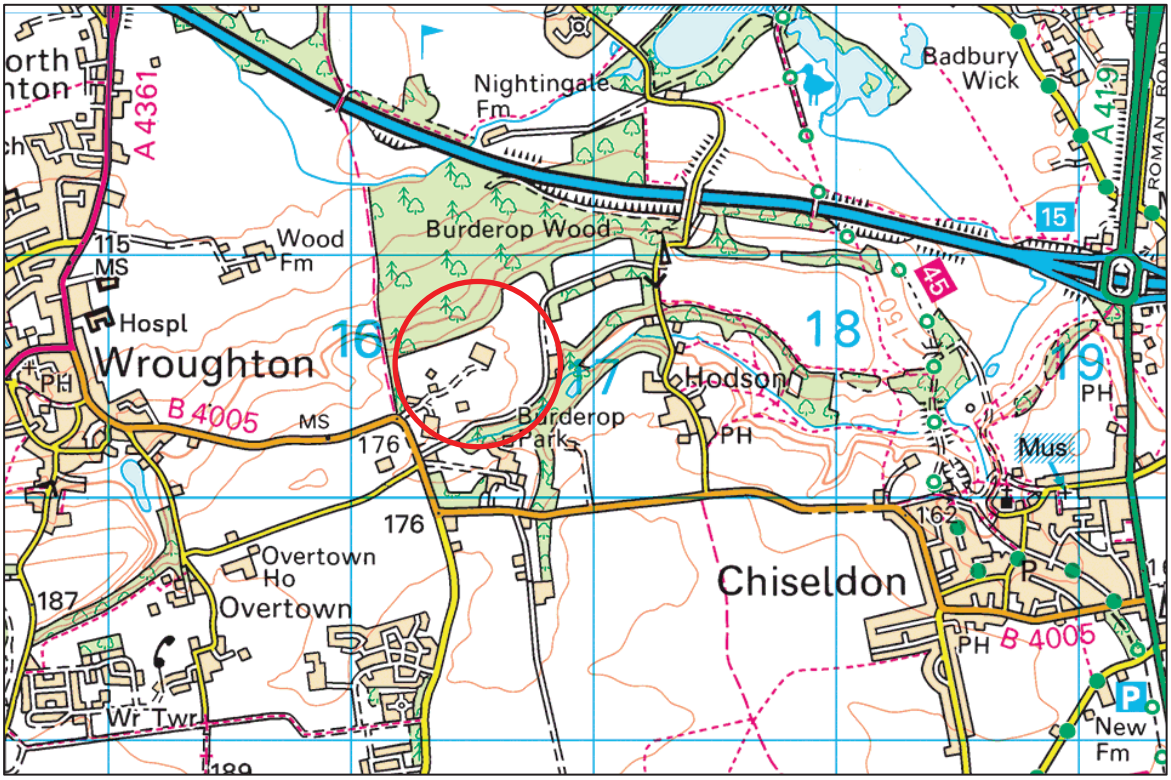
Contents

1 INTRODUCTION

1.1.1 This Construction Traffic Management Plan (CTMP) has been prepared by RPS to support a planning application for the redevelopment of land at the National Data Centre, located at the Old Burderop Hospital site, Brimble Hill, Wroughton (the Application Site) This CTMP accompanies the Environmental Statement (ES) and a suite of technical reports forming part of the application for a replacement data centre and associated infrastructure (the proposed development).

1.1.2 The Application Site location is shown on Figure 1 and lies within the administrative area of Swindon Borough Council (SBC). Swindon is located approximately 1.2km to the north of the site. The site is currently accessed via the existing access on the western boundary of the site leading onto the B4005 Brimble Hill.

Figure 1: Site Location



1.2 Context and Scope

1.2.1 The principal aim of this CTMP is to ensure that the construction works are organised and delivered in a manner that safeguards the highway impact, highway safety and amenity of the area surrounding the site.

1.3 CTMP Structure

- **Section 2** summaries the different phases of work and sets out the construction process and working hours;
- **Section 3** outlines the anticipated composition and volume of traffic during the construction phase of the Development along with the proposed routing of traffic;

- **Section 4** provides an appraisal of the identified construction route, having regard to current design guidance in combination with the volume and type of traffic generated by the proposed development;
- **Section 5** focuses on the proposals to ensure that a suitable management strategy and structure is in place to control activity on the Application Site and to ensure a suitable reporting procedure for local residents and stakeholders; and
- **Section 6** outlines the Construction Worker Travel Plan measures.

2 CONSTRUCTION PROCESS

2.1.1 This section outlines the proposed indicative development schedule, construction methodology and the way in which deliveries will be controlled with regards to the local highway network.

2.2 Delivery of Plant and Materials

2.2.1 The construction phase (including demolition) is estimated to take 10 – 12 months to complete and will comprise external construction and civils activities. At the end of that period all external construction activities and civils work will be completed, including:

- Demolition of Beta/Gamma and Alpha buildings;
- Hard and soft landscaping;
- Security and access areas;
- Perimeter fencing;
- Internal access roads and car parking areas;
- Drainage and attenuation; and
- The shell and core construction of the main data centre building and administration block.

2.2.2 The construction phase will be followed by the installation and testing of the IT equipment (data storage and data processing technology) and then the creation of the data networks and various cloud computing services that will operate from the facility. These are then tested prior to becoming available for Customer data. Note the applicant will not fully deploy all the IT and data storage equipment across the entire facility. Instead the data servers are deployed on a phased basis, determined by Customer demand. The reason for this is that having unused data servers and associated mechanical and electrical support systems would unnecessarily consume energy and also require ongoing maintenance and servicing. Thus, they are deployed close to the anticipated Customer needs.

2.2.3 Fitout works associated with these subsequent phases will primarily be carried out inside the completed building and be of circa 6 months duration. There will be limited external works involving the installation of generator sets and roof mounted mechanical equipment, associated with that phase. The principal foundations for each generator set will be built during the main construction period, as described above.

2.2.4 All materials and plant associated with the development process will be stored within the footprint of the Application Site. A loading and unloading area for plant and materials will be provided within the site boundary. It is anticipated that the majority of deliveries will be made via articulated low loader vehicles and rigid HGVs.

2.3 Working Hours

Normal Working Hours

2.3.1 Working hours will be conducted as per the below:

- Monday to Friday - 07:00 to 19:00.
- Saturday – 07:00 to 14:30.
- Sunday and Bank Holidays - no working.

2.3.2 Construction traffic management will seek to minimise vehicle movements during the network peak hours.

Activities Outside Normal Working Hours

2.3.3 Non-noisy activities such as the internal fit out of buildings may be undertaken outside of the normal working hours, where these activities will not cause disturbance off site and construction HGV movements would not occur.

3 CONSTRUCTION TRAFFIC GENERATION

3.1.1 This section sets out the estimated volume and type of vehicles that will be generated throughout the construction phase of the development. This information has been used in subsequent sections that consider the geometry and safety of the adjoining highway networks, in order to inform the suite of management measures proposed.

3.1.2 It should be noted that the construction programme and corresponding construction traffic strategy may be subject to change following the appointment of a Principal Contractor and prior to work commencing on the Application Site. Any substantial changes in the build program and / or number of vehicular movements will be communicated to Swindon Borough Council (SBC) in advance of construction.

3.2 Construction Vehicles

3.2.1 The trip generation potential of the construction phase of development has been informed though discussion with the Applicant on the anticipated construction programme and is based on experience of delivering similar developments in the United Kingdom.

3.2.2 The construction period is anticipated to last for up to 12 months, commencing in early Q3 2021 shortly after granting of consent. Construction will consist of a mixture of construction staff vehicle movements, LGVs and HGVs. Using data derived from a similar data centre construction as received from the prospective operator, the following numbers have been derived:

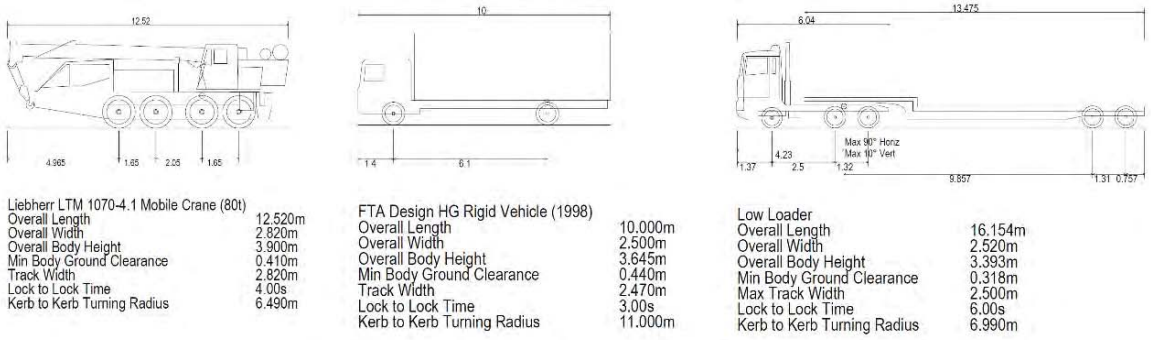
- An average of 275 construction staff on site per day,
- A peak (first 3 months of construction) of 400 construction staff per day;
- An average of 50% of staff as car drivers with the remaining 50% car sharing and arriving by sustainable means of transport;
- Taking into account 50% of construction staff will car share or arrive by sustainable means of transport, an average of 138 construction staff vehicles on site, equating to 275 two-way vehicle movements per day (accounting for one arrival and one departure);
- Taking into account 50% of construction staff will car share or arrive by sustainable means of transport, a peak (during first 3 months of construction) of 200 construction staff vehicles on site, equating to 400 two-way vehicle movements per day (accounting for one arrival and one departure);
- An average of 75 HGVs on site per day, equating to 150 two-way HGV movements per day;
- A peak (during first 3 months of construction) of 110 HGVs on site per day, equating to 220 two-way HGV movements per day; and
- A peak (during first 3 months of construction) of 30 LGVs on site per day, equating to 60 two-way LGV movements per day.

3.2.3 Deliveries are expected to fluctuate during the construction this period. It is envisaged that the majority of movements would be Monday to Friday with only a limited number of movements on Saturdays.

3.3 Construction Vehicle Types

3.3.1 It is noted that a variety of vehicles will need to access the Application Site during construction. These will include articulated HGVs, rigid HGVs and crane associated with delivering the requisite materials. The typical dimensions of the vehicle types are shown on **Figure 2**.

Figure 2: Vehicle Dimensions



Liebherr LTM 1070-4.1 Mobile Crane (80t)	
Overall Length	12.520m
Overall Width	2.820m
Overall Body Height	3.900m
Min Body Ground Clearance	0.410m
Track Width	2.820m
Lock to Lock Time	4.00s
Kerb to Kerb Turning Radius	6.490m

FTA Design HG Rigid Vehicle (1998)	
Overall Length	10.000m
Overall Width	2.500m
Overall Body Height	3.645m
Min Body Ground Clearance	0.440m
Track Width	2.470m
Lock to Lock Time	3.00s
Kerb to Kerb Turning Radius	11.000m

Low Loader	
Overall Length	16.154m
Overall Width	2.520m
Overall Body Height	3.393m
Min Body Ground Clearance	0.318m
Max Track Width	2.500m
Lock to Lock Time	6.00s
Kerb to Kerb Turning Radius	6.990m

3.4 Delivery Vehicle Dwell Times

3.4.1 Delivery vehicles are likely to attend the Application Site for up to a maximum of approximately one hour per vehicle, depending upon the load being unloaded or loaded. There will be sufficient space within the curtilage of the site to ensure that no vehicles would have to wait on the surrounding highway network.

3.5 Construction Staff and Parking

3.5.1 During construction, there is a balance to be made between the intensity of on-site activity and duration of activity. It has been advised by the Applicant, using data from the construction of another Data Centre, that the average number of construction staff on site will be approximately 275, with a peak of 400 staff on site.

3.5.2 Experience of similar developments elsewhere suggests that where car sharing is promoted by the Principal Contractor the number of cars brought to site reduces. This will be achieved through management of staff travel patterns and actively encouraging car sharing as set out further in **Section 6.**

3.5.3 Most construction staff are anticipated to arrive at the site during the 30-minute period preceding the start of the operating day and depart during the 30-minute period that follows the end of the operating day. Staff trips are likely to travel to / from different origins / destinations and hence spread their movement across the highway network.

3.5.4 Provision will be made to ensure that vehicles are able to park on the Application Site to avoid obstruction to the operation of the public highway. This shall be strictly enforced.

3.5.5 **Section 6** sets out full details on construction worker trips and also contains a Construction Worker Travel Plan that seeks to minimise construction workers' travel.

4 CONSTRUCTION VEHICLE ACCESS AND ACCESS ROUTE

4.1.1 The construction and operational vehicle access to the Application Site is to be taken from the existing access on the south-western corner of the site, accessed via the B4005 which connects the site to the wider highway network. This is shown on the proposed site masterplan at **Annex A** of the Transport Assessment (20305S-RPS-00-XX-RP-P-9724)

4.2 Construction Traffic Routeing

4.2.1 The majority of construction traffic will route via the M4, with the potential for some local contractors to route from Swindon.

4.2.2 All construction traffic routeing from the M4 will exit at junction 15, and route south on the A346 and along the B4005. This will be the primary route for all construction traffic, as it utilises a network of A and B classification roads between the M4 and the site.

4.2.3 It is considered that the proposed routeing minimises the use of minor roads and maximises the use of the strategic and principal roads. It is proposed that temporary signage is used to direct construction traffic to the site along the proposed construction traffic route utilising existing street furniture.

4.2.4 A construction compound area will provide an area for loading and unloading of vehicles and will provide a turning area to allow vehicles to exit the site in forward gear. All delivery drivers and construction workers will be advised of the construction route prior to making their delivery or commencing work by the Site Manager. This may be in the form of route maps.

4.2.5 It is considered appropriate to avoid routes where scheduled road works and construction vehicles could conflict. The Site Manager will keep up to date on scheduled roadworks in the area using the one.network website. Any major roadworks on the preferred route that result in the deviation of the preferred route will be agreed with officers at SBC in advance.

4.3 Construction Access

4.3.1 The site is currently served by one access point via a private road leading from Brimble Hill Road (B4005) which is adjacent to the part of the site's western boundary. The private road has entry barriers restricting access into the site. This vehicular access will remain unchanged.

4.3.2 The site will include a controlled access enclosure involving a series of secure barriers, electronic bi-fold gates and an intercom system linked to the Security Gatehouse.

4.3.3 Vehicles accepted onto the site will pass through the security gates and past the security gatehouse. Vehicles rejected from site will turn inside the gates and back out onto the private internal access road, onto Brimble Hill.

4.4 Access Visibility

4.4.1 Visibility splays can be achieved at the site access for the speed of vehicles along the B4005 Brimble Hill; however, it is proposed that temporary signage also be located in the vicinity of the site access during the construction period to warn drivers of the site entrance, as shown on **Plate 1.** The exact location will be determined by the Site Manager.

Plate 1: Temporary Signage at Site Access

4.5 Highway Safety

4.5.1 Personal Injury Accident (PIA) data has been obtained from Crashmap for the latest available five-year period, for the period between 1 January 2015 and 31 December 2019. The study area includes the B4005 from the Overtown Hill junction in south Wroughton, to the Burderop Barns junction to the southeast.

4.5.2 There have been three slight injury accidents recorded within the study area during the five-year analysis period. These all occurred at different locations and there were no clusters of injury accidents. This combined with the low number of injury accidents suggests there are no aspects with the local highway network that contributes to a road safety issue that needs to be accounted for in this CTMP.

5 MEASURES, MANAGEMENT AND CONTROL PROCESSES

5.1.1 This section sets out the measures, management structure and control processes that will be put in place to implement, monitor and manage the CTMP. The Site Manager will be responsible for the site works which will ensure that the control processes are efficiently implemented.

5.2 Public Rights of Way

5.2.1 There is a Public Rights of Way (PRoW) adjacent to the development site; however, construction works will not cross the PRoW and will be unaffected by the construction works. Thus, no management measures are required for PRoW in relation to the construction works.

5.3 Ongoing Review of Access Routes

5.3.1 As aforementioned, it is considered appropriate to avoid routes where scheduled road works and construction vehicles could conflict. Any major roadworks on the access routes that result in the deviation of the route will be agreed with officers at SBC in advance where feasible.

5.4 Transport Co-ordination

5.4.1 The Applicant will appoint a Site Manager to be confirmed in April 2021, or the construction of the proposed development and the details will be provided to SBC once confirmed. The Site Manager for the proposed development will undertake the transport co-ordination role for the site. In this respect, their main responsibilities will include:

- Managing the implementation of the CTMP;
- Vehicle scheduling (including potentially avoiding deliveries arriving or departing during peak school pick-up and drop-off hours);
- Checking for scheduled road works on one.network;
- Checking for scheduled refuse collections to avoid conflict with HGV deliveries within built up areas;
- Handling any complaints; and
- Acting as a point of contact for employees, contractors and the general public.

5.4.2 The Site Manager will ensure that there is adequate liaison between the following key stakeholders throughout the construction period:

- The Contractor;
- The Applicant;
- Site neighbours;
- Other local stakeholders such as emergency services or local transport providers; and
- SBC.

5.4.3 Regular review meetings and telecommunication will be held between the Site Manager and SBC if requested. It is envisaged that update meetings / telecommunication will be held on an ad-hoc basis as required. Furthermore, the Site Manager will provide delivery schedules, complaints or breaches of agreements to SBC if requested.

5.5 Booking System

5.5.1 On a weekly basis, the Site Manager will evaluate details of the daily profile of deliveries proposed for the upcoming week. Through discussions with hauliers the Site Manager will, as far as practicable, ensure that the deliveries are spread out across the week and across the day to minimise potential disruption.

5.5.2 The proposed deliveries will be checked against the weekly delivery schedule. This will be overseen by the Site Manager to ensure that construction deliveries are managed in an efficient manner with minimal disruption and delays.

5.5.3 Hauliers will be required to contact the Site Manager to give an indicative delivery time to ensure that the delivery space and banksmen (if required) are ready for their arrival onsite.

5.5.4 Where possible, sufficient time will be given between deliveries to allow for any delays as a result of the delivery vehicle getting stuck in traffic or the loading / unloading taking longer than expected and to avoid any vehicles waiting.

5.5.5 The Site Manager will ensure banksmen are on hand to assist with the manoeuvring of delivery vehicles throughout the Site. The construction compound will be located off the public highway within the site, accessed via the internal access road.

5.5.6 Where possible, all deliveries by goods vehicles (>3.5 tonnes) will be undertaken outside of the highway peaks of 08:00 to 09:00 and 17:00 to 18:00. Where practicable, vehicles ready to depart the Site during these periods shall be held back within the compound area until the appropriate time has passed.

5.6 Route Compliance

5.6.1 Use of the agreed vehicle routes shall be included as a contractual requirement of the Contractor and will be communicated to all drivers. This will include information on the times of operation, delivery routes and the vehicle booking system.

5.7 Construction Compound

5.7.1 The construction compound will provide an area for loading and unloading of vehicles and provide a turning area to allow vehicles to exit the site in forward gear. The vehicle compound will be capable of accommodating a turning vehicle whilst at least one vehicle is parked, to allow for vehicles to be held back during restricted periods and ensure no vehicles wait on the public highway.

5.8 Wheel Wash

5.8.1 A wheel washing facility will be provided for the duration of the construction works to ensure levels of soil on roadways near the Application Site is minimised.

5.8.2 HGVs will be required to use the wheel washing facility before leaving the Application Site, and the Principal Contractor will ensure that the area around the site including the public highway is regularly and adequately swept to prevent any accumulation of dust and dirt.

6 CONSTRUCTION TRAVEL PLAN

6.1.1 A Travel Plan is a package of measures aimed at promoting greener, cleaner travel choices and reducing reliance on the private car. It enables employers to reduce the impact of travel on the environment, whilst also bringing a number of other benefits to the organisation as an employer and to staff.

6.1.2 This Construction Worker Travel Plan seeks to address activities related to the construction of the site which includes commuter journeys for construction workers, material supplies and deliveries. By successfully addressing these different types of travel by promoting travel via sustainable modes and sourcing labour and goods locally where feasible, the Travel Plan objectives can be achieved.

6.2 Trip Generation

6.2.1 From experience of constructing other data centres, the Applicant estimates that there may be up to 400 construction staff on site per day (equating to 200 vehicles), with an average of 275 construction staff on site per day (equating to 138 vehicles). This equates to 50% of staff arriving as car drivers, with the remainder as car passengers and using public transport.

6.2.2 Car sharing will be achieved through management of staff travel patterns and actively encouraging car sharing. As such the Site Manager will actively promote the use of car sharing as the primary method for construction workers to access the site.

6.3 Existing Conditions

6.3.1 The Application Site will connect to the local pedestrian network via the B4005 Brimble Hill, which provides a footway on its southern side. The combined footway connects to the pedestrian network within Wroughton (and subsequently to Swindon) to the west and to Chiseldon to the east.

6.3.2 Public bridleway WR36 is located adjacent to the western border of the Application Site. The public bridleway routes from the B4005 to the south, routeing north to the B4006 Pipers Way in south Swindon.

6.3.3 The nearest bus stops to the Application Site are located approximately 100m west of the site access on the B4005 Brimble Hill. These stops provide access to the 82 and 83 bus services.

6.3.4 The Principal Contractor, where feasible, will seek to recruit construction workers from the local area. This will help maximise the potential for construction workers to walk and cycle to the Application Site.

6.3.5 There is potential for construction workers to car share to work, especially given the fact that some sub-contractors are likely to be travelling from the same origin (their local residence) to the same destination (the site).

6.3.6 Car sharing represents a relatively convenient form of travel offering a significant potential to reduce overall private mileage of construction workers. It is this mode of transport which often forms one of the most convenient methods of sustainable travel for construction workers.

6.3.7 The Site Manager would promote a car-sharing scheme throughout the construction programme. The Site Manager would also make construction workers aware of existing car sharing schemes such as liftshare.com/uk.

6.3.8 The Site Manager will determine construction staff members' willingness to car share. Furthermore, looking at workers home / local residence postal addresses it would become evident whether there are any area groupings of people that would make the principle of car sharing a

reasonable prospect of being successful. The Site Manager will then investigate setting up a database of construction workers willing to share journeys, including information such as their home / local residence addresses and could try and match suitable car sharers. This process will be the responsibility of the Site Manager.

6.3.9 The Application Site will provide facilities in accordance with requirements set out in Health and Safety Executive guidelines. The facilities will include: a drying room, storage facilities, toilets, offices and kitchen facilities within the welfare area. This will encourage people to travel to the Application Site by sustainable modes whilst having the added benefit of reducing the number of trips made off site during lunch breaks.

6.4 Aims and Targets

6.4.1 The site is a construction site and sustainable transport measures will be adopted. Construction worker parking at the site will be monitored, controlled and recorded by the Site Manager to ensure that single occupancy car use is minimised. The Site Manager will ensure there is space made available for any overspill parking during the early periods of construction.

6.4.2 This CTMP and Travel Plan will be communicated to all construction workers as part of their induction / training process. An up to date copy of this CTMP and Travel Plan will always be available for consultation.

6.5 Measures

6.5.1 As indicated above, there is potential for construction workers to car share or travel by bicycle to the site. It is therefore deemed appropriate to promote the following measures to promote sustainable travel by construction staff:

- Include local public transport timetables and route maps within the on-site compound for construction staff to review;
- Providing changing and storage facilities for construction staff;
- Assist in matching car sharers; and
- Minimise, where possible, the number of contractors on site at any one time to reduce trips generated and promote car sharing.

6.6 Review

6.6.1 The Site Manager will be responsible for reviewing all matters on a six-monthly basis to determine if alterations to the CTMP measures are required in terms of optimisation.

Contact

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transport@rpsgroup.com

Annex E

Staff Trip Generation

08:00 - 17:	3 to 4	17:00 - 08:	3 to 4
07:00 - 19:	5 to 26	19:00 - 07:	2 to 3
Typically a	2 to 15	N/A	N/A
Day shift	10 to 45	Night Shift	5 to 7
		15 - 52	

08:00 - 17:	4	17:00 - 08:	4
07:00 - 19:	26	19:00 - 07:	3
Typically a	13	N/A	N/A
Day shift	43	Night Shift	7
		50	

08:00 - 17:	4	17:00 - 08:	4
07:00 - 19:	26	19:00 - 07:	3
Typically a	13	N/A	N/A
Day shift	45	Night Shift	7
		52	

HGVs per day

Person trip 1 unit

Time Begin	Hourly Staff Trip Generation		
	Arrivals	Departures	Two Way
	Person Movement		
00:00			
01:00			
02:00			
03:00			
04:00			
05:00			
06:00	26		26
07:00	17	3	20
08:00		4	4
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00		13	13
16:00	4		4
17:00		4	4
18:00	3		3
19:00		26	26
20:00			
21:00			
22:00			
23:00			
Total	50	50	100

Annex F

Census Journey to Work Data

WP703EW - Method of travel to work (2001 specification) (Workplace population)

population	All usual residents aged 16 to 74 in employment in the area the week before the census
units	Persons
area type	2011 super output areas - middle layer
area name	E02003236 : Swindon 025

Method of travel to work	**2011**				50	staff	45	staff
All categories: Method of travel	3,734							
Work mainly at or from home	600		**New Staff**	**Extant**				
Underground, metro, light rail o	1	0.0%	0	0				
Train	21	0.7%	0	0				
Bus, minibus or coach	171	5.5%	3	2				
Taxi	18	0.6%	0	0				
Motorcycle, scooter or moped	35	1.1%	1	1				
Driving a car or van	2,301	73.4%	37	33				
Passenger in a car or van	169	5.4%	3	2				
Bicycle	83	2.6%	1	1				
On foot	319	10.2%	5	5				
Other method of travel to work	16	0.5%	0	0				
	3,134	**100%**	**50**	**45**				

In order to protect against disclosure of personal information, records have been swapped between different geographic areas. Some counts will be affected, particularly small counts at the lowest geographies

Annex G

Staff Distribution

usual residence : 2011 super output area - middle layer	E02003236 : Swindon 025	M4 East	M4 West	A419	A346 South	B4005 West (from
E02000193 : Camden 028	3	3				
E02000204 : Croydon 011	1	1				
E02000390 : Hammersmith and Fulham 019	1	1				
E02000393 : Hammersmith and Fulham 022	1	1				
E02000395 : Hammersmith and Fulham 024	1	1				
E02000544 : Hounslow 019	1	1				
E02000620 : Lambeth 003	1	1				
E02000627 : Lambeth 010	1	1				
E02000658 : Lewisham 006	1	1				
E02000696 : Merton 008	1	1				
E02000787 : Richmond upon Thames 004	1	1				
E02000805 : Richmond upon Thames 022	1	1				
E02000822 : Southwark 016	1	1				
E02000827 : Southwark 021	1	1				
E02000834 : Southwark 028	1	1				
E02000868 : Tower Hamlets 005	1	1				
E02000876 : Tower Hamlets 013	1	1				
E02001169 : Salford 013	1			1		
E02001428 : St. Helens 023	1			1		
E02001958 : Coventry 001	1			1		
E02002007 : Dudley 008	1			1		
E02002559 : Darlington 001	1			1		
E02002909 : Herefordshire 005	1			1		
E02002945 : Telford and Wrekin 018	1			1		
E02002988 : Bath and North East Somerset 004	1					1
E02002989 : Bath and North East Somerset 005	1					1
E02002991 : Bath and North East Somerset 007	1					1
E02002994 : Bath and North East Somerset 010	2					2
E02002999 : Bath and North East Somerset 015	2					2
E02003002 : Bath and North East Somerset 018	1					1
E02003003 : Bath and North East Somerset 019	1					1
E02003007 : Bath and North East Somerset 023	1					1
E02003009 : Bath and North East Somerset 025	1					1
E02003022 : Bristol 011	1					1
E02003026 : Bristol 015	1					1
E02003027 : Bristol 016	2					2
E02003033 : Bristol 022	1					1
E02003034 : Bristol 023	1					1
E02003037 : Bristol 026	2					2
E02003041 : Bristol 030	1					1
E02003043 : Bristol 032	2					2
E02003044 : Bristol 033	1					1
E02003049 : Bristol 038	1					1
E02003051 : Bristol 040	1					1
E02003055 : Bristol 044	1					1
E02003060 : Bristol 049	1					1
E02003068 : North Somerset 004	1					1
E02003092 : South Gloucestershire 003	2					2
E02003093 : South Gloucestershire 004	1					1
E02003094 : South Gloucestershire 005	1					1
E02003096 : South Gloucestershire 007	2					2
E02003097 : South Gloucestershire 008	1					1
E02003098 : South Gloucestershire 009	1					1
E02003103 : South Gloucestershire 014	1					1
E02003106 : South Gloucestershire 017	1					1
E02003107 : South Gloucestershire 018	3					3
E02003110 : South Gloucestershire 021	2					2
E02003112 : South Gloucestershire 023	1					1
E02003113 : South Gloucestershire 024	2					2
E02003114 : South Gloucestershire 025	1					1
E02003115 : South Gloucestershire 026	1					1
E02003121 : South Gloucestershire 032	1					1
E02003152 : Plymouth 031	1					1
E02003199 : Poole 006	1	1				
E02003202 : Poole 009	1	1				
E02003212 : Swindon 001	30			30		

E02003214 : Swindon 003	26					26
E02003215 : Swindon 004	39					39
E02003216 : Swindon 005	32					32
E02003217 : Swindon 006	24					24
E02003218 : Swindon 007	34					34
E02003219 : Swindon 008	35			17.5		17.5
E02003220 : Swindon 009	56			28		28
E02003221 : Swindon 010	37					37
E02003222 : Swindon 011	51					51
E02003223 : Swindon 012	74					74
E02003224 : Swindon 013	59			59		
E02003225 : Swindon 014	40					40
E02003226 : Swindon 015	36					36
E02003227 : Swindon 016	29					29
E02003228 : Swindon 017	61					61
E02003229 : Swindon 018	55					55
E02003230 : Swindon 019	80					80
E02003231 : Swindon 020	52			52		
E02003232 : Swindon 021	88					88
E02003233 : Swindon 022	74					74
E02003234 : Swindon 023	81			81		
E02003235 : Swindon 024	82					82
E02003236 : Swindon 025	603				120.6	482
E02003367 : West Berkshire 001	2	2				
E02003368 : West Berkshire 002	5	5				
E02003370 : West Berkshire 004	2	2				
E02003371 : West Berkshire 005	1	1				
E02003372 : West Berkshire 006	1	1				
E02003373 : West Berkshire 007	1	1				
E02003376 : West Berkshire 010	7	7				
E02003377 : West Berkshire 011	5	5				
E02003379 : West Berkshire 013	1	1				
E02003380 : West Berkshire 014	2	2				
E02003381 : West Berkshire 015	1	1				
E02003384 : West Berkshire 018	1	1				
E02003386 : West Berkshire 020	1	1				
E02003387 : West Berkshire 021	3	3				
E02003389 : Reading 001	1	1				
E02003392 : Reading 004	3	3				
E02003399 : Reading 011	2	2				
E02003400 : Reading 012	2	2				
E02003404 : Reading 016	1	1				
E02003405 : Reading 017	1	1				
E02003440 : Wokingham 002	1	1				
E02003441 : Wokingham 003	1	1				
E02003444 : Wokingham 006	1	1				
E02003446 : Wokingham 008	3	3				
E02003447 : Wokingham 009	1	1				
E02003449 : Wokingham 011	4	4				
E02003451 : Wokingham 013	1	1				
E02003455 : Wokingham 017	1	1				
E02003533 : Portsmouth 010	1	1				
E02003557 : Southampton 009	1	1				
E02003693 : South Bucks 006	1	1				
E02003694 : South Bucks 007	1	1				
E02003701 : Wycombe 006	1	1				
E02003912 : Cornwall 048	1		1			
E02003993 : Carlisle 007	1			1		
E02004244 : East Dorset 002	1				1	
E02004263 : Purbeck 001	1				1	
E02004600 : Cheltenham 001	1			1		
E02004604 : Cheltenham 005	1			1		
E02004605 : Cheltenham 006	1			1		
E02004606 : Cheltenham 007	3			3		
E02004609 : Cheltenham 010	2			2		
E02004610 : Cheltenham 011	1			1		
E02004611 : Cheltenham 012	2			2		

E02004614 : Cheltenham 015	1			1	
E02004616 : Cotswold 002	1			1	
E02004618 : Cotswold 004	1			1	
E02004619 : Cotswold 005	5			5	
E02004620 : Cotswold 006	5			5	
E02004621 : Cotswold 007	8			8	
E02004622 : Cotswold 008	7			7	
E02004623 : Cotswold 009	5			5	
E02004624 : Cotswold 010	9			9	
E02004625 : Cotswold 011	3			3	
E02004634 : Forest of Dean 009	1			1	
E02004635 : Forest of Dean 010	1			1	
E02004636 : Gloucester 001	1			1	
E02004645 : Gloucester 010	1			1	
E02004651 : Stroud 001	1			1	
E02004652 : Stroud 002	1			1	
E02004653 : Stroud 003	1			1	
E02004657 : Stroud 007	4			4	
E02004658 : Stroud 008	4			4	
E02004661 : Stroud 011	1			1	
E02004665 : Stroud 015	1			1	
E02004671 : Tewkesbury 006	1			1	
E02004676 : Basingstoke and Deane 002	1	1			
E02004679 : Basingstoke and Deane 005	1	1			
E02004704 : East Hampshire 008	1	1			
E02004720 : Eastleigh 009	1	1			
E02004749 : Gosport 009	1	1			
E02004752 : Hart 002	1	1			
E02004758 : Hart 008	1	1			
E02004807 : Rushmoor 006	1	1			
E02004814 : Test Valley 001	3				3
E02004818 : Test Valley 005	1				1
E02004822 : Test Valley 009	1				1
E02004826 : Test Valley 013	1				1
E02004830 : Winchester 002	1	1			
E02004837 : Winchester 009	2	2			
E02005085 : Maidstone 018	1	1			
E02005349 : Charnwood 005	1			1	
E02005354 : Charnwood 010	1			1	
E02005546 : Great Yarmouth 009	1			1	
E02005602 : South Norfolk 006	1			1	
E02005691 : South Northamptonshire 011	1			1	
E02005922 : Cherwell 002	1			1	
E02005951 : Oxford 012	2			2	
E02005961 : South Oxfordshire 004	1			1	
E02005966 : South Oxfordshire 009	1			1	
E02005975 : South Oxfordshire 018	2			2	
E02005978 : Vale of White Horse 001	2	2			
E02005980 : Vale of White Horse 003	1	1			
E02005981 : Vale of White Horse 004	1	1			
E02005982 : Vale of White Horse 005	2	2			
E02005986 : Vale of White Horse 009	8	8			
E02005987 : Vale of White Horse 010	2	2			
E02005991 : Vale of White Horse 014	1	1			
E02005992 : Vale of White Horse 015	3	3			
E02005996 : West Oxfordshire 004	1			1	
E02006002 : West Oxfordshire 010	1			1	
E02006004 : West Oxfordshire 012	3			3	
E02006006 : West Oxfordshire 014	1			1	
E02006080 : South Somerset 006	1		1		
E02006095 : South Somerset 021	1		1		
E02006105 : Taunton Deane 007	1		1		
E02006291 : Suffolk Coastal 005	2	2			
E02006499 : Rugby 008	2			2	
E02006513 : Stratford-on-Avon 010	1			1	
E02006520 : Warwick 002	1			1	
E02006536 : Adur 003	1	1			

E02006538 : Adur 005	1	1				
E02006565 : Chichester 005	1	1				
E02006571 : Chichester 011	1	1				
E02006614 : Mid Sussex 011	1	1				
E02006634 : Wiltshire 012	47				24	24
E02006635 : Wiltshire 019	36		18			18
E02006636 : Wiltshire 024	20				20	
E02006637 : Wiltshire 025	8					8
E02006638 : Wiltshire 026	8					8
E02006639 : Wiltshire 028	6					6
E02006640 : Wiltshire 029	7					7
E02006641 : Wiltshire 034	8					8
E02006642 : Wiltshire 038	6				6	
E02006643 : Wiltshire 041	2				2	
E02006644 : Wiltshire 001	23			23		
E02006645 : Wiltshire 002	19					19
E02006646 : Wiltshire 003	22			22		
E02006647 : Wiltshire 004	25					25
E02006648 : Wiltshire 005	13		6.5			6.5
E02006649 : Wiltshire 006	48					48
E02006650 : Wiltshire 007	51					51
E02006651 : Wiltshire 008	1		1			
E02006652 : Wiltshire 009	8		8			
E02006653 : Wiltshire 010	7		7			
E02006654 : Wiltshire 011	8		8			
E02006655 : Wiltshire 013	4		4			
E02006656 : Wiltshire 014	7		7			
E02006657 : Wiltshire 015	17					17
E02006658 : Wiltshire 016	16					16
E02006659 : Wiltshire 017	2		2			
E02006660 : Wiltshire 018	3		3			
E02006661 : Wiltshire 045	1				1	
E02006662 : Wiltshire 046	1				1	
E02006663 : Wiltshire 048	1				1	
E02006664 : Wiltshire 049	1				1	
E02006667 : Wiltshire 052	1				1	
E02006670 : Wiltshire 055	3				3	
E02006672 : Wiltshire 057	2				2	
E02006674 : Wiltshire 059	1				1	
E02006675 : Wiltshire 060	1				1	
E02006678 : Wiltshire 020	1				1	
E02006679 : Wiltshire 021	5				5	
E02006681 : Wiltshire 023	2				2	
E02006682 : Wiltshire 027	2				2	
E02006683 : Wiltshire 030	1				1	
E02006685 : Wiltshire 032	1				1	
E02006687 : Wiltshire 035	1				1	
E02006689 : Wiltshire 037	1				1	
E02006690 : Wiltshire 039	3				3	
E02006691 : Wiltshire 040	2				2	
E02006695 : Wiltshire 047	3				3	
E02006837 : Epsom and Ewell 010	1	1				
E02006840 : Torbay 019	2		2			
E02006847 : Swindon 026	62			62		
E02006848 : Swindon 027	41			41		
E02006849 : Swindon 028	36			36		
E02006886 : Vale of White Horse 016	28			28		
E02006890 : Bristol 057	1		1			
W02000107 : Powys 011	1			1		
W02000131 : Pembrokeshire 006	1		1			
W02000133 : Pembrokeshire 008	1		1			
W02000140 : Pembrokeshire 015	1		1			
W02000333 : Torfaen 011	1		1			
W02000342 : Monmouthshire 007	1		1			
W02000346 : Monmouthshire 011	2		2			
W02000347 : Newport 001	1		1			
W02000353 : Newport 007	1		1			

W02000388 : Cardiff 022	1		1			
W02000400 : Cardiff 034	1		1			
SUM	2704	122	82.5	584.5	214.1	1700.9
		4.5%	3.1%	21.6%	7.9%	62.9%
				29.2%		

Annex H

Traffic Flow Scenarios

Observed Traffic Flows					
Link Number	**Source**	**Location**	**Year**	**AADT**	**HGVs**
1	DfT	A346 between M5 and B4005	2019	18102	1073
2	DfT	A419 between the M5 and A4259	2019	63903	5864
3	DfT	M4 west of J15	2019	87934	9275
4	DfT	M4 east of J15	2019	95761	9439
5	ATC	B4005 Brimble Hill between the site and Burderop Barns	2016	5093	-
6	ATC	B4005 south of Burderop Park	2016	4627	-
7	Factored	B4005 West of the site	2016	5093	-

2021 Growthed Traffic Flows					
Link Number	**Source**	**Location**	**Year**	**AADT**	**HGVs**
1	DfT	A346 between M4 and B4005	2021	19013	1127
2	DfT	A419 between the M5 and A4259	2021	67120	6159
3	DfT	M4 west of J15	2021	92361	9742
4	DfT	M4 east of J15	2021	100582	9914
5	ATC	B4005 Brimble Hill between the site and Burderop Barns	2021	5349	-
6	ATC	B4005 south of Burderop Park	2021	4860	-
7	Factored	B4005 West of the site	2021	5349	-

2021 Baseline Traffic Flows					
Link Number	**Source**	**Location**	**Year**	**AADT**	**HGVs**
1	DfT	A346 between M4 and B4005	2021	19362	1127
2	DfT	A419 between the M5 and A4259	2021	67120	6159
3	DfT	M4 west of J15	2021	92361	9742
4	DfT	M4 east of J15	2021	100931	9914
5	ATC	B4005 Brimble Hill between the site and Burderop Barns	2021	5698	-
6	ATC	B4005 south of Burderop Park	2021	5209	-
7	Factored	B4005 West of the site	2021	5698	-

2021 Baseline + Development Traffic Flows					
Link Number	**Source**	**Location**	**Year**	**AADT**	**HGVs**
1	DfT	A346 between M4 and B4005	2021	19384	1139
2	DfT	A419 between the M5 and A4259	2021	67136	6163
3	DfT	M4 west of J15	2021	92363	9746
4	DfT	M4 east of J15	2021	100934	9918
5	ATC	B4005 Brimble Hill between the site and Burderop Barns	2021	5726	-
6	ATC	B4005 south of Burderop Park	2021	5236	-
7	Factored	B4005 West of the site	2021	5745	-

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PROPOSED REPLACEMENT DATA CENTRE

FLOOD RISK ASSESSMENT

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton, Swindon

Appendix 8.4

20305S-RPS-SI-XX-RP-D-9602

Replacement Data Centre
Flood Risk Assessment
Final
17 March 2021

rpsgroup.com

Approval for issue

Jonathan Morley	17 March 2021

Prepared by:

RPS

20 Farringdon Street
London, EC4A 4AB

Prepared for:

Mullhaven Propoerties LLC

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1 INTRODUCTION

1.1 Purpose of the Report

1.1.1 This site-specific Flood Risk Assessment (FRA) has been prepared on behalf of Mullhaven Properties LLC (the Applicant) to support their planning application for the redevelopment of land at the National Data Centre, located at the Old Burderop Hospital site, Brimble Hill, Wroughton (the Application Site) This FRA accompanies the Environmental Statement (ES) and a suite of technical reports forming part of the application for a replacement data centre and associated infrastructure (the proposed development).

1.1.2 The key objectives of this FRA are to:

- assess the flood risk to the proposed development and to demonstrate the feasibility of appropriately designing the development such that any residual flood risk to the development and users would be acceptable;
- assess the potential impact of the proposed development on flood risk elsewhere and to demonstrate the feasibility of appropriately designing the development such that the development would not increase flood risk elsewhere; and
- satisfy the requirements of the National Planning Framework (NPPF) (MHCLG, 2019) and PPG ID7 (MHCLG, 2014) which require FRAs to be submitted in support of planning applications for development over 1 hectares (ha) in area.

1.2 Report Structure

1.2.1 This FRA has the following structure:

- Section 2 summarises the legislation, planning policy and guidance;
- Section 3 identifies the sources of information that have been consulted in preparation of the report and describes the site location and the existing layout;
- Section 4; summarises the proposed development;
- Section 5 provides a hydrological review of the site and undertakes an FRA of the proposed development scheme;
- Section 6 describes the site's vulnerability status in line with the NPPF and PPG;
- Section 7 describes the mitigation measures; and
- Section 8 provides a summary and conclusion to the report.

2 LEGISLATION AND POLICY CONTEXT

2.1 Planning Policy

National Planning Policy Framework

2.1.1 The NPPF (MHCLG, 2019), sets out the Government's planning policies for England and how these are expected to be applied. The framework provides guidance for local planning authorities and decision-takers, both in drawing up plans and making decisions about planning applications.

2.1.2 Paragraph 163 of the NPPF (MHCLG, 2019) states that when determining planning applications, local authorities should ensure that the proposed development does not lead to an increased flood risk elsewhere.

2.1.3 Footnote 50 states that a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving:

- sites of 1 hectare or more;
- land which has been identified by the Environment Agency as having critical drainage problems;
- land identified in a strategic flood risk assessment as being at increased flood risk in future; or
- land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

2.1.4 The NPPF (MHCLG, 2019) requires the application of a sequential risk-based approach to determining the suitability of land for development in flood risk areas. The Sequential Test approach steers new development to areas of land with the lowest probability of flooding (i.e. Flood Zone 1). Where there are no reasonably available sites in Flood Zone 1, LPAs should consider reasonably available sites in Flood Zone 2 (i.e. areas with a medium probability of flooding), applying the Exception Test if required. The Exception Test is a method to demonstrate that the flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

Planning Practice Guidance

2.1.5 Current guidance on development and flood risk (PPG ID7: Flood Risk and Coastal Change. MHCLG, 2014) identifies several key considerations for the design and operation of a development to ensure it is appropriately flood resilient and resistant, safe for its users for the development's lifetime, and will not increase flood risk overall. These considerations are as follows and have been taken into account in this FRA:

- the development should not be at a significant risk of flooding and should not be susceptible to damage due to flooding;
- the development should not be exposed to flood risk such that the health, safety or welfare of the users of the development, or the population elsewhere, is threatened;
- normal operation of the development should not be susceptible to disruption as a result of flooding;
- safe access to and from the development should be possible during flood events;

- the development should not increase flood risk elsewhere;
- the development should not prevent safe maintenance of watercourses or maintenance and operation of flood defences;
- the development should not be associated with an onerous or difficult operation and maintenance regime to manage flood risk. The responsibility for any operation and maintenance required should be clearly defined;
- future users of the development should be made aware of any flood risk issues relating to the development;
- the development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues;
- the development should not lead to degradation of the environment; and
- the development should meet all of the above criteria for its entire lifetime, including consideration of the potential effects of climate change.

2.1.6 The FRA has taken account of the impact from the proposed development on the prevailing hydrological, surface water drainage, flooding and water quality environments. The assessment has been undertaken in accordance with the NPPF (MHCLG, 2019), PPG ID7 (MHCLG, 2014), Non-statutory technical standards for sustainable drainage systems (Defra, 2015) and CIRIA 753 The SuDS Manual (CIRIA, 2015).

2.1.7 PPG ID7 provides guidance to ensure the effective implementation of the NPPF planning policy for development in areas at risk of flooding. The NPPF (MHCLG, 2019) sets out when a site-specific FRA is needed (see above). The FRA should consider vulnerability to flooding from a range of sources (e.g. groundwater) as well as from river and sea flooding. PPG ID7 also sets out a checklist of the information that should be included in a site-specific flood risk assessment, including the following key stages:

- Development site and location – including current use of the site;
- Development proposals;
- Sequential test – for development in Flood Zones 2 and 3 only. If the development site is wholly within Flood Zone 1 it is not necessary to undertake this stage;
- Climate change – how is the flood risk likely to be affected by climate change;
- Site specific flood risk – what are the main sources of flooding, what is the probability of flooding, how will the development be made safe from flooding, ensure that the development and any flood risk measures do not increase the risk of flooding off-site; and
- Surface water management.

Local Planning Policy

Wiltshire Core Strategy adopted January 2015

2.1.8 Under Core Policy 67, Flood Risk '*Development proposed in Flood Zones 2 and 3 as identified within the Strategic Flood Risk Assessment will need to refer to the Strategic Housing Land Availability Assessment when providing evidence to the local planning authority in order to apply the sequential test in line with the requirements of national policy and established best practice. All*

new development will include measures to reduce the rate of rainwater run-off and improve rainwater infiltration to soil and ground (sustainable urban drainage) unless site or environmental conditions make these measures unsuitable.'

2.1.9 Wiltshire Council's current Core Strategy identifies development policy to the period to 2026. The new Local Plan for the period up to 2036 is currently in Consultation phase. Among the Policies identified to be amended/reviewed is Core Policy 67, however no details are confirmed at this moment.

Swindon Borough Council Local Plan 2026

2.1.10 Policy EN6: Flood Risk of the Local Plan 2026 states that:

a. *The risk and impact of flooding will be minimised through:*
   - *Directing development to areas with the lowest probability of flooding;*
   - *Ensuring that all development addresses the effective management of all sources of flood risk;*
   - *Ensuring that development does not increase the risk of flooding elsewhere including on adjoining and surrounding land; and*
   - *Ensuring wider environmental benefits of development in relation to flood risk.*

b. *The suitability of development proposed in flood zones will be assessed using the Sequential Test, and, where necessary, the Exceptions Test. A sequential approach should be used at site level.*

c. *A site specific flood risk assessment will be required for development proposals of one hectare or greater in Flood Zone 1 and for all proposals for development (including minor development and change of use) in Flood Zones 2 and 3 and Critical Drainage Areas, and also where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding. Appropriate mitigation and management measures must be implemented.*

d. *All development proposals must be assessed against the Local Flood Risk Management Strategy to address locally significant flooding including that affecting neighbouring authorities. Appropriate mitigation and management measures must be implemented.*

Emerging Policy – Swindon Borough Local Plan 2036

2.1.11 The Proposed Submission Draft of Swindon Borough Council's new Local Plan was published in December 2019 and states that:

Policy DM 36 'Flood Risk'

1. *National policy and guidance on the requirement for a site specific flood risk assessment, which should assess the risk from all sources of flooding, and on the sequential and exception tests (and where appropriate the sequential approach), will be applied in the consideration of planning applications.*
2. *Flood Zone 3b shall be safeguarded from any development. Redevelopment in Flood Zone 3b shall not increase the vulnerability classification of the site and must result in a net reduction in flood risk.*

3. *All development within Flood Zones 2 and 3 or extent of any other source of flooding must not result in a net loss of flood storage capacity. Where possible, opportunities should be sought to achieve a net increase in the provision of floodplain storage.*
4. *For developments proposals located in areas at risk of fluvial, surface water and groundwater flooding, safe access/egress must be provided in line with guidance within the Swindon Strategic Flood Risk Assessment.*
5. *All 'More Vulnerable' and 'Highly Vulnerable' development located in areas at risk of fluvial, surface water and groundwater flooding should set finished floor levels 300mm above the known or modelled 1 in 100 annual probability (1% AEP) flood level including an allowance for climate change. Other mitigation measures must be implemented as appropriate.*
6. *All development should not adversely affect flood routing and thereby increase flood risk elsewhere. Opportunities should be sought within the site design to make space for water and therefore reduced flood risk elsewhere.*
7. *Planning applications for major developments (as defined in the Town and Country Planning (Development Management Procedure) Order 2015) shall be required to provide a drainage strategy. Such developments will be expected to ensure that run-off rates are attenuated to greenfield run-off rates. Higher rates would need to be justified and the risks quantified.*
8. *Suitable surface water management measures should be incorporated into all new development designs in order to reduce and manage surface water flood risk to, and posed by proposed development. This should be achieved by incorporating Sustainable Drainage Systems (SuDS).*
9. *SuDs should protect and seek to enhance water quality and biodiversity.*
10. *Development proposals should integrate naturalised SuDs features into the design of green infrastructure, and where they are part of open space they should be safe and accessible and should not compromise the functionality of open space.*
11. *A sequential approach to site planning should be applied within new development sites.*
12. *Development adjacent to a Main River or Ordinary Water Course should include an 8m wide buffer zone along both sides of the watercourse. Where possible a buffer zone greater than 8m should be achieved and opportunities for riverside restoration explored. these riparian buffer zones should be preserved, or created and managed to contribute to the achievement of net biodiversity gain.*
13. *Site specific flood risk assessments should take account of the findings of the Swindon Borough Strategic Flood Risk Assessment.*

2.2 Other Guidance

Non-statutory Technical Standards for Sustainable Drainage Systems

2.2.1 The document, produced by Defra (2015), contains non-statutory technical standards for the design, maintenance and operation of sustainable drainage systems, to drain surface water from housing, non-residential or mixed-use developments for the lifetime of the development.

2.2.2 Sustainable drainage systems slow the rate of surface water run-off and improve infiltration, by mimicking natural drainage in both rural and urban areas. This reduces the risk of "flash-flooding" which occurs when rainwater rapidly flows into the public sewerage and drainage systems.

2.2.3 The drainage system must be designed so that (unless an area is designated to hold and/or convey water as part of the design) flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

Climate Change

2.2.4 In February 2016 (most recently updated in July 2020) the Environment Agency published advice on climate change allowances to support NPPF. The guidance requires that flood risk assessments and strategic flood risk assessments, take into account, where appropriate, increases in rainfall intensity, peak river flows and sea level rise. Table 2.1 presents both the central and upper end estimates for climate change associated with rainfall intensity to understand the range of the potential impact.

Table 2.1. Change to extreme rainfall intensity compared to a 1961-90, applicable across England

Climate Change Allowance	Total potential change anticipated for '2020s' 2015-2039)	Total potential change anticipated for '2050s' (2040- 2069)	Total potential change anticipated for the '2080s' (2070-2115)
Upper Estimate	10%	20%	40%
Central Estimate	5%	10%	20%

Peak River Flow (2015 baseline)

2.2.5 The peak river flow allowances show the anticipated changes to peak flow by river basin district. The Application Site falls within the Thames river basin district and the peak river flow allowance and outlined in Table 2.2 below.

Table 2.2. Peak river flow allowances by river basin district

River Basin District	Allowance	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Thames	H++	25%	40%	80%
	Upper end	25%	35%	70%
	Higher central	15%	25%	35%
	Central	10%	15%	25%

2.2.6 The guidance on flood risk assessments and climate change allowances (online) notes that the allowances provided have been derived from national scale research. There may be cases where local evidence supports the use of other local climate change allowances.

2.2.7 RPS has added 40% to all attenuation / runoff calculation for the development to account for climate change.

Local Authority Strategic Flood Risk Assessment

Swindon Borough Council Level 1 Strategic Flood Risk Assessment, May 2019

2.2.8 Swindon Borough Council's Level 1 Strategic Flood Risk Assessment (SFRA) is a planning tool to guide local planning authorities in their selection and development of sustainable site allocations away from vulnerable flood risk areas. It provides an overview of flood risk from various sources within the district. Relevant information from the SFRA has been included in section 4 of this report.

Drainage Responsibilities

2.2.9 Following the implementation of the Flood and Water Management Act 2010, local flood risk has become the responsibility of the local planning authority. The Act places new duties on upper tier councils, by designating them as Lead Local Flood Authorities (LLFAs) for the coordination of local flood risk management in their respective administrative areas.

2.2.10 From 6 April 2015, the local planning authority is responsible for approving the design of proposed drainage and surface water management systems. The designs have to meet national standards for sustainable drainage and the proposals should be submitted as part of the planning application process.

2.2.11 The local planning authority is also responsible for adopting and maintaining Sustainable Drainage Systems (SuDS) which serve more than one property and have been approved. The Highways Authorities will be responsible for maintaining SuDS in public roads to National Standards.

2.2.12 The SuDS Manual C753 sets out the criteria by which the form of drainage appropriate to any particular site or development can be determined, as well as requirements for the design, construction, operation and maintenance of SuDS.

2.2.13 Additional guidance for the use of SuDS is provided via CIRIA and BRE in the following:

- C523 Sustainable Drainage Systems - Best practice (CIRIA, 2001);
- C156 Infiltration Drainage - Manual of Good practice (CIRIA, 1996); and
- BRE365 Soakaway design (BRE, 2016).

3 BASELINE

3.1 Methodology

3.1.1 The FRA has taken account of the impact from the proposed development on the prevailing hydrological, surface water drainage, flooding and water quality environments. The assessment has been undertaken in accordance with the NPPF (MHCLG, 2019), PPG ID7 (MHCLG, 2014), Non-statutory technical standards for sustainable drainage systems (Defra, 2015) and CIRIA 753 The SuDS Manual (CIRIA, 2015).

3.1.2 A 500 metre (m) buffer for the proposed development has been selected for data collection and is considered appropriate taking into account the likely zone of influence on hydrological receptors. Given the landscape surrounding the development and ongoing anthropogenic activities it would be difficult to ascertain the exact source of any impacts on water quality beyond 500 m.

3.1.3 Determination of the baseline conditions at the Application Site has been established through a review of literature and data obtained from publicly available sources.

3.2 Sources of Information

3.2.1 Table 3.1 lists the information sources consulted during preparation of this report.

Table 3.1: Information sources consulted during preparation of the report.

Source	Data	Notes
Ordnance Survey (OS).	OS Tile reference SU18.	Area information, rivers and other watercourses, general site environs, built environment, catchment Information.
British Geological Survey (BGS).	BGS (online) Geology of Britain Viewer.	Site and area geology.
Environment Agency (EA).	EA data holdings, customer service and engagement team.	Current flood risk, local flood defences, flood levels, supplementary geology and groundwater information.
Local Planning Authority (LPA).	Swindon Borough Council Level 1 Strategic Flood Risk Assessment	Flood Zoning. Local Development Framework
Water Utility Company.	Thames Water	Water and sewerage assets in the vicinity of the site.
Planning Policy	NPPF (2019). Planning Practice Guidance (2014)	FRA and Planning Guidance, Flood zoning for the site as used by the EA in England.
	The Department for Environment Food and Rural Affairs (Defra) Sustainable Drainage Systems Non-statutory technical standards for drainage systems (March 2015)	Surface water runoff standards
	UK Climate Projections 2018 (UKCP18)	Climate change prediction data

3.3 Baseline Conditions

Site Location

3.3.1 The Application Site is located in Burderop, south of Swindon at National Grid Reference (NGR) SU163805 and occupies an area of approximately 11.3 hectares (ha), although the development area is approximately 5.53 ha. The Application Site is located in a rural setting, with woodland located north of the site, cultivated farmland east and west, and a former estate house now converted and used as commercial offices to the south.

3.3.2 The main access to the Application Site is via the road B4005 “Brimble Hill” located to the west.

3.3.3 The northern perimeter of the Application Site shares a boundary with Burderop Wood, a registered Site of Special Scientific Interest (SSSI). There are no other designated ecological sites (e.g. Special Area of Conservation or Special Protection Area) within 1km of the site.

3.3.4 The site is located in the administrative boundary of Swindon Borough Council.

Existing Site

3.3.5 The Application Site is currently used as a data centre comprising three buildings: two buildings in the north east (known as Gamma and Beta) and one in the south (known as Alpha). The western area of the site is currently undeveloped.

3.3.6 A topographic survey completed by Clifton Surveys in June 2020 (drawing reference 989/4414/1) indicates that the level at the main access road is recorded to be 175 metres (m) above Ordnance Datum (AOD) at the site main entrance. The level drops to 172m AOD at the entrance to the southern data building and remains at that level following a path across the southern area of the site. Further east along the path, the level rises to 175m AOD before falling to 171m AOD at the entrance of the northern data building. Between the data buildings the topography rises to a peak of approximately 178m AOD, with peaks located in the central and north eastern areas of the site.

4 PROPOSED DEVELOPMENT

4.1.1 This application seeks consent for the demolition of the existing Gamma, Beta and Alpha buildings, replacing these buildings with the construction of a single storey Data Centre building that will include an office administration area, associated electrical and mechanical plant rooms, loading bay, maintenance and storage spaces, and screened plant at roof level. The proposed development will also include emergency generators with associated stacks, diesel storage tank, pump house, sprinkler tank and MV room.

4.1.2 The main access to the Application Site will remain as existing, and the main access road through the site is will be altered with new car parking space provided, as shown in the proposed Masterplan (document reference 20305S-RPS-SI-XX-DR-A-9501).

5 FLOOD RISK ASSESSMENT

5.1 Hydrological Overview

5.1.1 OS Mapping indicates that the nearest surface water feature is an unnamed ordinary watercourse, located approximately 90m south east of the site and flows in an easterly direction.

5.2 Fluvial and Tidal Flooding

5.2.1 The Environment Agency Flood Map for Planning, which is available online, indicates that the Application Site in its entirety is located within Flood Zone 1, where the annual probability of flooding from fluvial or tidal sources is classified as less than 1 in 1,000. The Environment Agency Flood Map for Planning is provided in Figure 1.

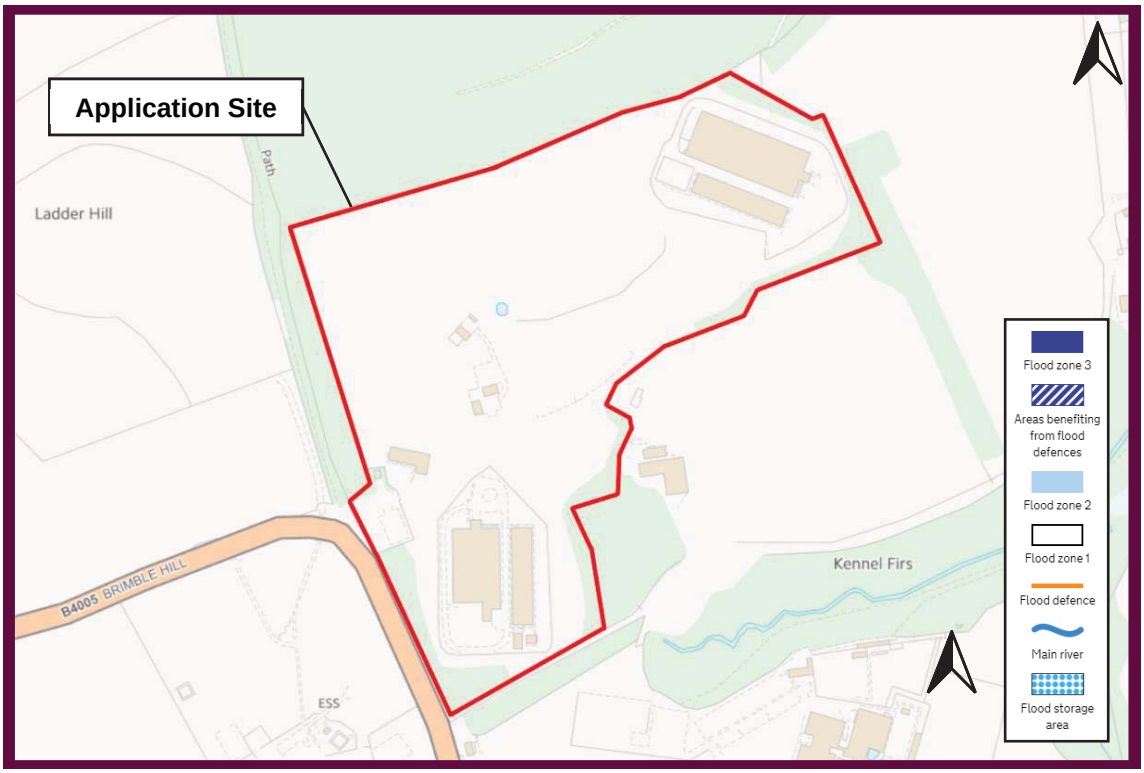


Figure 1. Environment Agency Flood Map for Planning (River and Sea), indicative red line boundary

5.2.2 Environment Agency Rivers and Sea flood mapping, which takes into account the effect of any local flood defences, if present, indicates that the entire site is located within an area assessed as low risk, defined as land with between 1 in 1,000 and 1 in 100 chance of flooding each year.

5.3 Surface Water Flood Risk

5.3.1 The Environment Agency's updated Flood Map for Surface Water, which is available online, indicates that the site is classified as having a predominantly 'very low' surface water flood risk. There are small, discrete areas of 'low' surface water flood risk located in the north eastern area of

the site, assumed to associated with low lying areas of land. The updated Flood Map for Surface Water is presented in Figure 2 and probabilities of flooding associated with the EA's classifications are given below.

- 'Very Low' surface water flood risk corresponds with an annual probability of surface water flooding of less than 0.1%;
- 'Low' risk means that each year this area has a chance of flooding of between 0.1% and 1%; and
- 'Medium' risk means that each year this area has a chance of flooding of between 1% and 3.3%.

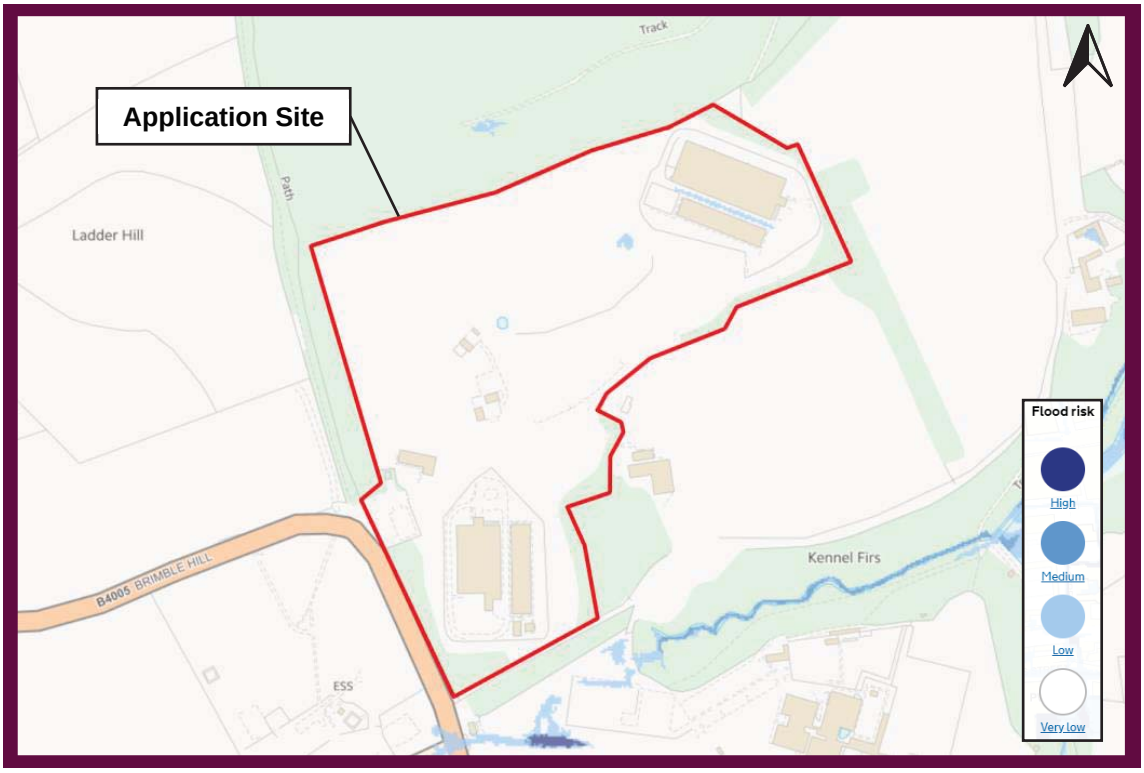


Figure 2. Updated Flood Map for Surface Water, indicative red line boundary

5.3.2 Environment Agency surface water flood modelling predicts that during a 1 in 100 year rainfall event the site is generally not expected to experience surface water flooding.

5.3.3 The SFRA mapping of surface water flood risk indicate that the site is classified as having a 'very low' risk of surface water flooding.

5.3.4 Overall, the site is assessed as having generally a very low susceptibility to surface water flooding.

5.4 Reservoir Failure Assessment

5.4.1 Environment Agency flood risk from reservoirs mapping indicates that the site is not located in an area at flood risk from reservoir failure.

5.5 Flooding from Rising / High Groundwater

5.5.1 British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is underlain by the West Melbury Marly Chalk Formation consisting of chalk. There are no superficial deposits reported to be present.

5.5.2 BGS mapping indicate that there are no representative available borehole logs located at the site or within its vicinity.

5.5.3 A Site Investigation and Soakaway Testing was completed by RPS in October 2020 (see Appendix 8.5 of the Environmental Statement). The works comprised the advancement of three trial pits and four boreholes including one borehole to a depth of approximately 10m. The remaining intrusive works were up to 2m deep. Groundwater was not encountered in any intrusive works at the site and is therefore inferred to generally rest at a depth greater than 10m below ground level (bgl). The full soakaway results are provided in the Ground Investigation Report.

5.5.4 The soils underlying the Application Site are described as '*shallow lime-rich soils over chalk or limestone*' by the National Soils Research Institute.

5.5.5 According to the Environment Agency's Aquifer Designation Mapping (Environment Agency, 2017), the West Melbury Marly Chalk Formation is classified as a Principal Aquifer. This is described by the Environment Agency as '*layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer*.'

5.5.6 SFRA mapping indicates that the site is located on land classified as having 'limited potential for groundwater flooding to occur'.

5.5.7 Based on the information outlined above the potential for groundwater flooding is considered to be low.

Source Protection Zones

5.5.8 Environment Agency online groundwater Source Protection Zone (SPZ) mapping indicates that the site is not located within a groundwater SPZ.

5.6 Sewer/Water Main Failure Assessment

Current Drainage

5.6.1 Thames Water plans of public sewers indicate that there is a surface water sewer located approximately 30m south of the southernmost area of the site. There are no manholes indicated to be present and the sewer is inferred to be flowing in an easterly direction. No other public sewers are indicated to be present within the local area of the site.

5.6.2 The topographic survey was completed by Clifton Surveys Ltd. in June 2020 (drawing reference 989/4414/1) and identifies numerous soakaways and water infrastructure across the site. There are two soakaways indicated to be present approximately 50m north from the southern data building. There are also two soakaways indicated to be present approximately 50m south west of the northern data building. There are two water conveying sewer pipes also identified following the path of the internal access road between both data buildings, with diameters of 125mm and 65mm and both made of medium-density polyethylene (MDPE). A foul water sewer is identified in the southern area of the site conveying foul water in an easterly direction to a foul water tank north of the southern data building. The topographic survey is included as Annex A.

5.6.3 The Office of Water Services (Ofwat) formerly the Director General of Water Services, require that all water companies keep a record of properties that have been affected by sewer flooding or are assessed as "At Risk". At Risk properties are those that the water company is required to include in the Regulatory Register that is reported annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure.

5.6.4 SFRA mapping indicates that the site is located in an area where Thames Water has more than 10 recorded properties at risk of sewer flooding within the ‘SN4 0’ postcode area. Site-specific sewer flood records are not provided in the SFRA.

5.6.5 A Drainage Design Philosophy has been prepared for the proposed development and accompanies the planning application, document reference 20305S-RPS-00-XX-RP-D-9065.

5.6.6 Taking into account the above and absence of any historical sewer flooding, the overall risk of flooding via artificial drainage system to the site has been assessed as a low.

Infrastructure Failure Assessment

5.6.7 The Environment Agency indicates that no flooding has occurred on site due to infrastructure failure. Historic flooding from infrastructure failure is not specifically assessed in the SFRA, suggesting that the Council has no records of such at the site.

Historical Flood Events

5.6.8 SFRA mapping of Swindon Borough Council’s records of historical flooding indicate that the site is not located in an area where fluvial or surface water flood events have been recorded. The Environment Agency also has no recorded instances of historic flooding at the site.

6 FLOOD RISK VULNERABILITY CLASSIFICATION

6.1 Vulnerability Classification

6.1.1 In accordance with the Flood Risk Vulnerability Classification in Table 2 of PPG ID7, a data centre facility is classified as a 'Highly Vulnerable' development in flood risk terms.

6.1.2 The Application Site is located within an area identified as Flood Zone 1. Table 3 of PPG ID7 (Table 6.1Table 6.1 of this report) indicates that 'highly vulnerable' developments within Flood Zone 1 are generally appropriate. The table does not show the application of the Sequential Test which should be applied first to steer development to areas of lowest flood probability (Flood Zone 1), then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea.

Table 6.1. Flood Risk Vulnerability and Flood Zone 'Compatibility'

Flood Risk Vulnerability classification (Table 3 of Planning Practice Guidance)	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	Yes	Yes	Yes	Yes	Yes
Zone 2	Yes	Yes	Exception test required	Yes	Yes
Zone 3a	Exception test required	Yes	No	Exception test required	Yes
Zone 3b Functional Floodplain	Exception test required	Yes	No	No	No

Key: Yes: Development is appropriate, No: Development should not be permitted.

7 MITIGATION MEASURES

7.1 Surface Water and Drainage Strategy

7.1.1 The sustainable management of surface water is an essential element of reducing future flood risk to the site and its surroundings.

7.1.2 The Application Site was previously used for three data centres, all of which will be demolished to facilitate the proposed development. The topographical survey indicates that there are existing soakaways, suggesting that the site is located on good infiltration media.

7.1.3 Site Investigation and Soakaway Testing was completed by RPS in October 2020. Groundwater was not encountered in any intrusive works at the site.

7.1.4 Surface water arising from a developed site should as far as is practicable be managed in a sustainable manner. It should also provide betterment to the existing surface water flows arising from the site prior to the proposed development while reducing the risk of flooding at the site and elsewhere, taking climate change into account.

7.1.5 A drainage strategy has been prepared (20305S-RPS-00-XX-DR-D-9630) for the proposed development to support this FRA and forms part of the planning application. It sets out the proposed approach for managing surface water from the proposed development.

7.2 Sustainable Drainage Techniques

7.2.1 The NPPF (Ministry of Housing, Communities and Local Government, 2019) associated PPG ID7 (Ministry of Housing, Communities and Local Government, 2014), CIRIA C753 SUDS Manual (2015) and Local Authority policy promotes sustainable water management through the use of SuDS. A hierarchy of techniques is identified:

1. Prevention – the use of good site design and housekeeping measures on individual sites to prevent runoff and pollution (e.g. minimise areas of hard standing).
2. Source Control – control of runoff at or very near its source (such as the use of rainwater harvesting).
3. Site Control – management of water from several sub-catchments (including routing water from roofs and car parks to one/several large soakaways for the whole site).
4. Regional Control – management of runoff from several sites, typically in a detention pond or wetland.

7.2.2 The implementation of SuDS as opposed to conventional drainage systems provides several benefits by:

- reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream;
- reducing the volumes and frequency of water flowing directly to watercourses or sewers from developed sites; improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources;
- reducing potable water demand through rainwater harvesting;
- improving amenity through the provision of public open spaces and wildlife habitat; and
- replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

Surface Water Drainage Constraints

7.2.3 Constraints placed on the design of surface water drainage serving the proposed development are as follows:

- Asset Location plans from Thames Water indicate there are no public sewers located in the vicinity of the site
- In accordance with guidance from the criterion 9 in Policy DM36 in Swindon Borough Council's emerging Local Plan 2036 SuDS '*should seek to enhance water quality and biodiversity*'.

7.3 Proposed Surface Water Drainage

7.3.1 Surface water runoff at the site is proposed to be discharged via infiltration via a basin within the eastern extent of the site. Details for of the supporting calculations are presented in RPS Drainage Design Philosophy, reference 20305S-RPS-00-XX-RP-D-9605.

7.3.2 The proposed new surface water drainage system has been designed using current Micro Drainage analysis software, cognisant of planning policies, LLFA and EA guidance to prevent uncontrolled flooding off the site to surrounding areas.

7.3.3 The Overall Proposed Surface Water Drainage Strategy is presented on drawing reference 20305S-RPS-00-XX-DR-D-9630 within the RPS Drainage Design Philosophy (20305S-RPS-00-XX-RP-D-9605).

7.3.4 In summary surface water runoff from the proposed development will be collected as follows:

1. Surface water runoff generated by the new data centre will be conveyed in an easterly direction to an infiltration basin located east of the data buildings; and
2. Impermeable building roof areas will be drained using traditional gravity gutters and downpipes, connected to a network of slot drains and conveyed to the infiltration basin .

7.3.5 Filter drains will be installed on land associated with the former southern data centre. The drain will encourage surface water flows to existing perimeter infiltration ditches.

7.3.6 This strategy is presented in the Drainage Design Philosophy (20305S-RPS-00-XX-RP-D-9605) of the planning application together with indicative invert levels of the proposed infiltration basin. The location and levels of the proposed surface water conveyance network and infiltration basin will be confirmed during the detailed design stage.

7.3.7 The infiltration basin will assist with the removal of sedimentation from runoff, with benefits in improving water quality and reducing the total maintenance required. The proposed system also provides benefits in encouraging biodiversity through habitat creation.

7.3.8 Surface water runoff from the site will be discharged principally via infiltration.

8 SUMMARY

8.1 Flood Risk

8.1.1 A site-specific FRA in accordance with the NPPF and PPG ID7 has been undertaken for the construction of a proposed new data centre building at Land at Burderop, Swindon.

8.1.2 Environment Agency mapping shows that the proposed development is located within an area designated as Flood Zone 1, classified as low risk of flooding from fluvial and tidal sources.

8.1.3 Environment Agency surface water flood risk mapping indicates the site is predominantly has a ‘very low’ surface water flood risk, with small and isolated areas of ‘low’ surface water flood risk present in the east of the site. Environment Agency and SFRA surface water flood modelling predicts that during a 1 in 100 year rainfall event the site is not expected to experience surface water flooding. The site is not considered to have significant surface water flood risk.

8.1.4 The Application Site susceptibility to groundwater flooding has been assessed as low.

8.1.5 The Application Site is not at low risk of flooding from reservoir infrastructure failure.

8.1.6 The proposed development type is defined as ‘highly vulnerable’ in the NPPF and PPG ID7 and such development is generally acceptable in Flood Zone 1 considering the effects of climate change for the lifetime of the development.

8.1.7 Surface runoff will be discharged principally via infiltration using soakaway into a geocellular storage.

8.1.8 A Drainage Design Philosophy is presented in 20305S-RPS-00-XX-RP-D-9605 which proposes that surface water runoff generated from the proposed data centre is conveyed into an infiltration basin..

8.1.9 The impacts of the increase in surface water runoff will be reduced by the incorporation of appropriate and practicable SuDS mitigations measures in the built design, including the implementation of appropriate on-site management pollution control strategy.

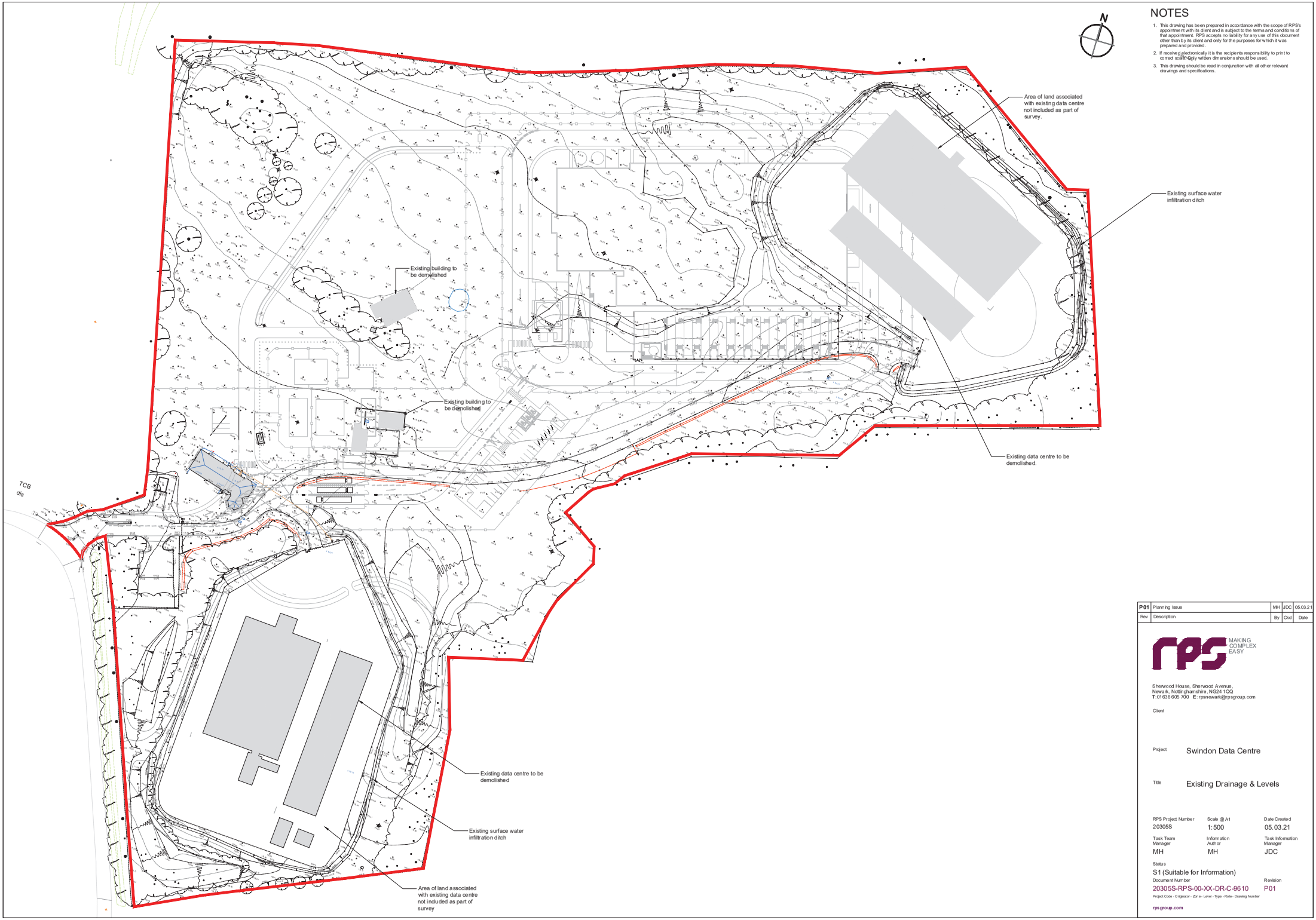
8.2 Conclusion

8.2.1 This FRA illustrates that the application area is at low risk of flooding and meets the requirements of the NPPF and PPG ID7.

ANNEXES

Annex A

Topographic Survey



NOTES

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Rev	Description	By	Ckd	Date
P01	Planning Issue	MH	JDC	05.03.21

MAKING COMPLEX EASY

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Client

Project: Swindon Data Centre

Title: Existing Drainage & Levels

RPS Project Number	Scale @ A1	Date Created
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PROPOSED REPLACEMENT CENTRE

GROUND INVESTIGATION REPORT

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton, Swindon

Appendix 8.5

20305S-RPS-XX-XX-RP-P-9734

Replacement Data Centre
Ground Investigation Report
Final
March 2021

rpsgroup.com

Approval for issue

Aaron Cousins	16 March 2021

Prepared by:

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EXECUTIVE SUMMARY

RPS Consulting Services Ltd (RPS) was commissioned to undertake a Ground Investigation Report of Land at Burderop Park, Swindon. The report has been commissioned prior to the proposed redevelopment of the site and accompanies the Environmental Statement and planning application. The Application Site is currently used as a data centre campus comprising three buildings: two buildings in the north east (known as Gamma and Beta) and one in the south (known as Alpha). The proposed development involves the replacement of these buildings with a new data centre building together with associated infrastructure, parking and infiltration pond.

A site investigation was undertaken by Arcadis in July 2020 comprising six rotary boreholes to a maximum depth of 15m below ground level (bgl). Additional investigation was undertaken by RPS in October 2020 comprising 15 trial pits, two hand dug pits and three soakaway tests. Gas and groundwater level monitoring was undertaken on three occasions by RPS during October 2020.

Ground conditions typically comprised Made Ground overlying the West Melbury Marly Chalk Formation which is underlain by the Upper Greensand Formation.

Asbestos fibres were detected in eight of sixteen samples of the Made Ground collected across the site during the RPS investigation. The Made Ground is variable across the Application Site and the asbestos fibres do not appear to be restricted to a distinct layer or location.

In areas of the site proposed to be covered by buildings and hardstanding the risks to on-site users from asbestos in soils via the pathway inhalation will be mitigated. In areas of the completed development which are not covered in either buildings or hardstanding, the pathway of asbestos inhalation could still be active.

Existing grassland and scrub habitat in the north west of the Application Site will be retained and grassland from the centre of the site (identified as having a higher biodiversity value) will be translocated to receptor areas in the south west and east of the site as part of the ecological mitigation. In order to minimise the risk associated with asbestos in Made Ground these areas will be subject to supplementary shallow soil sampling to enable more detailed assessment of the risk in these areas. If the targeted assessment identifies a potential risk in these areas then it may be necessary to implement a surface cover system in some areas, or design enhanced management systems for these areas such as preventing unauthorised access and controlling the potential for soil disturbance using management plans and a permit to work procedures.

Groundwater was not encountered during either site investigation and is deemed to be present at a depth of greater than 10m bgl. Based on a limited number of potential contamination sources, soil observations made during the investigation and the soil analytical data RPS does not consider it likely that discernible groundwater contamination will be present relating to on-site contamination sources.

Under the proposed development, the Application Site will be under extensive hardstanding limiting infiltration and reducing the likelihood of contaminants leaching into the aquifer. In the area of the proposed infiltration pond and cellular soakaway will be located directly within the chalk bedrock (see the Drainage Strategy document reference 20305S-RPS-00-XX-RP-D-9605), which will mitigate the risk of the contaminants of concern from the Made Ground leaching into the groundwater.

Preliminary loads for the proposed development are indicated to be a maximum of 1,800kN. It is anticipated that following the earthworks both fill material and in-situ material will be present within the proposed building footprint. Based on site descriptions, laboratory testing and SPT results it is anticipated that Grade Dm West Melbury Marly Chalk Formation will be present at 1.25m to 2.00m bgl which will be able to support pad foundations, with an allowable bearing capacity of 200kN/m^2.

It is anticipated that either fill material or the West Melbury Marly Chalk will be present at floor slab formation level beneath the proposed development due to the earthworks being undertaken on site. For ground bearing floor slabs to be adopted any fill material should be placed and compacted to match the geotechnical properties of the natural soil, in accordance with an agreed earthworks specification.

A chalk cavity database search and desk-based assessment was undertaken for the Application Site, this concluded a low risk for the presence of natural or mining cavities.

The Application Site has a significant development history. Relic structures were encountered as part of the investigation in two trial pits at 0.60m and 1.90m bgl, these may require total or partial removal to enable construction of the proposed development. It should be possible to excavate any relic structures with conventional earth moving plant.

Groundwater was not encountered during intrusive works and subsequent monitoring visits. Therefore, groundwater exclusion and control measures may not be required for proposed foundation excavations.

It is considered that a Design Sulphate Class of DS-2 and an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC-1s would be appropriate for all buried concrete structures.

Soakaway testing in the location of the infiltration pond indicated that infiltration rates would not be adequate for a shallow based infiltration drainage solution. A deeper borehole infiltration test was subsequently undertaken which indicated higher infiltration rates could be achieved below approximately 3m bgl in the West Marly Chalk Formation and Upper Green Sand Formation subject to regulatory approval.

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1 INTRODUCTION

1.1 Preamble

1.1.1 RPS Consulting Services Ltd (RPS) was commissioned to undertake a Ground Investigation Report of land at the Old Burderop Hospital Site, Swindon. The report has been commissioned prior to the proposed redevelopment of the site. The Application Site is currently used as a data centre campus comprising three buildings: two buildings in the north east (known as Gamma and Beta) and one in the south west (known as Alpha). The proposed development involves the replacement of Gamma, Beta and Alpha buildings with a new data centre building together with associated infrastructure, parking and infiltration pond.

1.1.2 Arcadis undertook a site due diligence report in July 2020 which included a Phase 1 environmental review and geotechnical assessment, along with a Phase 2 site investigation targeting the proposed location of the data centre.

1.1.3 This Ground Conditions Report has been commissioned to expand on these initial findings based on updated proposed development plans and more recent ground investigation.

1.2 Objectives

1.2.1 The principal objectives of this assessment were as follows:

- to determine the contamination status of soil beneath the site;
- to assess whether contamination is present within soil beneath the site at concentrations which could impact future site uses/occupiers and the wider environment; and
- to determine the engineering properties of the underlying soils and to provide geotechnical parameters to assist preliminary foundation, ground slab and external hard-standing design.

1.3 Legislation, Planning Policy and Guidance

1.3.1 This report has been produced in general accordance with:

- Contaminated Land (England) Regulations 2006 (as amended);
- DEFRA Environmental Protection Act 1990: Part 2A - *Contaminated Land Statutory Guidance (2012);*
- Environment Agency (2020) Land Contamination: Risk Management (LCRM 2020);
- National Planning Policy Framework (2019);
- CIRIA Document C665: *Assessing Risks Posed by Hazardous Ground Gases to Buildings*;
- British Standard requirements for the *'Investigation of potentially contaminated sites - Code of practice'* (ref. BS10175:2011+A1:2017);
- British Standard requirements for the *'Code of practice for ground investigations'* (ref. BS5930:2015+A1:2020);
- British Standard requirements for the *'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'* (ref BS8485:2015+A1:2019);
- CIRIA Document C574: *Engineering in Chalk;*
- EN 1997-1 (2004): Eurocode 7: *Geotechnical design - Part 1: General rules*; and

- EN 1997-2 (2007): Eurocode 7: *Geotechnical design - Part 2: Ground investigation and testing.*

1.3.2 Details of the limitations of this type of assessment are described in Annex A.

2 SITE SETTING

2.1 Site Location and Description

2.1.1 The Application site is located at the Old Burderop Hospital Site, approximately 980m from Wroughton, 1.2km south of Swindon and 670m from the M4 motorway. The site location is shown on Figure 1 (20305S-RPS-00-XX-DR-A-9500) and an existing site plan is provided in Figure 2 (20305S-RPS-00-XX-DR-A-9502).

2.1.2 The Application Site extends to 11.3 hectares (ha) with the development area is comprising approximately 5.53ha. The Application Site is currently used as a data centre campus comprising three buildings: two buildings in the north east (known as Gamma and Beta) and one in the south west(known as Alpha). The western area of the Application Site is currently undeveloped. The site supports an area of semi-improved calcareous grassland with scattered areas of trees, tall ruderal and ephemeral vegetation.

2.1.3 The Application Site appears generally flat with earthworks from the two existing data centres creating a variable topographic profile across the site. Existing gradients vary across the site between 170m and 178m AOD, however in the north western area gradients are generally between ±4% slope and locally up to ±10% slope.

2.1.4 The Application Site is located within a rural setting, surrounded predominantly by countryside/recreational land, with some residential and industrial businesses located to the south and west. Burderop Park is located directly south of the Application Site.

2.1.5 The Application Site is located within the North Wessex Downs Area of Outstanding Natural Beauty (AONB) and adjacent to the Burderop Woods Site of Special Scientific Interest (SSSI).

2.2 Proposed Development

2.2.1 The application seeks consent for a new data centre comprising of the following key elements:

- data hall, associated electrical and AHU Plant Room loading bay, maintenance and storage space, office administration areas and plant at roof level;
- 11 emergency backup generators and emission stacks, diesel tanks and filling area;
- associated infrastructure including:
  - electrical switchroom;
  - a water sprinkler system and storage tank;
  - a security gatehouse;
  - site access and internal access roads;
  - hard and soft landscaping;
  - a rainwater infiltration pond;
  - cycle shelter;
  - waste bin store;
  - process water tank;
  - MV Room; and
  - intermediate power supply.

2.2.2 All Buildings on site including Beta, Gamma and Alpha will be demolished in order to accommodate the proposed development.

2.3 Previous Reports

2.3.1 RPS has been provided with the reports detailed below for review. RPS cannot confirm the accuracy or validity of the information provided within third party reports and the following opinion is based solely upon the reports.

Mini Region Burderop Park Site Due Diligence (July 2020)

2.3.2 A due diligence report for the Application Site was carried out by Arcadis in July 2020 (report ref. 10040272-SDD-SN4-001). As part of the report a geotechnical and environmental Phase 1 assessment was undertaken along with a ground investigation. The investigation was undertaken in connection with the proposed redevelopment of the site. Salient information provided by the report is provided as follows:

2.3.3 The Application Site was identified as originally being agricultural land before being used as a hospital followed by the current site layout with three data centres. The Made Ground on site was identified as a potential source of contamination, whilst the historical uses of the site as a hospital, infilled ponds, four tanks and two substations were also identified as possible sources of contamination.

2.3.4 With reference to British Geological Survey (BGS) mapping, the reports indicates that the geological sequence at the Application Site is anticipated to comprise Made Ground deposits underlain by the West Melbury Marly Chalk Formation generally 15-20m thick, in turn underlain by the Upper Greensand Formation. Both the Chalk and Upper Greensand Formations are classified as Principal Aquifers.

2.3.5 The Application Site is not indicated to be within a groundwater Source Protection Zone (SPZ). One potable groundwater abstraction license is active located 1,088m west of the site, whilst three non-potable groundwater abstraction licenses are recorded with the closest at 733m to the east of the site.

2.3.6 Within the Arcadis Report reference is made to a Groundsure report, this indicates the potential for ground stability hazards is very low, with no potential from shrinking or swelling clays and dissolution hazards and very low potential from running sands, compressible deposits, collapsible ground and landslide hazards.

2.3.7 With reference to the dissolution hazard rating provided within the Groundsure Report, RPS would not wholly agree with the risk rating applied. RPS considers there is a risk of such features due to the presence of chalk beneath the site.

2.3.8 An intrusive ground investigation was carried out between 8 and 16 July 2020 by Arcadis which comprised six rotary boreholes up to 15m bgl. General stratigraphy beneath the Application Site was recorded as grass over topsoil or Made Ground, overlying the West Melbury Marly Chalk which was generally structureless (Grade Dm) at the Made Ground / chalk interface becoming more competent with depth) overlying strata of the Upper Greensand Formation.

2.3.9 No groundwater strikes where recorded during the intrusive investigation and subsequent groundwater monitoring visit.

2.3.10 The reports surmises that widespread, gross or potential mobile contamination impacts were not identified at the Application Site. It concludes that based on the measured contaminant concentrations, site soils do not present a significant risk to human health receptors under a commercial development scenario. The risk to controlled waters is also not indicated to be significant. Elevated PAHs were recorded within four shallow soil sample; however, it is suggested

that these are not anticipated to leach into the underlying aquifer. Therefore, no contaminants were identified that would require remediation by the Arcadis assessments.

2.3.11 From a geotechnical perspective, the reports states that data centre will be constructed in the north western area of the Application Site on a development plateau at proposed level of 176m AOD. As such ground conditions in the area would comprise up to 1m of fill in places, overlying structureless chalk or extremely weak to very weak low to medium density chalk, at around 174m AOD (or 2m below the development plateau). It suggests that shallow pad foundations would be feasible on the West Melbury Marly Chalk Formation, with an allowable bearing capacity of around 200kN/m^2 at a depth of 1.50 to 2.00m

3 PRELIMINARY CONCEPTUAL SITE MODEL

3.1 Background

3.1.1 A preliminary conceptual site model (CSM) consists of an appraisal of the *source-pathway-receptor* 'contaminant linkages' which is central to the approach used to determine the existence of 'contaminated land' according to the definition set out under Part 2A of the Environmental Protection Act 1990. For a risk to exist (under Part 2A), all three of the following components must be present to facilitate a potential post development 'pollutant linkage'.

- **Source** referring to the source of contamination (Hazard).
- **Pathway** for the contaminant to move/migrate to receptor(s).
- **Receptor** (Target) that could be affected by the contaminant(s).

3.1.2 Receptors include human beings, other living organisms, crops, controlled waters and buildings / structures. The National Planning Policy Framework, used to address contaminated land through the planning process, follows the same principles as those set out under Part 2A. Further details on the Part 2A regime are presented within Annex C.

3.2 Potential Pollutant Linkages

3.2.1 Each stage of the potential post-development pollutant linkages has been assessed individually on the basis of information reviewed with the Arcadis Site Due Diligence Report (July 2020) and are discussed in the following sections.

Potential Contaminant Sources

On Site

3.2.2 There are no potentially contaminative land uses currently on the Application Site. Made Ground may be present beneath the site where present this could represent a potential source of contaminants of concern and / or ground gas.

3.2.3 The historical land use of the Application Site as a hospital with associated (four) storage tanks and two substations along with a possible infilled pond represent potential sources of contaminants of concern.

Off-site

3.2.4 Current off-site potential sources of contaminants of concern include two substations, one 95m to the south west and one 228m to the south east of the Application Site.

3.2.5 Historical off-site potential sources of contaminants of concern included an infilled chalk pit (approximately 70m east), three historical tanks (65m to 183m south west) and a sewage tank (270m east).

Potential Pathways

3.2.6 In areas of the Application Site covered by buildings or hardstanding following development, the risks to future human health receptors via the pathways of dermal contact and ingestion will be mitigated. However, in areas of soft landscaping, the pathways of dermal contact and ingestion could still be active. In addition, there would be potential for the airborne migration of soil/dust from these areas.

3.2.7 There is the potential for ground gas and volatile contaminants of concern in soil and/or groundwater (if present) beneath the site to impact future site users via the inhalation pathway in indoor areas.

3.2.8 There is the potential for contaminants of concern (if present) beneath the Application Site to migrate on or off-site via granular horizons of the Made Ground (if present) and the West Melbury Marly Chalk Formation. These may impact off-site human heath receptors via the dermal contact, ingestion and vapour inhalation pathways. These may also impact controlled waters receptors.

Potential Receptors

3.2.9 Potential human health receptors include future post-development site users and off-site receptors.

3.2.10 Providing construction workers adopt appropriate levels of hygiene and personal protective equipment (as set out in the Code of Construction Practice), they are not considered to be at significant risk from potential contaminants of concern and have not been considered further as part of this assessment.

3.2.11 The Principal Aquifer relating to the West Melbury Marly Chalk Formation represents a sensitive receptor.

3.2.12 The previous report identified an unnamed stream 90m south east of the Application Site but did not identify it as a sensitive receptor to potential on-site contamination in the conceptual site model.

3.3 Preliminary Conceptual Site Model

3.3.1 A preliminary CSM has been developed and is used to identify potential sources, pathways and receptors (i.e. potential pollutant linkages) on site and is summarised in the Table 3.1:

Table 3.1: Preliminary Conceptual Site Model

Potential Sources	Contaminants of Concern	Via	Potential Pathways	Potentially Active Linkages	Receptors
On site – current: Made Ground **On site – historical:** Hospital, tanks, substations and infilled pit	Metals, hydrocarbons, solvents, asbestos and polychlorinated biphenyls (PCBs)	Soil	Direct contact/ingestion	✓	Future site users
			Inhalation of volatiles	✓	
			Airborne migration of soil or dust	✓	Off-site users
			Leaching of mobile contaminants	✓	Principal Aquifer
		Groundwater	Direct contact/ingestion	✓ ✓	Future site users Off-site users
			Inhalation of volatiles	✓ ✓	Future site users Off-site users
			Vertical and lateral migration in permeable strata	✓	Principal Aquifer
Off-site – current: Substations Made Ground **Off site – historical:** Infilled Chalk Pit, tanks and sewage tank	Metals, hydrocarbons, solvents and polychlorinated biphenyls (PCBs)	Groundwater	Direct contact/ingestion	✓	Future site users
			Inhalation of volatiles	✓	Future site users
On and off-site – Made Ground and infilled pits	Carbon dioxide and methane	Ground gas	Inhalation of ground gas	✓ ✓	Future site users Off-site users
			Explosive risks	✓ ✓	Future site users Off-site users

4 INTRUSIVE SITE INVESTIGATION

4.1 Introduction

4.1.1 A supplementary intrusive site investigation was carried out by RPS in October 2020 to further investigate ground conditions at the Application Site to inform the design of the proposed data centre along with material re-use for earthworks.

4.1.2 The supplementary site investigation also provided further information relating to whether pollutant linkages identified within the outline CSM (see Table 3.1) are currently active or will be made active upon redevelopment of the site.

4.2 Description of Works

4.2.1 The supplementary site investigation was carried out between 5 October and 8 October 2020 with additional works being undertaken between 11 November and 13 November 2020 and comprised:

- excavation of 15 trial pits to depths of up to approximately 3.50m bgl using a mechanical excavator (TP101 to TP115);
- excavation of two pits to depths of up to approximately 0.90m using hand digging methods (HP101 and HP102);
- geotechnical sampling throughout the depth of all trial pits; and
- undertaking three soakaway tests in accordance with BRE365 within selected trial pits (TP113 to TP115);
- excavation of one borehole to a depth of up to approximately 10m bgl using dynamic sampling and open hole drilling methods (BH201);
- excavation of three boreholes to depths of up to approximately 2.00m bgl using window sampling drilling techniques (BH202 to BH204); and
- undertaking infiltration testing within each borehole BH201 to BH204.

4.2.2 An exploratory hole location plan is provided as Figure 3.

4.2.3 The soil arisings from each exploratory hole were carefully examined for visual and olfactory evidence of contamination. Headspace testing was undertaken on site for ionisable volatile organic compounds (iVOCs) using a portable Photo-Ionisation Detector (PID).

4.2.4 Ground gas monitoring was undertaken on three occasions using the existing wells on site between the 9^{t} October and the 21 October. Installations were monitored for concentrations of methane, carbon dioxide, carbon monoxide, hydrogen sulphide, oxygen and iVOCs. In addition, the flow rate and barometric pressure were recorded.

4.3 Investigation Rationale

4.3.1 The rationale behind each of the site investigation locations is summarised in the table below.

Table 4.1: Exploratory Location Rationale

Exploratory Location ID	Location on site	Rationale
TP101 to TP112	Across whole site	These trial pits were located across the site to ensure general geotechnical and geo-environmental coverage.
TP113 and TP114	North East Corner	Targeted within the proposed location of the attenuation pond for soakaway testing.

Exploratory Location ID	Location on site	Rationale
TP115	South of the site	Targeting a proposed soakaway location and historical tank.
HP101 and HP102	West and centre of the site	Targeting location of historical substations.
BH201	North east corner	Targeted within the proposed location of the attenuation pond for borehole infiltration testing.
BH202 to BH204	North east corner	Targeted close to the existing drainage ditch to undertake infiltration tests.

4.4 Site Restrictions

4.4.1 Due to the presence of the existing data centre in the north east of the site, trial pits for soakaway testing and borehole soakaway testing could only be undertaken in the southern end of the proposed attenuation pond. Site investigation exploratory locations were also not feasible in these areas of the Application Site.

4.5 Laboratory Testing

Geo-Environmental Laboratory Testing - Soil

4.5.1 16 samples of Made Ground were submitted to a UKAS/MCERTS accredited laboratory and analysed for a number of determinands including

- Inorganic Determinands:
  - pH, arsenic, cadmium, chromium, hexavalent chromium, copper, lead, mercury, nickel, sulphide, total cyanide, sulphate, sulphur, selenium, zinc and asbestos.
- Organic Determinands:
  - Speciated polyaromatic hydrocarbons (PAH), speciated total petroleum hydrocarbons (TPH CWG) including benzene, toluene, ethylbenzene and xylenes (BTEX) and methyl tert-butyl ether (MTBE), volatile organic compounds (VOCs), PCBs, and monohydric phenol.

Geo-Environmental Laboratory Testing - Groundwater

4.5.2 Groundwater was not encountered within any of the pre-existing boreholes installed as wells by Arcadis on the Application Site, as such no testing of groundwater was undertaken as part of the supplementary site investigation.

Geotechnical Laboratory Testing

4.5.3 Samples of the Made Ground and West Melbury Marly Chalk Formation were submitted to a UKAS accredited geotechnical testing laboratory and analysed for Moisture Content, Particle Density, Particle Size Distribution (PSDs), Compaction Testing and Intact Dry Density.

5 SITE INVESTIGATION FINDINGS

5.1 Geology

5.1.1 The strata encountered during the July and October 2020 RPS intrusive investigations are summarised in the table below and described in the following section, including data from the previous Arcadis investigation.

Table 5.1: Encountered Strata

Strata	Depth to top of strata (m AOD)	Thickness (m)
Topsoil	Ground Level (177.40 to 170.49)	0.10 to 0.25
Made Ground	Ground Level to 0.25 (178.16 to 170.24)	0.15 to 3.20
West Melbury Marly Chalk Formation	0.30 to 3.20 (177.62 to 170.91)	4.43 to 6.65 (where proven) Up to 14.80 (not proven)
Upper Greensand Formation	4.90 to 7.90 (170.29 to 168.88)	3.10 to 5.55 (not proven)

5.1.2 The Application Site is generally open land with Topsoil or Made Ground present from the ground surface. Hardstanding is present in areas of buildings and roads, but no exploratory holes were located in these areas.

5.1.3 Obstructions were encountered within two trial pits at depths of 0.60m and 1.90m bgl. The obstructions consisted of concrete slabs or brick foundations.

5.1.4 The ground conditions encountered align with the published geology. It is noted the Upper Greensand Formation was only encountered in three of the six previous boreholes and that Made Ground of greater than 1.25m in thickness was only encountered within two trial pit locations.

5.1.5 Topsoil was encountered in seven locations above the Made Ground and was generally grass over brown slightly gravelly clay with frequent plant roots and rootlets.

5.1.6 General descriptions of the strata encountered during the intrusive investigation are summarised below. Reference should be made to the exploratory hole logs within Annex D of this report for full descriptions of ground conditions underlying the site.

Made Ground

5.1.7 Made Ground was generally present from ground level or from below the Topsoil, ranging in thickness from approximately 0.15m to 3.20m, but in general was only up to 1.25m in thickness.

5.1.8 The stratum was variable in nature, but generally comprised gravelly silty clay with frequent cobbles of brick and concrete. Gravel was angular to subrounded flint, chalk, brick, coal fragments and wood. Occasional pockets of ash were also noted.

5.1.9 Atterberg Limit testing was undertaken on nine soil samples collected from the Made Ground at depths ranging from approximately 0.10m to 1.20m bgl. This testing was undertaken to determine values for Liquid Limit (LL), Plastic Limit (PL) and Plasticity Index (PI). The results for LL ranged from 31% to 90%. The results for PL ranged from 17% to 36%. The results for PI ranged from 14% to 60%. This is indicative of a variable material, comprising low to high plasticity clay. Modified plasticity index values indicate that these samples have a low to high volume change potential.

5.1.10 Natural Moisture Content testing was undertaken on 12 samples from 0.10m to 1.20m bgl and ranged in value from 9.0% to 32.7%.

5.1.11 Particle Density testing was undertaken on three samples of Made Ground from 0.30m to 0.50m bgl and ranged in value from 2.60Mg/m^3 to 2.64Mg/m^3.

5.1.12 Particle Size Distribution (PSD) testing was undertaken on five samples collected from the Made Ground at depths of approximately 0.10m to 1.70m bgl. The constituents of the sample are summarised below:

- Cobbles: 0% to 20%;
- Gravel: 3% to 54%;
- Sand: 6% to 28%; and
- Silt/clay 9% to 91%.

5.1.13 This is indicative of a variable material ranging from granular to cohesive in nature with cobbles present within some samples. This is in line with the description of the material across the Application Site.

5.1.14 Compaction testing using a 2.5kg rammer was undertaken on three samples of the Made Ground at depths of approximately 0.30m to 0.50m bgl in order to determine their dry density relationship. The particle density of these samples ranged from 2.60Mg/m^3 to 2.64Mg/m^3, the maximum dry density ranged from 1.33Mg/m3 to 1.69Mg/m^3. The optimum moisture content ranged from 16% to 29.6%.

5.1.15 Moisture Condition Value (MCV) was determined on one sample of the Made Ground at a depth of 0.30m bgl. This gave a moisture condition value ranging from 18.7 to 7.6 across a moisture content range of 16.7% to 27.4%

West Melbury Marly Chalk Formation

5.1.16 The West Melbury Marly Chalk Formation was encountered beneath the Made Ground at depths ranging from approximately 0.30m to 3.20m bgl (177.62m to 170.91m AOD). The thickness of the stratum ranged from approximately 4.43m to 6.65m, where proven in boreholes BH04 to BH06 and up to 14.80m in borehole BH02. The thickness of the West Melbury Marly Chalk Formation was generally greatest in the western part of the site decreasing eastwards.

5.1.17 The stratum was variable in nature but generally comprised an upper layer of structureless chalk composed of white/cream gravelly silt with medium cobble content of very weak to weak chalk (Grade Dm). This become a structureless chalk composed of white/off white silty gravel and cobbles (Grade Dc) between 1.10m and 2.70m bgl. Clasts were low density very weak to weak chalk. At depth, this changed into an extremely weak to weak low to medium dense brownish grey chalk with mediumly spaced fractures.

5.1.18 Atterberg Limit testing was undertaken on nine soil samples collected from the West Melbury Marly Chalk Formation at depths ranging from approximately 0.50m to 6.00m bgl. The results for LL ranged from 39% to 59%. The results for PL ranged from 22% to 31%. The results for PI ranged from 14% to 32%. This is indicative of a variable material, comprising intermediate to high plasticity clay. Modified plasticity index values indicate that these samples have a low to medium volume change potential.

5.1.19 Natural Moisture Content testing was undertaken on 12 samples from 1.00m to 6.50m bgl and ranged in value from 15.5% to 27.6%.

5.1.20 Saturated Moisture Content testing was undertaken on two samples from 3.00m and 3.20m bgl. This gave bulk density values of 2.13Mg/m^3 and 2.01Mg/m^3, dry density values of 1.81Mg/m^3 and 1.67Mg/m^3, saturated moisture content of 18% and 23 % with porosity of 33% and 38%.

5.1.21 38 Standard Penetration Tests (SPTs) undertaken within the West Melbury Marly Chalk Formation at depths ranging from approximately 1.20m to 14.00m bgl (176.82m to 161.58m AOD) ranged from N = 16 to N > 50.

5.1.22 Six Uniaxial Compressive Strength tests were undertaken on samples collected from the West Melbury Marly Chalk Formation at depths ranging from 4.10m to 14.00m bgl. The results ranged from 0.224 to 10 MPa.

5.1.23 12 Point Load strength tests were undertaken on samples collected from the West Melbury Marly Chalk Formation at depths ranging from 3.50m to 15.50m bgl. The Point Load Index Is^{50} of these samples ranged from 0.03 to 0.43 MPa.

5.1.24 Five Particle Density test were undertaken on samples collected from the West Melbury Marly Chalk Formation at depths ranging from approximately 0.70m to 3.00m bgl. The particle density values ranged from 2.57Mg/m^3 to 2.63Mg/m^3.

5.1.25 Compaction testing using a 4.5kg rammer was undertaken on four samples of the West Melbury Marly Chalk Formation at depths of approximately 0.30m to 0.50m bgl in order to determine their dry density relationship. The particle density of these samples ranged from 2.61Mg/m^3 to 2.65Mg/m^3, the maximum dry density ranged from 1.64Mg/m^3 to 1.82Mg/m^3. The optimum moisture content ranged from 15% to 16.7%.

5.1.26 Moisture Condition Value (MCV) was determined on one sample of the West Melbury Marly Chalk Formation at a depth of 2.00m bgl. This gave a moisture condition value ranging from 15.3 to 4.7 across a moisture content range of 20.5% to 32%

Upper Greensand Formation

5.1.27 The Upper Greensand Formation was encountered beneath the West Melbury Marly Chalk Formation in four boreholes BH04 to BH06 and BH201 at depths ranging from approximately 4.90m to 7.90m bgl (170.29m to 168.88m AOD). The proven thickness of the stratum ranged from approximately 3.10m to 5.55m. The stratum comprised extremely weak to weak greenish grey fine sandstone with widely space fractures and red staining.

5.1.28 Eight SPTs undertaken within the Upper Greensand Formation at depths ranging from 5.50m to 10.00m bgl (169.89m to 164.78m AOD) gave results of N = 15 to N_{60} = 46.

5.1.29 Four Uniaxial Compressive Strength tests were undertaken on samples collected from the Upper Greensand Formation at depths ranging from 5.10m to 10.40m bgl. The results ranged from 0.180 to 0.333 MPa.

5.1.30 Four Point Load strength tests were undertaken on samples collected from the Upper Greensand Formation at depths ranging from 6.10m to 9.90m bgl. The Point Load Index Is^{50} of these samples ranged from 0.01 to 0.79 MPa.

5.2 Groundwater

5.2.1 Groundwater was not encountered within any of the trial pits excavated during the RPS supplementary investigation. Groundwater was also not encountered during the Arcadis site investigation and subsequent monitoring of wells by Arcadis and RPS.

5.3 Field Evidence of Contamination

Visual and Olfactory Evidence of Contamination

5.3.1 Visual and olfactory evidence of contamination encountered during the intrusive investigation and subsequent monitoring is summarised in the table below:

Table 5.2: Field Evidence of Soil Contamination

Exploratory Hole ID	Depth (m bgl) (m AOD)	Strata	Observation	Site location
TP108	Ground Level to 0.30 (171.28 to 170.98)	Made Ground	Asbestos	Next to the eastern data centre
TP111	1.70 to 3.20 (176.46 to 174.96)	Made Ground	Slight hydrocarbon odour and ashy pockets	Centre of the site
TP115	0.40 to 1.00 (174.01 to 173.41)	Made Ground	Localised hydrocarbon odour and ashy pockets	Central southern near to data centre

5.3.2 TP115 is located in the region of a historic tank, whilst TP108 and TP111 are in areas of significant Made Ground

5.3.3 No visual/olfactory evidence of contamination was noted during the previous Arcadis site investigation.

Photo-Ionisation Detector (PID) Readings

5.3.4 All readings were below the instrument limit detection (<0.1ppm) during the intrusive investigation.

5.3.5 During the subsequent monitoring, a peak reading of 1.4ppm was recorded in monitoring well BH04 on the 18 October 2020. This reading is not considered to be indicative of a significant source of contamination.

5.4 Ground Gas Monitoring

5.4.1 Ground gas monitoring was undertaken on three occasions between 10 October and 21 October 2020 by RPS. Installations were monitored for concentrations of methane, carbon dioxide and oxygen. In addition, the flow rate and barometric pressure were recorded. The results of the ground gas monitoring are presented in Annex F.

5.4.2 Methane was recorded at levels below the machine detection limit in all boreholes. Carbon dioxide was recorded at a maximum concentration of 3.9% v/v within monitoring well BH05, screened within the West Melbury Marly Chalk Formation and Upper Greensand Formation on 21 October 2020.

5.4.3 The maximum recorded peak ground gas flow rate was 3.0l/hr, recorded in monitoring well BH01, screened within the West Melbury Chalk Formation on 18 October 2020.

5.4.4 The lowest recorded oxygen concentration was 14.6% v/v within monitoring well BH04 on 18 October 2020. Atmospheric pressure ranged from 972mb to 990mb during the three monitoring periods.

5.4.5 CIRIA Report C665 '*Assessing risks posed by hazardous ground gases to buildings'* outlines indicative guideline concentrations for carbon dioxide and methane in association with gas flow rates for which gas protection measures may be required in new residential or commercial developments. The methodology is based on the Modified Wilson and Card approach that characterises the gas regime into a series of Characteristic Situations (1 to 5), with corresponding indicative gas protection measures. Using this methodology, the ground gas regime at this site corresponds to Characteristic Situation 1, whereby no specific gas protection measures are required.

5.5 Soakaway/Infiltration Testing Results

5.5.1 Soakaways tests were undertaken within trial pits TP113, TP114 and TP115. Trial pits TP113 and TP114 targeted the proposed infiltration pond in the east of the site and were excavated to a depth of 2.00m bgl. TP115 targeted a proposed soakaway in the south of the Application Site and was dug to 2.50m bgl.

5.5.2 Soakaway tests were also undertaken within boreholes BH201 to BH204, BH201 to target the proposed infiltration pond area, whilst BH202 to BH204 targeted the existing drainage ditch running along the eastern boundary.

5.5.3 Trial pit infiltration rates are calculated by measuring the time taken for the water level to fall from 75% to 25% effective storage depth in the test pit.

5.5.4 Borehole infiltration rates are calculated by taking the length of time the test is running and divide it by the level of the water at that time. Once this reach 0.37, the time taken to reach this value is used to determine the infiltration rate based on the properties of the well, (size, head of water etc).

5.5.5 Three full infiltration tests where completed in trial pit TP115 while only one was completed in TP114, as all remaining tests failed to drain to a sufficient level to determine a soil infiltration rate.

5.5.6 Three full infiltration tests and one shallow test where completed in borehole BH201 and two full tests where undertaken in BH202. Two tests were undertaken within BH203 and BH204 both tests did not full drain but enough drained to allow for the data to be interpolated and infiltration rate calculated.

5.5.7 The calculated infiltration rates are presented in the tables below and the full test calculation presented in Annex C.

Table 5.3: Soakaway Testing Results

Exploratory Hole ID	Test Result 1 (m/s)	Test Result 2 (m/s)	Test Result 3 (m/s)
TP113	Insufficient fall	Insufficient fall	n/a
TP114	$3.82x10^{-7}$	Insufficient fall	n/a
TP115	$1.87x10^{-5}$	$2.05x10^{-5}$	$2.44x10^{-5}$
BH201	$1.03x10^{-6}$	$1.41x10^{-6}$	$1.07x10^{-6}$
BH202*	$1.70x10^{-7}$	$4.67x10^{-7}$	n/a
BH203**	$7.11x10^{-8}$	$6.86x10^{-8}$	n/a
BH204**	$4.90x10^{-8}$	$6.39x10^{-8}$	n/a

* Groundwater present within well at 1.10m bgl.

** Infiltration rates are based on interpolation of the data.

5.5.8 A fourth test was undertaken within BH201 with the water being filled to 7.20m bgl as such testing the infiltration rate within the Upper Greensand Formation at the base of the hole. This resulted in an infiltration rate of $9.97x10^{-7}$m/s.

5.5.9 These test results have been used to inform the drainage design philosophy (document reference 20305S-RPS-00-XX-RP-D-9605).

6 CHEMICAL RESULTS AND ASSESSMENT

6.1 Introduction

6.1.1 Chemical analysis of representative soil samples was undertaken as part of the RPS site investigation and as part of the previous Arcadis site investigation. The concentrations of contaminants of concern was compared to published generic assessment criteria (AC) to determine whether the concentrations represent an unacceptable risk to post development human health receptors.

6.2 Human Health Assessment Criteria

6.2.1 In order to assess risks to future site users, concentrations of contaminants of concern have been compared to Suitable 4 Use Levels (S4UL) published by Land Quality Management: Chartered Institute of Environmental Health (LQM:CIEH) in 2015. *In accordance with the copyright notice the Publication Number for RPS Group is S4UL3177.*

6.2.2 Given the proposed use of the site as a data centre, the assessment has been based on a commercial land use criteria.

6.2.3 Soil Organic Matter (SOM) for samples of Made Ground collected on site ranged from NDP to 4.20%. Concentrations of contaminants of concern have therefore been compared to S4UL (1% SOM) values.

6.2.4 A notable exclusion from the S4ULs is lead. In the absence of a S4UL for lead, the Category 4 Screening Level (C4SL) has been selected, published by DEFRA in 2014. It is noted that the C4SL are based on the acceptance of a low level of toxicological concern, rather than the more conservative standard adopted in the derivation of S4ULs, which are based on a tolerable or minimal level of risk.

6.2.5 The potential risk posed to controlled waters from contaminants of concern within soils beneath the Application Site is not addressed by these screening criteria.

Comparison of Soil Analyses to Assessment Criteria

6.2.6 Chemical analysis by a UKAS/MCERTS accredited laboratory was undertaken on 16 samples of Made Ground collected during the RPS supplementary site investigation. A comparison of soil analyses to the relevant generic assessment criteria (AC) is summarised below and presented as Annex G. Analytical certificates for soils are presented in Annex H.

6.2.7 No samples contained contaminants of concern at concentrations above their respective AC within the soil samples collected from the Made Ground.

6.2.8 16 samples of Made Ground were submitted for an asbestos screen. Asbestos was identified in eight of the 16 samples submitted for screening. Chrysotile was identified in six samples of the Made Ground at a depth ranging from 0.20m to 0.50m bgl in trial pits TP101, TP103, TP110, TP112, TP113 and hand pit HP101. Amosite was identified in one sample at 0.30m bgl in TP108. Chrysolite, Crocidolite and Amosite where all identified with a sample from 0.25m bgl in TP107.

6.2.9 As part of the previous Arcadis site investigation, 29 samples were analysed and compared against commercial assessment criteria. None of the samples had contaminant concentrations in excess of the assessment criteria for human health receptors. Of the 29 samples eight where screened for asbestos and none was identified.

Summary of Soil Contamination

6.2.10 No soil contaminants have been identified at a concentrations exceeding the adopted AC which indicates that these soil contaminant concentrations do not represent a chronic risk to human health receptors in a commercial land use setting.

6.2.11 Asbestos fibres were detected in eight samples of the Made Ground collected from across the Application Site. The Made Ground is variable across the site and the asbestos fibres do not appear to be restricted to a distinct layer or location.

6.3 Controlled Waters Assessment Criteria

6.3.1 The Application Site is situated above a Principal Aquifer relating to the West Melbury Marly Chalk Formation and Upper Greensand Formation.

6.3.2 No groundwater was encountered during the RPS site investigation or the previous Arcadis site investigation, as such direct chemical analysis and assessment of the groundwater against the assessment criteria was not possible.

6.3.3 However, as part of the Arcadis investigation soil samples were compared to AC derived by Arcadis for protection of controlled waters (groundwater and surface water). This resulted in 14 exceedances however Arcadis concluded that the risk to controlled waters was low. The following text is taken from that report:

'Various PAH compounds were measured within soil samples at concentrations exceeding the GACs protective of controlled waters (groundwater and surface water). These exceedances were observed in shallow samples from the uppermost 1m. PAH concentrations within the deeper natural deposits were below the laboratory detection limit. PAHs are known to be relatively insoluble and do not readily dissolve in water. Concentrations of PAHs were not found to be elevated in the underlying soils in these locations, confirming that they are not likely to be mobilised by leaching into the underlying aquifer or migrating to nearby surface water receptors.

Elevated TPH was also recorded within one soil sample from 0.2-0.3m in BH06. Total TPH was measured at 335mg/kg, predominantly comprising relatively insoluble heavy-end aromatic hydrocarbons >C16.

Under the proposed development scenario, the site will be under extensive hardstanding limiting infiltration and reducing the likelihood of contaminants leaching into the aquifer. Additionally, groundwater was not encountered during the investigation, suggesting that the water table lies at a depth greater than 10m bgl, further reducing the likelihood of impacts to the underlying aquifer.'

6.3.4 Based on the above information and on-site observations made during the RPS site investigation, RPS considers the risk to controlled waters to be low.

7 REVISED CONCEPTUAL SITE MODEL

7.1 Introduction

7.1.1 The UK approach to the management of land contamination through the development process is risk based as set out by Land Contamination: Risk Management (EA, 2020).

7.1.2 The potential pollutant linkages identified as part of the outline CSM have been assessed in light of the findings of the two site investigations and are discussed below for each of the individual receptors identified.

7.2 Human Health Receptors

Future Site Users and Off-site Human Health Receptors

7.2.1 No soil contaminants were identified at concertation's exceeding the adopted AC.

7.2.2 Asbestos fibres were detected in eight of sixteen samples of Made Ground collected from across the site during the RPS site investigation. The depth and composition of Made Ground is variable across the Application Site and the asbestos fibres do not appear to be restricted to a distinct layer or location of the Made Ground.

7.2.3 In areas of the site proposed to be covered by buildings and hardstanding the risks to on-site users from asbestos in soils via the pathway inhalation will be mitigated. In areas of the completed development which are not covered in either buildings or hardstanding, the pathway of asbestos inhalation could still be active.

7.2.4 Existing grassland and scrub habitat in the north west of the Application Site will be retained and grassland from the centre of the site (identified as having a higher biodiversity value) will be translocated to receptor areas in the south west and east of the site as part of the ecological mitigation. In order to minimise the risk associated with asbestos in Made Ground, these areas will be subject to supplementary shallow soil sampling to enable more detailed assessment of the risk in these areas. If the targeted assessment identifies a potential risk in these areas then it may be necessary to implement a surface cover system in some areas, or design enhanced management systems for these areas such as preventing unauthorised access and controlling the potential for soil disturbance using management plans and a permit to work procedures.

7.2.5 Groundwater is deemed to be at a depth greater than 10m bgl and as such is not considered to represent a risk to human health receptors.

7.2.6 On the basis of the above, on the basis that a site-wide surface cover system is implemented as part of the proposed development, the potential risk to future site users and off-site users from contaminants of concern identified within soils sampled from the site is considered to be **LOW**. In areas where a surface cover system is impractical further soil sampling and risk assessment will be necessary to determine any enhanced mitigation that is required.

Construction/ Maintenance Workers

7.2.7 S4ULs or C4SLs cannot be used to assess the acute (short term exposure) risk that personnel in close contact with exposed soils may experience during demolition, redevelopment or site maintenance duties.

7.2.8 Potential risks to construction workers can easily be controlled in most site areas by the use of appropriate personal protective equipment (disposable coveralls, gloves, and particulate/vapour masks) and by adopting high levels of personal hygiene.

7.2.9 Asbestos fibres were detected in a number of Made Ground samples across the Application Site. An asbestos management plan should be implemented for the proposed redevelopment. Should significant quantities of asbestos be detected in soils during any site redevelopment, a specialist contractor should be approached to advise on removal and disposal.

7.2.10 Providing contractors undertake and implement a site-specific risk assessment and resulting mitigation measures are taken, based on the available information, the potential risk to ground workers is considered to be **LOW**.

7.3 Controlled Waters Receptors

7.3.1 The groundwater is deemed to be present at a depth of greater than 10m bgl, as such samples of the groundwater could not be obtained and analysed. Arcadis assessed the soil concentration using in-house assessment criteria and concluded that the soil contamination risk to controlled waters was low.

7.3.2 Under the proposed development, the Application Site will be under extensive hardstanding limiting infiltration and reducing the likelihood of contaminants leaching into the aquifer. Additional groundwater was not encountered during the intrusive investigation or subsequent monitoring visits, suggesting the groundwater lies at least at a depth greater than 10m bgl.

7.3.3 The proposed infiltration pond and cellular soakaway will be located directly within the chalk bedrock (see the Drainage Strategy document reference 20305S-RPS-00-XX-RP-D-9605), which will mitigate the risk of the contaminants of concern from the Made Ground leaching into the groundwater On the basis of the above, the potential risk to groundwater and surface water from contaminants of concern originating from the site is considered to be **LOW**.

7.4 Structures and Infrastructure

Buildings (on site and off site)

7.4.1 Based on ground gas monitoring undertaken on site as part of the current investigation, CIRIA CS1 is applicable to the Application Site, whereby no specific ground gas protection measures are required for new buildings.

Polymeric Utility Pipes

7.4.2 Elevated concentrations of hydrocarbon contaminants were recorded within samples collected from soils on site. Standard polymeric utility pipes may therefore be unsuitable for the proposed development. Barriers may be required for new underground utilities, or service pipes laid in dedicated trenches and backfilled with clean, inert material.

7.4.3 Requirements for buried utility pipes should be discussed with service providers before the development stage. Provided the recommended mitigation measures are adopted, the risk posed to buried services is considered to be **LOW**.

7.5 Revised Conceptual Model

7.5.1 The potential source-pathway-receptor linkages and associated risks upon completion of the proposed development as identified following completion of the assessment, are summarised in the revised CSM below.

7.5.2 The risk assessment is based upon the available information relating to the Application Site and recommended mitigation measures being implemented. Should unforeseen ground conditions or ground conditions inconsistent with those outlined in this report be encountered RPS should be contacted to enable further assessment.

Table 7.1: Revised Post Development Conceptual Site Model

Potential Sources	Contaminants of Concern	Via	Potential Pathways	Potentially Active Linkages	Receptors
On site – current: Made Ground **On site – historical:** Hospital, tanks, substations and infilled pit	Asbestos	Soil	Direct contact/ingestion	**x1**	Future site users
			Inhalation of volatiles	**x**	
			Airborne migration of soil or dust	**x1**	Off-site users
			Leaching of mobile contaminants	**x**	Principle Aquifer
On and off-site – Made Ground and infilled pits	Carbon dioxide and methane	Ground gas	Inhalation of ground gas	**x** **x**	Future site users Off-site users
			Explosive risks	**x** **x**	Future site users Off-site users

1 Surface cover system required to mitigate post development risk associated with asbestos in Made ground. Further sampling and assessment required to determine mitigation in areas where a surface cover system is not practicable.

8 GEOTECHNICAL ANALYSIS

8.1 Introduction

8.1.1 It is proposed to replace the existing data centre buildings with a new data centre. The replacement data centre will have associated parking, infrastructure and an infiltration pond. A proposed development plan is provided as drawing ref. 20305S-RPS-00-XX-DR-A-9501.

8.1.2 Preliminary loads for the development indicate they will be a maximum of 1,800kN. The recommendations below will need to be reviewed in light of subsequent detailed design.

8.2 Preliminary Geotechnical Risk Register

8.2.1 The table below summarises the potential geotechnical hazards associated with the development. The table provides an assessment of whether the site is likely to be affected by the hazard and the possible consequences and engineering considerations.

Table 8.1: Geotechnical Risk Register

Hazard Description	Potential for Hazard (High / Medium / Low / NA)	Comments / Possible Engineering Requirements
Sudden lateral / vertical changes in ground conditions	M	The ground conditions from existing ground level are generally consistent with Topsoil or Made Ground from ground level overlying the West Melbury Marly Chalk Formation. The Made Ground was variable but generally was up to 1.25m thick except in a couple of areas where 3.20m of Made Ground was encountered. The West Melbury Marly Chalk Formation will provide a suitable bearing stratum for the proposed design loads, where this is encountered at shallow depth with an allowable bearing pressure of 200kN/m2 on the Grade Dm chalk. Where grade Dc Chalk is encountered, bearing pressures may be higher in accordance with guidance provided in CIRIA C574.
Highly compressible / low bearing capacity soils, (including peat and soft clay)	L/M	A variable thickness of Made Ground was encountered across the site. Generally, this was up to 1.25m in thickness but was locally recorded up to 3.20m thick in one location.
Ground dissolution features / natural cavities	L	The Chalk Cavity database report indicates no dissolution features are likely to be present on site, however this should not be taken as conclusive. The site investigation also did not encounter these features on site. Foundation and drainage design should follow guidance set out in CIRIA C574 “Engineering in Chalk”.
Shrinking and swelling clays	L/M	The Made Ground is granular and cohesive in nature across the site. Testing has indicated it has low to high volume change potential. The underlying West Melbury Marly Chalk Formation is generally granular in nature, but the upper layers are weathered and are more cohesive in nature. Testing has indicated these have a low to moderate volume change potential.
Slope stability issues	L	Whilst the site has topography changes and generally slopes to the south, no significant slopes are present on site. Any temporary slopes created as part of the development should be subject to appropriate

Hazard Description	Potential for Hazard (High / Medium / Low / NA)	Comments / Possible Engineering Requirements
		geotechnical design based on site-specific site investigation information.
High groundwater table (including waterlogged ground)	L	Groundwater was not encountered during the investigation or subsequent monitoring visits. Excavations undertaken as part of the investigation works were all stable.
Filled and Made Ground (including embankments)	L/M	Made Ground was encountered to a maximum depth of up to 3.20m bgl beneath the site but in general was only up to 1.25m in thickness.
Obstructions (including foundations, services, basements, tunnels and adjacent sub-structures)	L/M	The Application Site has had a significant development history. Relic structures were encountered within two of the trial pits at depths of 0.60m and 1.90m. Such obstructions may require removal to enable the construction of the proposed development. It is likely these obstructions may be removed using standard construction plant.
Underground mining	L	The Chalk Cavity database report indicates underground mining is unlikely to be present on site, however this should not be taken as conclusive given the ground conditions
Concrete classification	L/M	Testing has indicated a Design Sulphate Class of DS-2 and an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC-1s would be appropriate for all buried concrete structures.
Seismic Activity	L	The Eurocode 8 seismic hazard zoning maps for the UK (Musson and Sargeant, 2007) indicate that horizontal Peak Ground Acceleration (PGA) values with 10% probability of being exceeded in 50 years (475 year return period) are between 0.00 and 0.02g, which is considered very low.

8.3 Preliminary Geotechnical Parameters

The following table shows the anticipated ground model and geotechnical parameters based of the findings of the intrusive investigation and subsequent testing.

Table 8.2: Preliminary Ground Model and Geotechnical Parameters

Stratum	Made Ground	West Melbury Marly Chalk Formation	
		Grade Dm	Grade Dc
Depths (m bgl)	Ground Level to 1.25	1.25 to 2.25	2.25 to 6.00
Bulk Unit Weight (kN/m^3)	20	19	19
Effective Angle of Friction (°)	-	33[a]	33[a]
Peak Effective Angle of Friction (°)	-	33[a]	33[a]
Secant Modulus Es (MPa)	-	6[b]	200 (short term)[c] 75 (long term)[c]

a. After CIRIA C574 Engineering in Chalk for matrix dominated White Chalk.
b. After CIRIA C574 Engineering in Chalk for Grade Dm Chalk.
c. After CIRIA C574 Engineering in Chalk for Grade Dc Chalk.

8.4 Foundation Solutions

8.4.1 It is proposed to form a development plateau for the data centre with a finished floor level of 175.50m AOD. Detailed earthwork drawings are not currently available but based on current levels across the area of the development both cut and fill would be required to create the proposed plateau, with up to approximately 1.50m of fill being required in some areas, from current ground surface. It has been assumed that the Made Ground along with any relic structures encountered will be stripped from the area of the plateau prior to fill commencing.

Traditional Foundations

8.4.2 Due to the inherent textural, compositional variability and compressibility of the Made Ground, this is considered unsuitable as a bearing stratum for shallow foundations.

8.4.3 It is anticipated that following the earthworks both fill material and in-situ material will be present within the proposed building footprint. Based on SPT results it is anticipated that Grade Dm West Melbury Marly Chalk Formation will be present at 1.25m to 2.00m bgl which will be able to support pad foundations, with an allowable bearing capacity of 200 kN/m^2. Building foundations will need to be extended through any placed fill to found on the Grade Dm chalk below.

8.4.4 As such a 3m x 3m pad foundation founded at 1.25m to 2.00m onto the Grade Dm West Melbury Marly Chalk Formation would be able to support the maximum likely loads from the development. Smaller pad foundations should be sized accordingly for lower columns loads

8.4.5 The foundation excavations should be inspected by the site engineer before placing foundation concrete. If Made Ground, low strength cohesive material or loose granular material is encountered at the target bearing depth, foundations should be taken deeper to an appropriate formation level or the unsuitable material should be excavated and replaced with compacted granular fill.

Earthworks

8.4.6 It is anticipated that any earthworks undertaken on the Application Site will strip all topsoil prior to commencing any works. This is to be stored and re-used as per an earthwork specification and site plan.

8.4.7 It is anticipated that any earthworks will encounter the Made Ground and underlying West Melbury Marly Chalk Formation, but not the Upper Greensand Formation which is located at depths greater than 4m beneath the Application Site.

8.4.8 The Made Ground is both granular and cohesive in nature and subject to the appropriate screening, handling, testing, placement and compaction should be suitable as a general class 1 (General Granular Fill) or class 2 (General Cohesive Fill).

8.4.9 The West Melbury Marly Chalk Formation is generally wet of optimum moisture content and may require some moisture content modification before it can be re-used. However, following this and subject to appropriate screening, handling, placement, compaction and testing it should be suitable for reuse as a class 3 fill material. Notwithstanding the recommendations in Trenter and Charles[1] and CIRIA C574 with regard to the use of chalk as an earthwork's material.

[1] Trenter, N A & Charles, J A, A Model Specification for Engineered Fills For Building Purposes, Proceedings of the Institution of Civil Engineers: Geotechnical Engineering, 1996-10

8.5 Chalk Cavities and Chalk Mines

8.5.1 A chalk cavity database search and desk-based assessment was undertaken for the site, this concluded a low risk for the presence of natural cavities and mining cavities. No natural cavity records or mining cavity records where present within 1km of the Application Site.

8.5.2 During the intrusive investigation no evidence of dissolution or mining features were encountered. Due to the nature of these features this does not negate the possibility of them being present on site. However, it is proposed to undertake earthworks across the site as part of the development, including the stripping of the topsoil. it is recommended this is undertaken under geotechnical supervision such that if any dissolution features are present at ground surface they can be identified.

8.5.3 Based on these observations, a low risk rating for the site is applicable. The Cavities Occurrence Assessment is provided in Annex H.

8.6 Floor Slabs

8.6.1 It is anticipated that either fill material or the West Melbury Marly Chalk will be present a floor slab formation level beneath the proposed development due to the earthworks being undertaken on site. For a ground bearing floor slab to be adopted, any fill material should be placed and compacted to match the geotechnical properties of the natural soil in order to support a ground bearing floor slab, in accordance with an agreed earthworks specification.

8.6.2 It should be noted that the gas monitoring carried out to date indicates a characteristic situation 1 in accordance with CIRIA document C665. This requires no gas protection measures.

8.7 Pavements

8.7.1 It is understood areas of hardstanding, car parking and access roads will be present across the site. Exact levels have not been determined as yet but it is understood these are likely to be constructed on the West Melbury Marly Chalk Formation which forms the development plateau.

8.7.2 Given the nature of the West Melbury Marly Chalk Formation encountered across the site and the results of the in-situ testing, it is recommended that the formation layer is proof rolled and with any soft spots removed and replaced with granular material. Following this, and further to the in-situ and laboratory test results, it is recommended that a preliminary design CBR value of 3% would be suitable.

8.7.3 The West Melbury Marly Chalk Formation is susceptible to frost action which may cause heave. As such non-frost susceptible materials should be used with 450mm of the surface.

8.7.4 It would be prudent to undertaken further plate load tests to determine CBR values when final road levels are known, prior to constriction, to assure the design process.

8.8 Chemical Attack on Buried Concrete

8.8.1 Samples collected from the Made Ground were tested for pH and for sulphate content. The results are presented below:

Table 8.3: pH and Sulphate Analytical Data

Strata	No. of samples	pH Range	Characteristic pH	Sulphate Range (mg/l)	Characteristic Sulphate (mg/l)	Design Sulphate Class	ACEC Class
Made Ground	16	7.7 – 8.9	7.9	1.5 - 124	99	DS-1	AC-1

8.8.2 The data was used to assess appropriate classification for buried concrete in accordance with BRE Special Digest 1, based on the following assumptions:

- Brownfield ground conditions; and
- Mobile groundwater conditions.

8.8.3 As part of the previous site investigation an assessment of the ground and groundwater conditions was undertaken, this indicated a DS-2 and AC-1s classification.

8.8.4 Based on the above, it is considered that a Design Sulphate Class of DS-2 and an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC-1s would be appropriate for all buried concrete structures.

8.9 Temporary Works and Excavations

8.9.1 Relic structures were encountered as part of the investigation in two trial pits at 0.60m and 1.90m bgl; these may require total or partial removal to enable construction of the proposed development. It should be possible to excavate any relic structures with conventional earth moving plant.

8.9.2 Groundwater was not encountered at during intrusive works and subsequent monitoring visits. Therefore, groundwater exclusion and control measures may not be required for proposed foundation excavations.

8.9.3 If perched groundwater is encountered during excavation, degradation of the formation may occur. The formation should therefore be adequately protected from seepages and protected from adverse weather conditions. If the formation layer becomes wet resulting in loosening of the surface materials, then excavation may have to be taken deeper in order to find a suitable bearing layer. Instability of excavations in granular material should be expected, especially during periods of adverse weather. Suitable shoring measures or battering back of slopes may be required for any excavations greater than 1.20m bgl. All temporary excavations should be undertaken in accordance with CIRIA Report 97 – Trenching Practice

8.10 Soakaway Drainage

8.10.1 Soakaway testing was undertaken in the east of the site in the location of the proposed infiltration pond. Low permeability and infiltration rates were calculated from these tests indicating that a shallow infiltration-based drainage system would not suitable in this area.

8.10.2 An additional deep borehole infiltration test was undertaken to determine if the deeper chalk and Upper Green Sand Formation would be suitable for borehole-based soakaways. These resulted in higher infiltration rates than those calculated from the trial pit soakaways.

8.10.3 In addition, three shallow borehole soakaways in the area of the existing drainage ditch running along the eastern perimeter of the site were undertaken to determine if reuse of this ditch was feasible for shallow infiltration drainage. These provided variable results, but generally indicated lower permeability values, in keeping with trial pit results.

8.10.4 The results from the soakaway testing showed that an infiltration solution would be feasible at depth. On this basis, an infiltration pond will be located in the north east of the site beneath which is a cellular storage/soakaway to allow flows to infiltrate into the chalk strata at depth. Further information on the infiltration pond is provided in the Drainage Design Philosophy (document reference 20305S-RPS-00-XX-RP-D-9605.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Geo-Environmental

9.1.1 No soil contaminants have been identified at a concentration exceeding the adopted AC which indicates that soil chemical contamination does not represent a chronic risk to human health receptors in a commercial land use setting.

9.1.2 Asbestos fibres were detected in eight of sixteen samples of the Made Ground collected across the Application Site. The Made Ground is variable in its composition and depth across the site and the asbestos fibres do not appear to be restricted to a distinct layer or location.

9.1.3 In areas of the site proposed to be covered by buildings and hardstanding the risks to on-site users from asbestos in soils via the pathway inhalation will be mitigated. In areas of the completed development which are not covered in either buildings or hardstanding, the pathway of asbestos inhalation could still be active.

9.1.4 Existing grassland and scrub habitat in the north west of the Application Site will be retained and grassland from the centre of the site (identified as having a higher biodiversity value) will be translocated to receptor areas in the south west and east of the site as part of the ecological mitigation. In order to minimise the risk associated with asbestos in Made Ground these areas will be subject to supplementary shallow soil sampling to enable more detailed assessment of the risk in these areas. If the targeted assessment identifies a potential risk in these areas then it may be necessary to implement a surface cover system in some areas, or design enhanced management systems for these areas such as preventing unauthorised access and controlling the potential for soil disturbance using management plans and a permit to work procedures.

9.1.5 The groundwater is deemed to be present at a depth of greater than 10m bgl, as such samples of the groundwater could not be obtained and analysed. Based on observations made during the site investigation and the soil analysis, RPS considers the risk to controlled waters to be low.

9.1.6 Areas of the site under hardstanding would limit infiltration and reduce the likelihood of contaminates leaching into the aquifer. Any areas of proposed soakaways should be placed beneath the level of the Made Ground or have the Made Ground removed to mitigate the risk of the contaminants of concern leaching into the groundwater.

9.1.7 There is potential for previously unidentified soil contamination to be encountered during the development process. In the event of such, specialist advice should be sought.

9.2 Geotechnical

9.2.1 It is proposed to replace the existing buildings with a new data centre.. The replacement data centre will have associated parking and infrastructure along with an attenuation pond. Preliminary loads for the development will be up to a maximum of 1,800kN.

9.2.2 It is anticipated that following the earthworks both fill material and in-situ material will be present within the proposed building footprint. Based on site descriptions, laboratory testing and SPT results it is anticipated that Grade Dm West Melbury Marly Chalk Formation will be present at 1.25m to 2.00m bgl which will be able to support pad foundations, with an allowable bearing capacity of 200 kN/m^2.

9.2.3 A chalk cavity database search and desk-based assessment was undertaken for the site, this concluded a low risk for the presence of natural cavities and mining cavities.

9.2.4 It is anticipated that either fill material or the West Melbury Marly Chalk will be present a floor slab formation level beneath the proposed development due to the earthworks being undertaken on site. For a ground bearing floor slabs to be adopted any fill material should be placed and compacted to

match the geotechnical properties of the natural soil in order to support a ground bearing floor slab, in accordance with an agreed earthworks specification.

9.2.5 The site has a significant development history. Relic structures were encountered as part of the investigation in two trial pits at 0.60m and 1.90m bgl, these may require total or partial removal to enable construction of the proposed development. It should be possible to excavate any relic structures with conventional earth moving plant.

9.2.6 Groundwater was not encountered at during intrusive works and subsequent monitoring visits. Therefore, groundwater exclusion and control measures may not be required for proposed foundation excavations.

9.2.7 It is considered that a Design Sulphate Class of DS-2 and an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC-1s would be appropriate for all buried concrete structures.

9.2.8 Soakaway testing in the location of the infiltration pond indicated that infiltration rates would not be adequate for a shallow based infiltration drainage solution. Deeper borehole infiltration testing was undertaken which indicated that borehole soakaways are feasible. An infiltration pond is proposed in the north east corner of the site below which is a cellular storage/soakaway to allow flows to infiltrate into the chalk strata at depth. For further information see the Drainage Design Philosophy (document reference 20305S-RPS-00-RP-D-9605).

FIGURES

Notes

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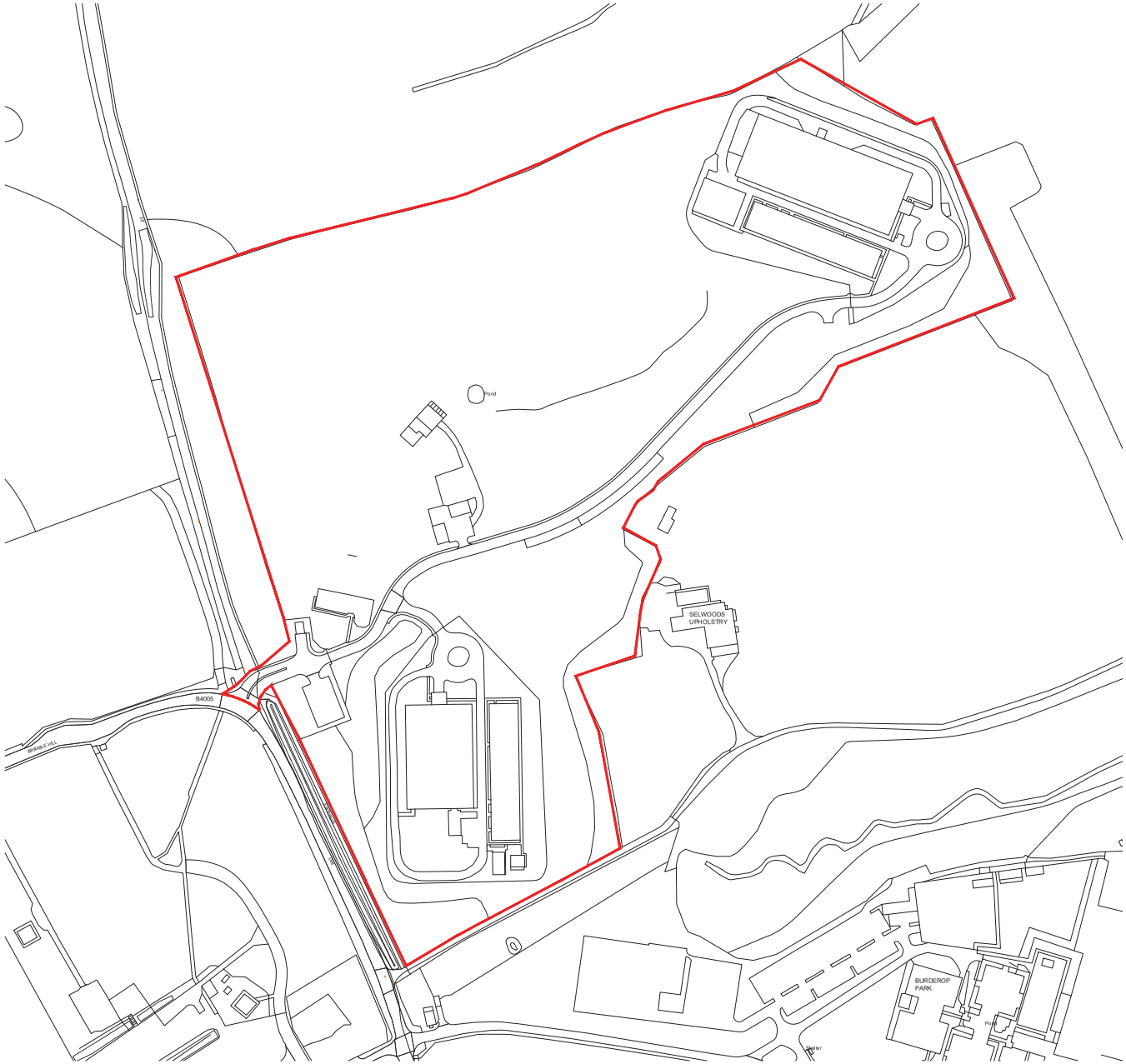
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

Key

Development Boundary

Total Site Area;
11.4 Ha (28.2 acres)



N

25m SCALE 1:1250

Rev	Description	By	Ckd	Date
P01	Planning Issue	AE	LS	03/02/21

MAKING COMPLEX EASY

Sherwood House, Sherwood Avenue,
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Client

Project: Swindon Data Centre

Title: Site Location Plan

Status	Scale	Date Created
Preliminary	1:1250 @ A1	10/09/20

Task Team Manager	Information Author	Task Information Manager
KF	DEC	SM

Document Number
20305S-RPS-00-XX-DR-A-9500
Project Code - Originator - Zone - Level - Type - Role - Drawing Number

RPS Project Number: NK020305S

Revision: P01

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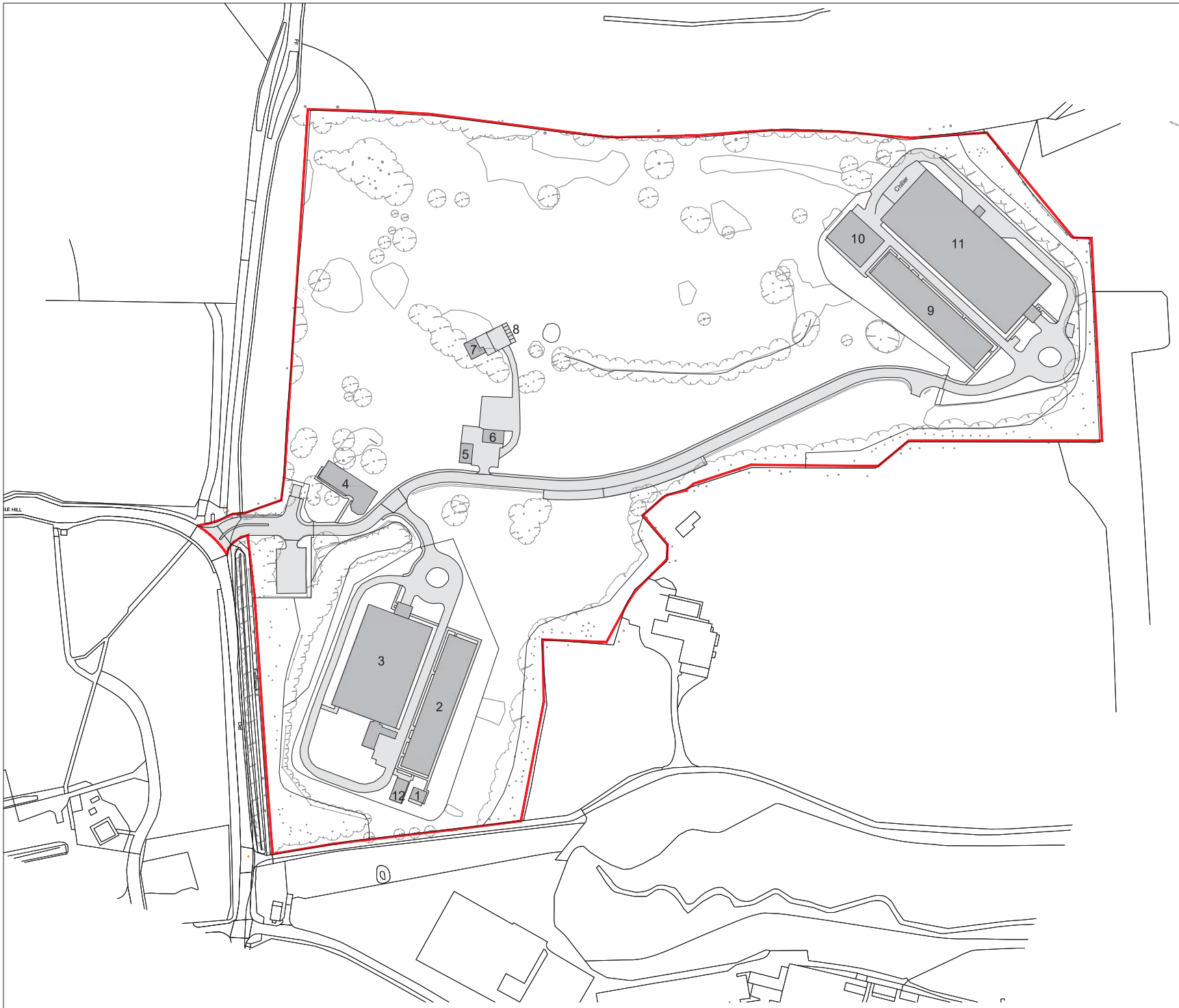

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10m SCALE 1:1000

N

Existing Building Area Schedule

1:	51m²
2:	1,247m²
3:	2,385m²
4:	384m²
5:	73m²
6:	82m²
7:	73m²
8:	33m²
9:	1,237m²
10:	492m²
11:	3,523m²
12:	85m²
Total:	9,665m²

Rev	Description	By	Ckd	Date
P01	Planning Submission	WP	KF	18.02.21

Sherwood House, Sherwood Avenue,
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Client

Project: Swindon Data Centre

Title: Existing Site Plan

Status	Scale	Date Created
Preliminary	1:1000 @A1	18.02.21

Task Team Manager	Information Author	Task Information Manager
KF	WP	SM

Document Number
20305S-RPS-00-XX-DR-A-9502
Project Code - Originator - Zone - Level - Type - Role - Drawing Number

RPS Project Number: NK020305S

Revision: P01

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Key

- Proposed Soakaway Borehole Locations
- Trial Pit Locations
- Soakaway Pit Locations
- Hand Pit Locations
- Arcadis Boreholes July 2020

N

Rev	Description	By	CB	Date

35 New Bridge Street, London, EC4V 6BW
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Client: RPS Newark

Project: [redacted] (Swindon)

Title: Exploratory Hole Location Plan

Status	Drawn By	PM/Checked by
DRAFT	MH	PS

Job Ref	Scale @ A3	Date Created
JER8749	-	Nov 20

RPS Drawing / Figure Number	Rev
03	01

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SPT N vs Depth

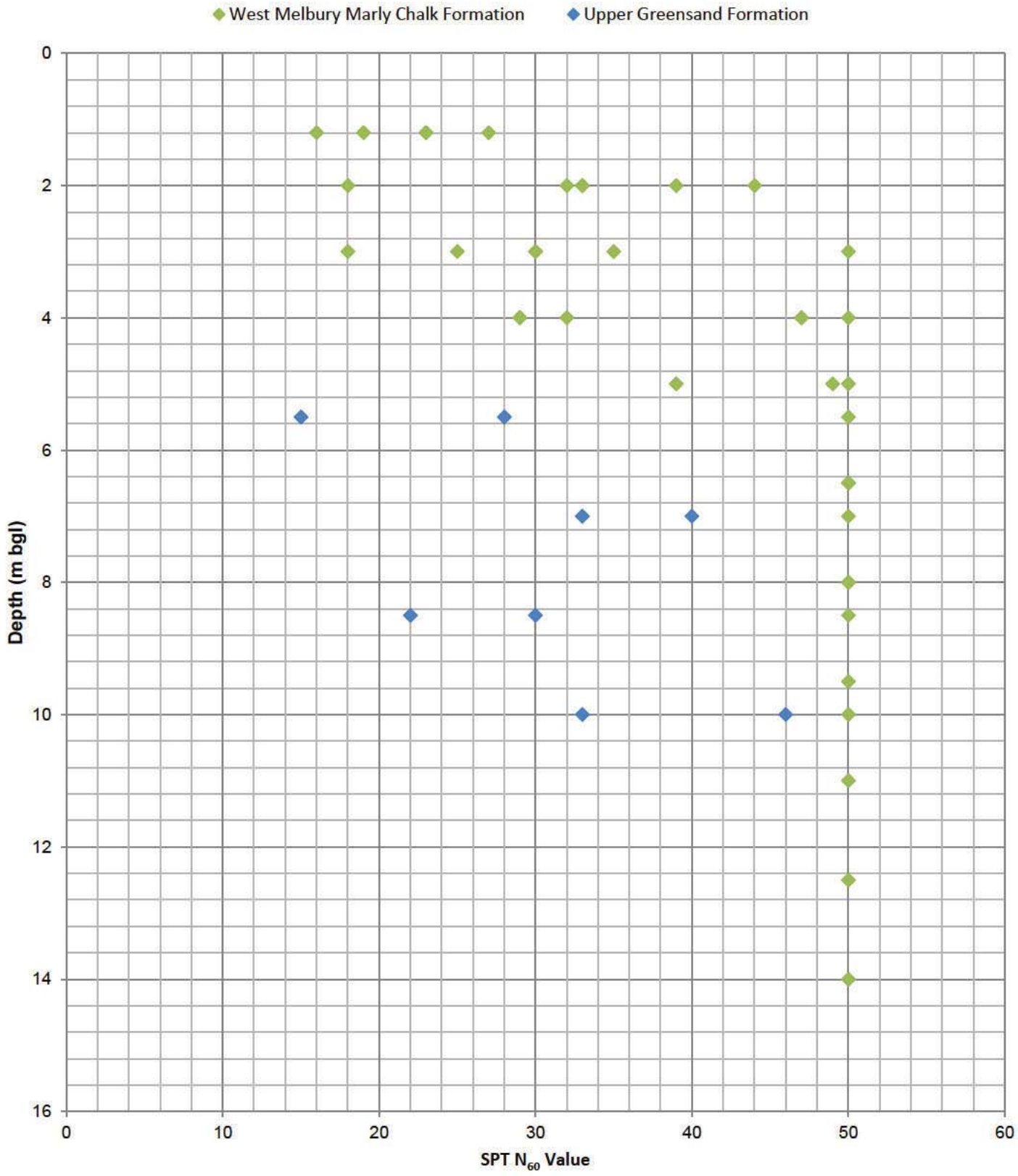
Figure 4

Project ID: **JER8749**

Project Title: [redacted] **Swindon**

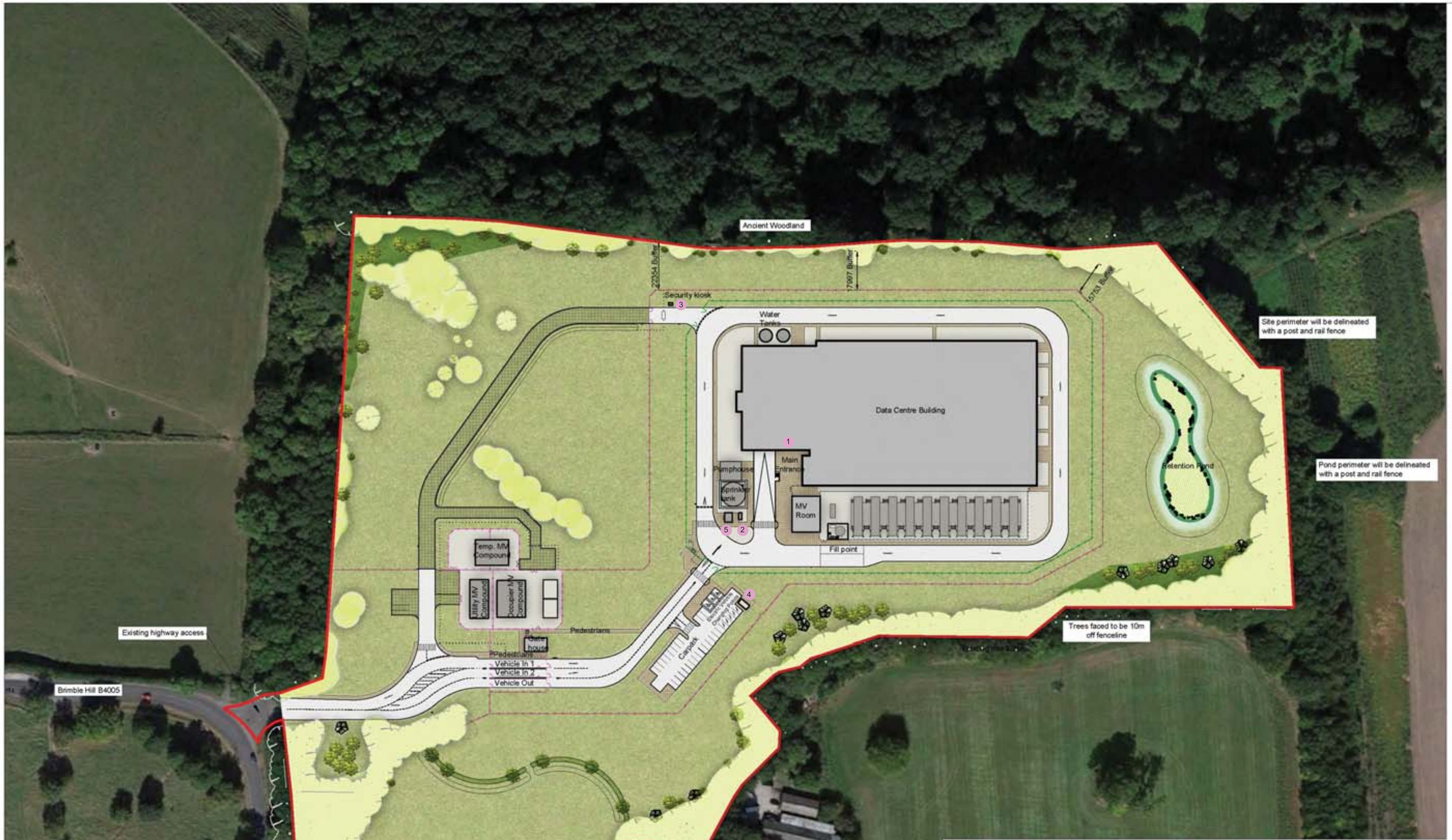
Client: **RPS Newark**

Location: **Swindon**



Date Reported: **06/11/2020**

DRAWINGS



Site Furniture

Entrance Canopy (Image shown for illustration)

Length: 4.9m
Width: 5.1m
Height: 3.0m
Finish: PPC powder coated steel
Colour: Anthracite (RAL 7016)

Smoking Shelter (Image shown for illustration)

Length: 3.135m
Width: 1.540m
Height: 2.25m
Finish: PPC powder coated steel
Colour: Anthracite (RAL 7016)

Security Kiosk (Image shown for illustration)

Length: 1.9m
Width: 1.2m
Height: 2.25m
Finish: Plastic coated steel
Colour: Grey

Cycle Shelter (Image shown for illustration)
Capacity: 10 cycles

Length: 5m
Width: 2.75m
Height: 2.86m
Finish: PPC powder coated steel
Colour: Anthracite (RAL 7016)

Bin Store (Image shown for illustration)

Length: 3.6m
Width: 4.3m
Height: 2.4m
Finish: Treated softwood timber fence with double gate
Colour: Natural

N

10m — SCALE 1:1000

NOTES

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3. This drawing should be read in conjunction with all other relevant drawings and specifications.

Key

- Development boundary
- Outer perimeter fence
- Inner perimeter fence
- Existing tree to be retained

For details of Proposed landscaping refer to drawings:

20305S-RPS-00-XX-DR-A-9530
20305S-RPS-00-XX-DR-A-9531
20305S-RPS-00-XX-DR-A-9532

Building Dimensions

	Length	Width	Height	Total Area (GEA)			Drawing references
Data Centre	[illegible]	[illegible]	[illegible]	[illegible]	Break down		[illegible]
					Office and Personnel Space	[illegible]	
					Technical Space	[illegible]	

Ancillary Structures					Drawing references
Water Tanks	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sprinkler Tank	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pumphouse	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Gatehouse	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MV Room	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fuel Tank	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Temporary MV Building	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Permanent Utility MV Building	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Permanent Occupier MV Building	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Rev	Description	By	Ckd	Date
P02	Updated to suit Natural England Comments	LTS	KF	05.02.21
P01	Planning Issue	AE	LS	05.02.21

MAKING COMPLEX EASY

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Client

Project: Swindon Data Centre

Title: Master Site Plan

Status	Scale	Date Created
Preliminary	1:1000@A1	10/09/20
Task Team Manager	**Information Author**	**Task Information Manager**
KF	JS	SM

Document Number
20305S-RPS-00-XX-DR-A-9501
Project Code - Originator - Zone - Level - Type - Role - Drawing Number

RPS Project Number: NK020305S
Revision: P02

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ANNEXES

Annex A

General Notes

RPS Consulting Services Ltd

Phase 2 – Site Investigations

General Notes

1. The assessments made in this report are based on the ground conditions as revealed by intrusive investigations, together with the results of any field or laboratory testing or chemical analysis undertaken and other relevant data which may have been obtained including previous site investigations. In any event, ground contamination often exists as small discrete areas of contamination ("hot spots") and there can be no certainty that any or all such areas have been located and/or sampled.

2. There may be special conditions appertaining to the site which have not been taken into account in the report. The assessment may be subject to amendment in the light of additional information becoming available.

3. Where any data supplied by the Client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS Companies for inaccuracies within the data supplied by other parties.

4. Whilst the report may express an opinion on possible ground conditions between or beyond trial pit or borehole locations, or on the possible presence of features based on either visual, verbal or published evidence this is for guidance only and no liability can be accepted for the accuracy thereof.

5. Comments on groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. Groundwater conditions may vary due to seasonal or other effects.

6. This report is prepared and written in the context of the agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or part after its original submission.

7. The copyright in the written materials shall remain the property of the RPS Company but with a royalty-free perpetual licence to the client deemed to be granted on payment in full to the RPS Company by the client of the outstanding amounts.

8. The report is provided for sole use by the Client and is confidential to them and their professional advisors. No responsibility whatsoever for the contents of the report will be accepted to any person other than the Client.

9. These terms apply in addition to the RPS Group "Standard Terms of Business" (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms of Business the said Standard Terms of Business shall prevail). In the absence of such a written contract the Standard Terms of Business will apply.

Annex B

Part 2A (The Contaminated Land Regime)

Contaminated Land Definition

Under Section 57 of the Environmental Act 1995, Part 2A was inserted into the Environmental Protection Act 1990 to include provisions for the management of contaminated land.

Subsequent regulations were first implemented in England in April 2000, Scotland in July 2000 and Wales in July 2001[2], providing a definition of 'contaminated land' and setting out the nature of liabilities that can be incurred by owners of contaminated land and groundwater.

According to the Act, contaminated land is defined as 'any land which appears to the local authority in whose area the land is situated to be in such a condition, by reason of substances in, on or under the land that:

a) *significant harm* is being caused or there is a *significant possibility* of such harm being caused; or
b) *significant pollution* of controlled waters[3] is being caused or there is a significant possibility of such pollution being caused[4]'

The guidance on determining whether a particular possibility is significant is based on the principles of risk assessment and in particular on considerations of the magnitude or consequences of the different types of significant harm caused. The term 'possibility of significant harm being caused' should be taken, as referring to a measure of the probability, or frequency, of the occurrence of circumstances that could lead to significant harm being caused.

The following situations are defined where harm is to be regarded as significant:

i. Chronic or acute toxic effect, serious injury or death to humans
ii. Irreversible or other adverse harm to the ecological system
iii. Substantial damage to, or failure of, buildings
iv. Disease, other physical damage or death of livestock or crops
v. The pollution of controlled waters[5].

[2] In England by The Contaminated Land (England) Regulations 2000, updated by The Contaminated Land (England) (Amendment) Regulations 2012; in Scotland by The Contaminated Land (Scotland) Regulations 2000, updated by the Contaminated Land (Scotland) Regulations 2005; and in Wales by The Contaminated Land (Wales) Regulations 2001, updated by the Contaminated Land (Wales) Regulations 2006.

[3] In Scotland the term "controlled water" has been updated to "water environment" under the Contaminated Land (Scotland) Regulations 2005 in line with the Water Environment and Water Services (Scotland) Act 2003.

[4] The definition was amended in 2012 by implementation of the Water Act 2003.

[5] Groundwater in this context does not include waters within underground strata but above the saturated zone.

With regard to radioactivity, contaminated land is defined as 'any land which appears to be in such a condition, by reason of substances in, on or under the land that harm is being caused, or there is a *significant possibility of such harm being caused*[6]'.

The Risk Assessment Methodology

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risks to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected with the hazard via one or several exposure pathways (e.g. the pathway of direct contact). Risks are generally managed by isolating or removing the hazard, isolating the receptor, or by intercepting the exposure pathway. Without the three essential components of a source (hazard), pathway and receptor, there can be no risk. Thus, the mere presence of a hazard at a site does not mean that there will necessarily be attendant risks.

The Risk Assessment

By considering where a viable pathway exists which connects a source with a receptor, this assessment will identify where pollutant linkages may exist. A pollutant linkage is the term used by the DEFRA in their standard procedure on risk assessment. If there is no pollutant linkage, then there is no risk. Therefore, only where a viable pollutant linkage is established does this assessment go on to consider the level of risk. Risk should be based on a consideration of both:

- The likelihood of an event (probability) - takes into account both the presence of the hazard and receptor and the integrity of the pathway.
- The severity of the potential consequence - takes into account both the potential severity of the hazard and the sensitivity of the receptor.

For further information please see the Contaminated Land section on the DEFRA website (www.defra.gov.uk).

[6] The Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 and Contaminated Land (Wales) Regulations 2006.

Annex C

Exploratory Hole Logs and Soakaway Results

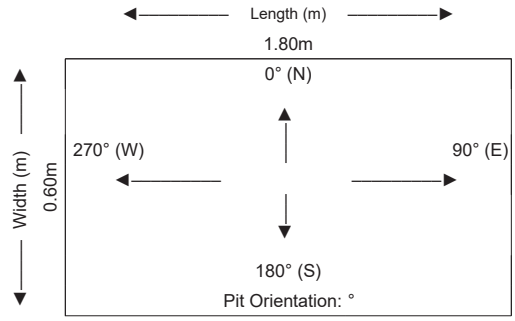
Contract Name: [redacted] - Swindon		Client: RPS Newark			Trial Pit ID: TP101
Contract Number: JER8749	Start Date: 08/10/2020	End Date: 08/10/2020	Checked By: MH	Status: DRAFT	Sheet 1 of 1
Trial Pit Log	Easting: 416252.4	Northing: 180574.0	Ground Level: 176.91mOD	Plant Used: JCB 3CX	Logged By: JG	Scale: 1:50
Wea her: Overcast	Hole Termination Terminated at 3.40m bgl. due to to hard bedrock strata.		Stability: Stable hroughout.		

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.20	ES		176.61	(0.30) 0.30		Grass over soft brown organic slightly gravelly clay. Gravel is angular fine of brick, Oolite and coal fragments. MADE GROUND		
0.50 - 1 00	B			(0.90)		Soft brown mottled light brown slightly silty gravelly clay. Gravel is angular to subrounded fine to medium of flint and rare coal fragments and rare relic rootlets (3cm x 10cm). MADE GROUND		
1.50 - 2 00	B		175.71	1.20		Structureless CHALK composed of white/ cream/ light grey gravelly SILT with medium cobble content of offwhite low density very weak to weak chalk. Gravel is very weak to weak low density light grey. (Grade Dm) WEST MELBURY MARLY CHALK FORMATION		
				(1.25)				
3.00 - 3.40	B		174.46	2.45		Structureless CHALK composed of cream/ offwhite very silty GRAVEL and COBBLES. Clasts are low density very weak to weak with occasional black specs. (Grade Dc) WEST MELBURY MARLY CHALK FORMATION		
				(0.95)				
			173.51	3.40		End of Trial Pit at 3.40m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 3.40m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

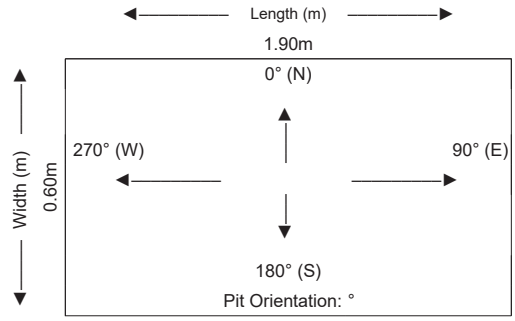
	Contract Name: [redacted] - Swindon		Client: RPS Newark		Trial Pit ID: TP102
	Contract Number: JER8749	Start Date: 08/10/2020	End Date: 08/10/2020	Checked By: MH	Status: DRAFT
					Sheet 1 of 1
Trial Pit Log	Easting: 416334.8	Northing: 180598.8	Ground Level: 174.90mOD	Plant Used: JCB 3CX	Logged By: JG
					Scale: 1:50
Wea her: Overcast		Hole Termination Terminated at 3.10m bgl. due to to hard bedrock strata.		Stability: Stable hroughout	

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.20 0.20 - 1 20	ES B		174.75	0.15 (1.05)		Soft dark reddish brown slightly gravelly clay with frequent plant rootlets. Gravel is angular fine flint. TOPSOIL Light grey silty clayey gravel. Gravel is angular to subangular fine to coarse of weak low denisty chalk, brick and rare coal fragments. MADE GROUND		
1.50 - 2 50	B		173.70	1.20 (1.80)		Brownish grey slightly clayey sandy gravel wi h medium boulder and cobble content of angular chalk, brick and concrete. Gravel is angular to subangular fine to coarse of flint, brick, concrete, chalk and rare coal fragments. Sand is fine to coarse. MADE GROUND		
3.00 - 3.10	B		171.90 171.80	3.00 3.10		Structureless CHALK composed of light grey slightly silty GRAVEL and COBBLES. Clasts are medium density weak to medium strong with occasional black spots and localised staining. (Grade Dc) WEST MELBURY MARLY CHALK FORMATION End of Trial Pit at 3.10m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 3.10m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

RPS TP Template Issue Number: 1 Issue Date: 13/09/2017

	Contract Name: [redacted] - Swindon		Client: RPS Newark		Trial Pit ID: TP103
	Contract Number: JER8749	Start Date: 07/10/2020	End Date: 07/10/2020	Checked By: MH	Status: DRAFT
					Sheet 1 of 1
Trial Pit Log	Easting: 416425.7	Northing: 180598.8	Ground Level: 173.97mOD	Plant Used: JCB 3CX	Logged By: JG
					Scale: 1:50

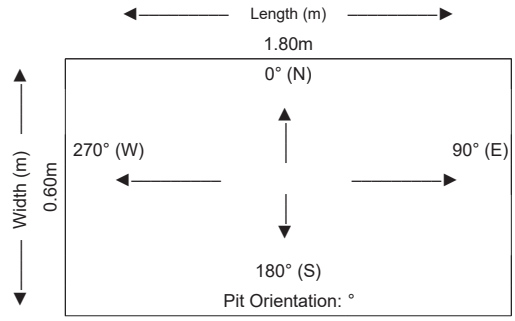
Wea her: Sunny/ Overcast | Hole Termination: Terminated at design depth of 3 50m bgl. | Stability: Stable hroughout.

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.15 0.20 - 1 00 0.35	ES B ES		173.77	0.20		Grass over soft brown organic slightly gravelly silty clay with frequent plant rootlets. Gravel is angular to subrounded fine to medium of flint, brick, concrete and rare coal fragments. MADE GROUND		
				(1.00)		Soft to firm light brown slightly gravelly sligh ly sandy clay with occasional metal fragments and medium boulder content of subrounded brick. Gravel is angular to subangular fine to coarse of brick, concrete, flint and coal fragments. MADE GROUND		
1.00 - 2 00	B		172.77	1.20		Structureless CHALK composed of cream/ light grey sligh ly gravelly SILT. Gravel is very weak to weak, low to medium density offwhite with occasional black staining features. (Grade Dm) WEST MELBURY MARLY CHALK FORMATION		
				(0.90)				
2.00 - 3 00	B		171.87	2.10		Structureless CHALK composed of cream/ light grey very silty GRAVEL and COBBLES. Clasts are very weak low to medium density with occasional black specs. Matrix is offwhite/ grey locally greenish light grey. (Grade Dc) WEST MELBURY MARLY CHALK FORMATION		
				(1.40)				
3.00 - 3 50	B		170.47	3.50		End of Trial Pit at 3.50m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 3.50m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

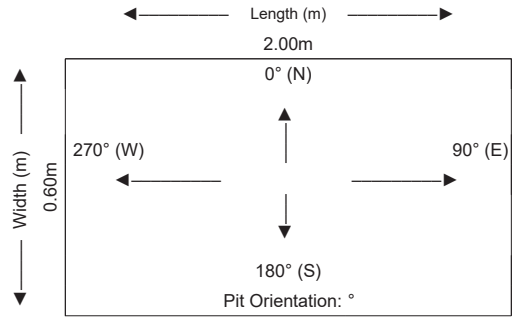
	Contract Name: [redacted] - Swindon		Client: RPS Newark			Trial Pit ID: TP104
	Contract Number: JER8749	Start Date: 08/10/2020	End Date: 08/10/2020	Checked By: MH	Status: DRAFT	Sheet 1 of 1
Trial Pit Log	Easting: 416227.1	Northing: 180534.6	Ground Level: 177.52mOD	Plant Used: JCB 3CX	Logged By: JG	Scale: 1:50
Wea her: Overcast/ Sunny spells		Hole Termination: Terminated at design depth of 3 50m bgl.		Stability: Stable hroughout		

Samples & In Situ Testing			Strata Details					
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water	Backfill
0.20 0.30 - 1 00 0.40	ES B ES		177.22	(0.30) 0.30		Grass over soft reddish brown slightly gravelly slightly sandy clay with frequent plant rootlets. Gravel is angular fine of brick, concrete, coal and rare clinker. MADE GROUND		
				(0.80)		Soft greyish brown slightly gravelly silty clay with medium boulder content of brick and concrete. Gravel is angular to subangular fine to coarse of concrete, brick and coal. MADE GROUND		
1.20	ES		176.42	1.10		Structureless CHALK composed of light grey very silty GRAVEL and BOULDERS. Clasts are low to medium density very weak to weak with occasional black spots and black/ orange brown staining features. (Grade Dc) WEST MELBURY MARLY CHALK FORMATION		
1.50 - 2 00	B							
2.00 - 3 50	B			(2.40)				
			174.02	3.50		End of Trial Pit at 3.50m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 3.50m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

	Contract Name: [redacted] - Swindon		Client: RPS Newark		Trial Pit ID: TP105
	Contract Number: JER8749	Start Date: 07/10/2020	End Date: 07/10/2020	Checked By: MH	Status: DRAFT
					Sheet 1 of 1
Trial Pit Log	Easting: 416291.3	Northing: 180519.7	Ground Level: 177.33mOD	Plant Used: JCB 3CX	Logged By: JG
					Scale: 1:50

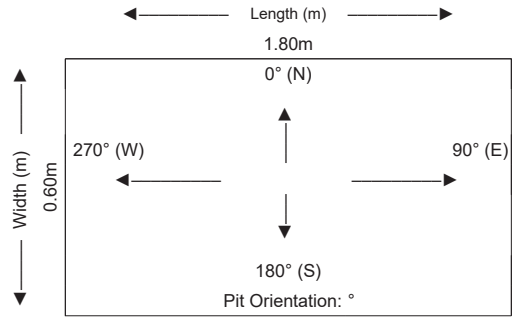
Wea her: Sunny/Overcast | Hole Termination: Terminated at design depth of 3 50m bgl. | Stability: Stable hroughout.

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.00 - 0 60 0.20	B ES			(0.60)		Grass over soft brown slightly gravelly silty clay with frequent rootlets. Gravel is angular fine of brick, Oolite and coal fragments. MADE GROUND		
0.70 - 1 50	B		176.73	0.60		Structureless CHALK composed of cream/ grey gravelly clayey SILT. Gravel is very weak to weak low density light grey with occasional orange brown staining features. (Grade Dm) WEST MELBURY MARLY CHALK FORMATION		
1.50 - 2 50	B			(2.10)				
3.00 - 3 50	B		174.63	2.70		Structureless CHALK composed of light grey/ cream slightly sandy silty GRAVEL and COBBLES. Clasts are weak to very weak low to medium density with occasional orange brown staining. Matrix is light grey. (Grade Dc) WEST MELBURY MARLY CHALK FORMATION		
			173.83	3.50		End of Trial Pit at 3.50m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 3.50m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

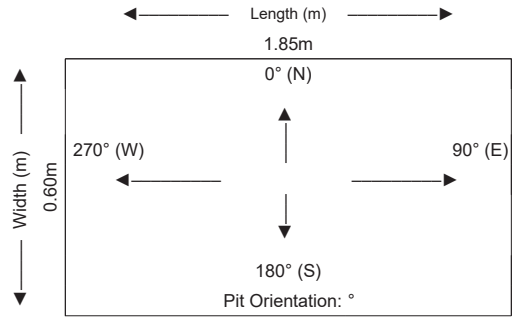
Contract Name: [redacted] - Swindon		Client: RPS Newark			Trial Pit ID: TP106
Contract Number: JER8749	Start Date: 07/10/2020	End Date: 07/10/2020	Checked By: MH	Status: DRAFT	Sheet 1 of 1
Trial Pit Log	Easting: 416314.0	Northing: 180558.9	Ground Level: 176.40mOD	Plant Used: JCB 3CX	Logged By: JG	Scale: 1:50
Wea her: Sunny/ Overcast	Hole Termination: Terminated at design depth of 3 50m bgl.		Stability: Stable hroughout.		

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.15 0.25 0.30 - 1 00	ES ES B		176.20	0.20		Grass over soft brown organic slightly gravelly clay with frequent plant rootlets. Gravel is angular to subrounded fine to medium of Oolite and occasional coal fragments. MADE GROUND		
				(0.95)		Soft brownish light grey slightly gravelly clay with medium boulder content of angular brick and occasional wood/ organic fragments (5cm x 10cm). Gravel is angular to subangular fine to coarse of brick, rare coal fragments and weak offwhite chalk. MADE GROUND		
1.20 - 2 00	B		175.25	1.15		Structureless CHALK composed of cream/ light grey very silty GRAVEL and COBBLES. Clasts are very weak to weak medium density with occasional black specs and orange brown staining. Matrix is blueish light grey/ cream. (Grade Dc) WEST MELBURY MARLY CHALK FORMATION		
2.00 - 3 00	B			(2.35)				
3.00 - 3 50	B							
			172.90	3.50		End of Trial Pit at 3.50m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 3.50m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

	Contract Name: [redacted] - Swindon		Client: RPS Newark		Trial Pit ID: TP107
	Contract Number: JER8749	Start Date: 07/10/2020	End Date: 07/10/2020	Checked By: MH	Status: DRAFT
					Sheet 1 of 1
Trial Pit Log	Easting: 416396.3	Northing: 180576.4	Ground Level: 174.52mOD	Plant Used:	Logged By:
					Scale: 1:50

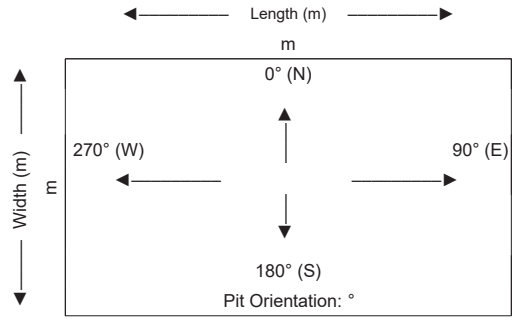
Hole Termination: Terminated at design depth of 3 50m bgl.

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.10 - 0.70	B		174.42	0.10		Grass over soft whiteish brown slightly gravelly clay with frequent plant rootlets. Gravel is angular fine to medium flint. TOPSOIL		
0.25	ES			(0.60)		Soft brownish white/ cream slightly sandy slightly gravelly clayey silt with a medium boulder content of angular brick and concrete. Gravel is angular fine of brick and concrete. MADE GROUND		
1.00 - 2 00	B		173.82	0.70		Structureless CHALK composed of white/ cream/ light grey gravelly SILT with medium cobble content of offwhite low density very weak to weak chalk. Gravel is very weak to weak low density light grey. (Grade Dm) WEST MELBURY MARLY CHALK FORMATION		
2.30 - 3 00	B		172.22	(1.60) 2.30		Structureless CHALK composed of light grey/ cream slightly sandy silty GRAVEL and COBBLES. Clasts are weak to very weak low to medium density with occasional orange brown staining. Matrix is light grey. (Grade Dc) WEST MELBURY MARLY CHALK FORMATION		
3.00 - 3 50	B			(1.20)				
			171.02	3.50		End of Trial Pit at 3.50m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 3.50m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

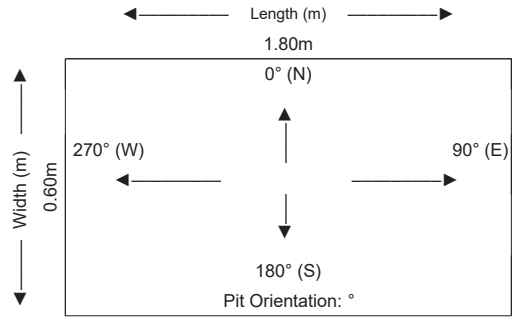
rps	Contract Name: [redacted] - Swindon		Client: RPS Newark			Trial Pit ID: TP108
	Contract Number: JER8749	Start Date: 08/10/2020	End Date: 08/10/2020	Checked By: MH	Status: DRAFT	Sheet 1 of 1
Trial Pit Log	Easting: 416477.0	Northing: 180610.2	Ground Level: 171.28mOD	Plant Used: JCB 3CX	Logged By: JG	Scale: 1:50
Wea her: Rainy	Hole Termination Terminated at 0.30m bgl due to suspected ACM fragement in the base of trial pit.		Stability: Stable hroughout			

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.00 - 0 30	B			(0.30)		Grass over soft brown organic slightly gravelly clay with frequent plant rootlets and medium boulder content of angular chalk and brick. Gravel is angular to subangular fine to coarse of flint, concrete, brick, chalk and occasional coal fragments. MADE GROUND		
0.30	ES		170.98	0.30		End of Trial Pit at 0.30m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 0.30m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

RPS TP Template Issue Number: 1 Issue Date: 13/09/2017

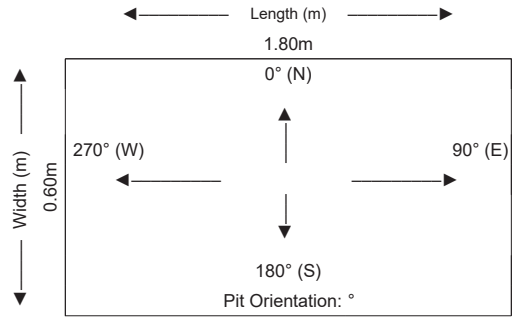
Contract Name: [redacted] - Swindon		Client: RPS Newark			Trial Pit ID: TP109
Contract Number: JER8749	Start Date: 06/10/2020	End Date: 06/10/2020	Checked By: MH	Status: DRAFT	Sheet 1 of 1
Trial Pit Log	Easting: 416283.9	Northing: 180469.5	Ground Level: 175.57mOD	Plant Used: JCB 3CX	Logged By: JG	Scale: 1:50
Wea her: Sunny/ Overcast	Hole Termination: Terminated at design depth of 3 50m bgl.		Stability: Stable hroughout		

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.10 - 0 30 0.20 0.30 - 1 00	B ES B		175.27	(0.30) 0.30		Grass over very soft brown organic sligh ly gravelly clayey silt with frequent plant rootlets. Gravel angular to subangular fine of flint and brick. MADE GROUND		
1.00 - 2 00	B			(1.70)		Structureless CHALK composed of soft light grey slightly gravelly silty CLAY. Gravel was angular fine of low density weak grey chalk. (Grade Dm) WEST MELBURY MARLY CHALK FORMATION		
2.00 - 3 00	B		173.57	2.00		Structureless CHALK composed of light grey clayey silty GRAVEL and BOULDERS. Clasts are weak low to medium density with frequent black specs. Matrix is light grey. (Grade Dc) WEST MELBURY MARLY CHALK FORMATION		
3.00 - 3 50	B		172.07	(1.50) 3.50		End of Trial Pit at 3.50m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 3.50m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

	Contract Name: [redacted] - Swindon		Client: RPS Newark		Trial Pit ID: TP110
	Contract Number: JER8749	Start Date: 06/10/2020	End Date: 06/10/2020	Checked By: MH	Status: DRAFT
					Sheet 1 of 1
Trial Pit Log	Easting: 416365.0	Northing: 180485.3	Ground Level: 177.40mOD	Plant Used: JCB 3CX	Logged By: JG
					Scale: 1:50

Wea her: Sunny/ Overcast

Hole Termination Terminated at 1.90m bgl due to concrete and brick constructed slab running along the full base of the trial pit.

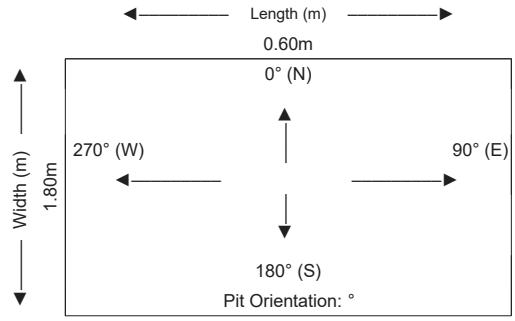
Stability: Stable hroughout.

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.20 0.20 - 1 00	ES B		177.25	0.15 (1.05)		Grass over soft brown organic slightly gravelly clayey silt with frequent plant rootlets. Gravel is angular to subangular fine of flint. TOPSOIL Soft to firm light brownish grey slightly gravelly silty clay with medium cobble content of angular red brick and rare metal fragments. Gravel is angular to subangular fine to coarse of off-white blueish grey chalk and brick. MADE GROUND		
1.20 - 1 90	B		176.20	1.20 (0.70)		Soft to firm light grey slightly gravelly silty CLAY with medium cobble content of brick and concrete. Gravel is angualar to subangular fine to coarse of brick and medium dense chalk. MADE GROUND		
			175.50	1.90		End of Trial Pit at 1.90m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 1.90m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

RPS TP Template Issue Number: 1 Issue Date: 13/09/2017

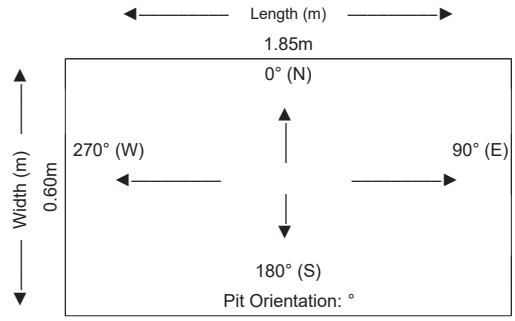
rps	Contract Name: [redacted] - Swindon		Client: RPS Newark			Trial Pit ID: TP111
	Contract Number: JER8749	Start Date: 06/10/2020	End Date: 06/10/2020	Checked By: MH	Status: DRAFT	Sheet 1 of 1
Trial Pit Log	Easting: 416416.9	Northing: 180509.2	Ground Level: 178.16mOD	Plant Used: JCB 3CX	Logged By: JG	Scale: 1:50
Wea her: Sunny/ Overcast	Hole Termination: Terminated at design depth of 3 50m bgl.		Stability: Stable hroughout.			

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.10 - 0 20	B		177.96	0.20		Grass over soft brown organic slightly gravelly clayey silt with frequent plant rootlets. Gravel is angular to subangular of flint, brick and rare tarmaccadam. MADE GROUND		
0.15	ES							
0.50 - 1 50	B			(1.50)		Soft brown mottled light grey gravelly silty clay with a low cobble content of angular brick, concrete and medium strong to strong off white blueish grey chalk and rare metal fragments. Gravel is angular fine to coarse of flint, brick, concrete, chalk and rare tarmaccadam. MADE GROUND		
1.70 - 2.70	B		176.46	1.70		Soft to firm blueish dark grey mottled light grey slightly gravelly silty clay with medium cobble content of angular brick and occasional black stained wood fragments and frequent black ash stained pockets and a slight hydrocarbon (creosote) odour. Gravel is angular to subangular fine to coarse of brick. MADE GROUND		
2.00	ES			(1.50)				
3.20 - 3 50	B		174.96	3.20		Structureless CHALK composed of off-white light grey GRAVEL and COBBLES. Clasts are medium strong medium density . Matrix is blueish light grey. (Grade Dc) WEST MELBURY MARLY CHALK FORMATION		
				(0.30)				
			174.66	3.50		End of Trial Pit at 3.50m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 3.50m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

RPS TP Template Issue Number: 1 Issue Date: 13/09/2017

	Contract Name: [redacted] Swindon		Client: RPS Newark		Trial Pit ID: TP112
	Contract Number: JER8749	Start Date: 06/10/2020	End Date: 06/10/2020	Checked By: MH	Status: DRAFT
					Sheet 1 of 1
Trial Pit Log	Easting: 416478.1	Northing: 180555.4	Ground Level: 176.46mOD	Plant Used: JCB 3CX	Logged By: JG
					Scale: 1:50

Wea her: Sunny/ Overcast

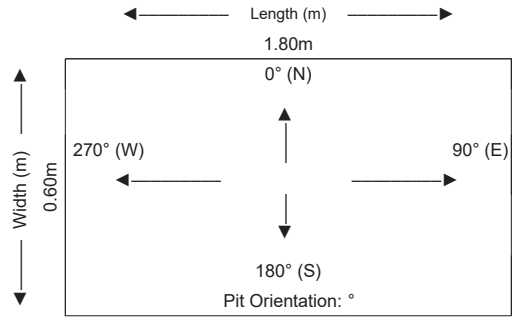
Hole Termination Terminated at 0.60m bgl due to concrete constructed slab running along the full base of the trial pit.

Stability: Stable hroughout.

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.10 - 0 20 0.20 - 0 60 0.25	B B ES		176.26 175.86	0.20 (0.40) 0.60		Grass over brown very soft sligh ly gravelly slightly silty clay with frequent plant rootlets. Gravel is angular to subangular fine to coarse of brick, limestone and rare tarmaccadam. MADE GROUND Light brown slightly clayey slightly sandy gravel with medium boulder content of angular to subrounded of brick and concrete. Gravel is angular to subangular fine to coarse of brick, clinker, concrete and flint. Sand is fine to coarse. MADE GROUND End of Trial Pit at 0.60m		

Dimensions:

Final Depth: 0.60m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

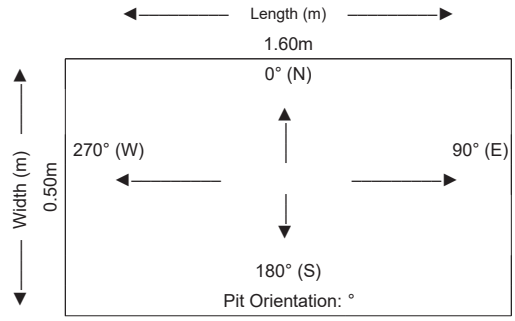
	Contract Name: [redacted] Swindon		Client: RPS Newark			Trial Pit ID: TP113
	Contract Number: JER8749	Start Date: 05/10/2020	End Date: 05/10/2020	Checked By: MH	Status: DRAFT	Sheet 1 of 1
Trial Pit Log	Easting: 416592.0	Northing: 180634.1	Ground Level: 170.66mOD	Plant Used: JCB 3CX	Logged By: JG	Scale: 1:50
Wea her: Overcast	Hole Termination: Terminated at design depth of 2 00m bgl.		Stability: Stable hroughout.			

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.20 - 0 50 0.25	B ES		170.46	0.20 (0.30)		Soft dark brown organic slightly gravelly silty clay wi h frequent plant rootlets. Gravel is angular fine of chalk. TOPSOIL		
0.50 - 1 00	B	PID 0.25m, 0 0ppm	170.16	0.50		Soft light grey slightly gravelly clayey silt with low cobble content of rounded flint and red brick. Gravel is angular to subangular fine to coarse of flint, brick, chalk and coal fragments. MADE GROUND		
				(1.50)		Soft light greenish brown mot led orange brown sandy SILT. Sand is fine. WEST MELBURY MARLY CHALK FORMATION		
			168.66	2.00		End of Trial Pit at 2.00m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 2.00m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

	Contract Name: [redacted] - Swindon		Client: RPS Newark		Trial Pit ID: TP114
	Contract Number: JER8749	Start Date: 05/10/2020	End Date: 05/10/2020	Checked By: MH	Status: DRAFT
					Sheet 1 of 1
Trial Pit Log	Easting: 416586.5	Northing: 180588.2	Ground Level: 170.49mOD	Plant Used:	Logged By:
					Scale: 1:50

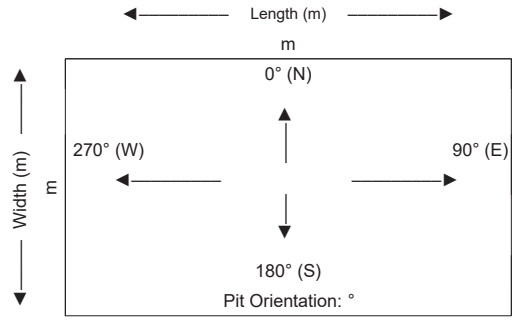
Hole Termination: Terminated at design depth of 2 00m bgl.

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.20	ES		170.24	0.25		Grass over soft brown organic slightly sandy slightly gravelly clay with frequent plant rootlets. Gravel is angular to fine of chalk. TOPSOIL		
0.25 - 0.40	B	PID 0.20m, 0 0ppm	170.09	0.40		Soft light grey slightly gravelly clayey silt with medium boulder content of rounded flint and red brick. Gravel is angular to subangular fine to coarse of flint and brick. MADE GROUND		
0.35	ES	PID 0.30m, 0 0ppm		(1.00)		Soft light blueish grey sligh ly sandy clayey SILT wi h frequent orange brown oxida ion silty pockets (5cm x 5cm). Sand is fine. WEST MELBURY MARLY CHALK FORMATION		
0.50 - 1 00	B							
1.40 - 2 00	B		169.09	1.40		Soft light blueish very sandy SILT with frequent orange brown oxidation pockets. Sand is fine. WEST MELBURY MARLY CHALK FORMATION		
				(0.60)				
			168.49	2.00		End of Trial Pit at 2.00m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 2.00m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

	Contract Name: [redacted] - Swindon		Client: RPS Newark		Trial Pit ID: TP115
	Contract Number: JER8749	Start Date: 05/10/2020	End Date: 05/10/2020	Checked By: MH	Status: DRAFT
					Sheet 1 of 1
Trial Pit Log	Easting: 416394.4	Northing: 180427.4	Ground Level: 174.41mOD	Plant Used:	Logged By:
					Scale: 1:50

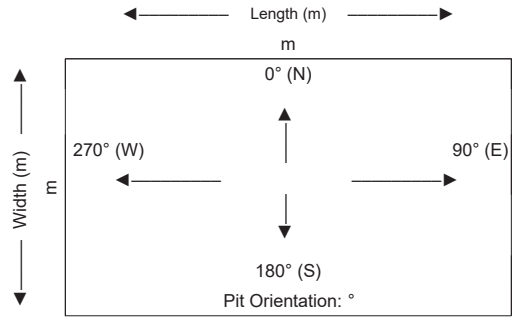
Hole Termination: Terminated at design depth of 2 50m bgl.

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.20 - 0.40	B		174.21	0.20		Grass over soft slightly gravelly clay wi h frequent plant rootlets. Gravel is angular fine of chalk. TOPSOIL		
0.25	ES		174.01	0.40		Soft greenish white clayey gravel. Gravel is angular to subangular fine to coarse of brick and offwhite chalk. MADE GROUND		
0.45	ES			(0.60)				
0.50 - 1 00	B							
1.00 - 2 00	B		173.41	1.00		Soft green mottled orange brown slightly gravelly sligh ly sandy clay with localised hydrocarbon odorous ash pockets. Gravel is angular to subangular fine to medium of limestone, clinker and chalk. MADE GROUND		
				(1.10)		Structureless CHALK composed of silty sligh ly gravelly CLAY. Gravel is weak low density greyish white. (Grade Dm) WEST MELBURY MARLY CHALK FORMATION		
2.10 - 2 50	B		172.31	2.10		Structureless CHALK composed of silty slightly sandy GRAVEL. Clasts are weak to medium strong light grey. Matrix is light grey. (Grade Dc). WEST MELBURY MARLY CHALK FORMATION		
			171.91	(0.40) 2.50		End of Trial Pit at 2.50m		

1 2 3 4 5 6 7

Dimensions:

Final Depth: 2.50m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

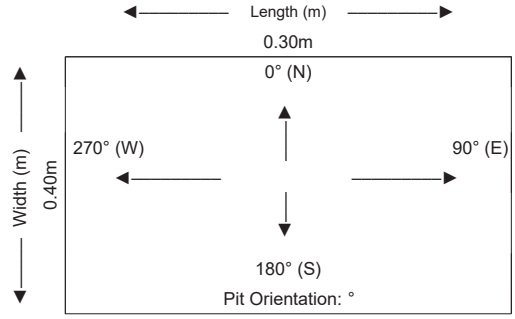
	Contract Name: [redacted] - Swindon		Client: RPS Newark			Trial Pit ID: HP101
	Contract Number: JER8749	Start Date: 09/10/2020	End Date: 09/10/2020	Checked By: MH	Status: DRAFT	Sheet 1 of 1
Trial Pit Log	Easting: 416431.0	Northing: 180458.0	Ground Level: 174.98mOD	Plant Used: Hand Dug	Logged By: MH	Scale: 1:25
Wea her: Sunny	Hole Termination Terminated due to layer of fine sand indicating possible service beneath		Stability: Stable hroughout			

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
			174.83	0.15		Soft brown sandy clay wi h occasional angular fine gravel of brick. TOPSOIL		
0.50	ES			(0.60)		Light brown clayey gravelly fine to medium sand. Gravel is angular to subangular fine to coarse flint, brick, concrete and chalk. MADE GROUND		
			174.23	0.75				
			174.18	0.80		Orange fine sand. MADE GROUND		
						End of Trial Pit at 0.80m		

1 2 3

Dimensions:

Final Depth: 0.80m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

RPS TP Template Issue Number: 1 Issue Date: 13/09/2017

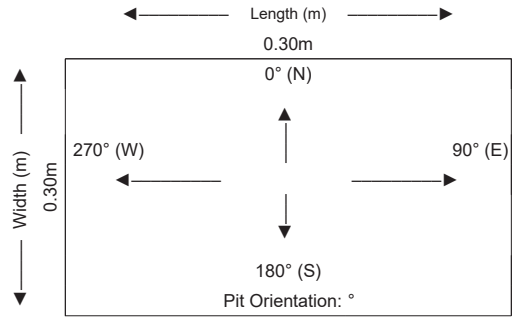
	Contract Name: [redacted] - Swindon		Client: RPS Newark		Trial Pit ID: HP102
	Contract Number: JER8749	Start Date: 09/10/2011	End Date: 09/10/2011	Checked By: MH	Status: DRAFT
					Sheet 1 of 1
Trial Pit Log	Easting: 416248.0	Northing: 180390.0	Ground Level: 175.04mOD	Plant Used: Hand Dug	Logged By: MH
					Scale: 1:25
Wea her: Sunny		Hole Termination: Terminated on Natural strata.		Stability: Stable hroughout	

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
			174.84	0.20		Light brown slightly sandy clay wi h frequent rootlets and occasional roots. TOPSOIL		
0.50	ES			(0.50)		Firm light brown gravelly clay. Gravel is angular to subangular fine to medium flint, brick and concrete. MADE GROUND		
			174.34	0.70		Greenish grey clayey fine to medium Sand. WEST MELBURY MARLY CHALK FORMATION		
0.90	ES			(0.30)				
			174.04	1.00		End of Trial Pit at 1.00m		

1 2 3

Dimensions:

Final Depth: 1.00m



General Remarks:

No groundwater encountered.

Water Strikes	
Strike (m)	Remarks

RPS TP Template Issue Number: 1 Issue Date: 13/09/2017

Contract Name: [redacted] - Swindon		Client: RPS Newark			Borehole ID: BH201
Contract Number: JER8749	Start Date: 12/11/2020	End Date: 12/11/2020	Checked By: MH	Status: DRAFT	Sheet 1 of 1
Rotary Open Hole Drilling Log	Easting: 416612.0	Northing: 180591.9	Ground Level: 170.59mOD	Plant Used: Comacchio 205	Logged By: TF	Scale: 1:50
Weather: Fine	Termination: Complete at 10.00m bgl.				

Samples & Core Recovery					Strata Details				Groundwater	
Depths	Type/ Ref	Duration (mm:ss)	Flush Return	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
					170.41	0.18		Tarmacadam ASPHALT		
						(0 52)		Light brown sandy sub-angular fine to coarse GRAVEL of limestone. MADE GROUND		
					169 89	0.70		Soft to firm grey slightly gravelly SILT with frequent orange oxidation pockets. Gravel is sub-rounded to sub-angular fine to coarse of sandstone. WEST MELBURY MARLY CHALK FORMATION		
						(0.70)		*From 0.80m becoming brown, gravelly.*		
					169.19	1.40		Stiff grey mottled brown sandy slightly gravelly SILT including frequent black specs and occasional orange oxidation pockets. Gravel is sub-rounded to sub-angular, fine to medium of limestone. Sand is fine. WEST MELBURY MARLY CHALK FORMATION		
						(1 30)		*From 2.00m becoming firm*		
								From 2.50m becoming very stiff.		
			100%		167 89	2.70		[From Flush Return] - Grey white silty sand. WEST MELBURY MARLY CHALK FORMATION		
						(4 30)				
					163 59	7 00		Became denser [From Flush Return] - Grey sand UPPER GREENSAND FORMATION		
			30%							
			0%			(3 00)				
			30%							
					160 59	10.00		End of Borehole at 10.00m		

Start & End of Shift Observations				
Date	Time	Depth (m)	Casing (m)	Water (m)
12-11-2020	08:00			
12-11-2020	16:00	0.00		

Installation				
Ref	Top (m)	Base (m)	Type	Dia (mm)
Pipe 1	0.00	3.00	PLAIN	50000
Pipe 1	3.00	10.00	SLOTTED	50000

Remarks:

1) Hand excavated inspection pit advanced to 1.20m bgl.
2) Borehole advanced using dynamic windowless sampling to refusal at 2.70m bgl.
3) Borehole advanced using rotary open hole methods with water flush to 10.00m bgl.

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Flush Information				
Top (m)	Base (m)	Flush Type	Return	Flush Colour
2.70	7.00	WATER	100%	Grey
7.00	8.50	WATER	30%	Yellowish grey
8.50	9.50	WATER	0%	
9.50	10.00	WATER	30%	Grey

Borehole Diameter		Casing Diameter	
Depth (m)	Dia (mm)	Depth (m)	Dia (mm)
10.00	150		

Contract Name: [redacted] - Swindon		Client: RPS Newark		Borehole ID: BH202
Contract Number: JER8749	Start Date: 11/11/2020	End Date: 11/11/2020	Checked By: MH	Status: DRAFT
Windowless Borehole Log	Easting: 416608.6	Northing: 180628.0	Ground Level: 170.40mOD	Plant Used: Dando Terrier
Logged By: TF	Scale: 1:25	Sheet 1 of 1		
Weather: Fine	Termination: Terminated upon refusal at 2.00m bgl.			

Samples & In Situ Testing				Strata Details				Groundwater	
Depths	Type/ Ref	SPT	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
				170 25	0.15		Soft brown CLAY including frequent roo lets. TOPSOIL		
				170 00	0.40		Light grey silty sandy sub-angular to angular fine to coarse GRAVEL of siltstone and chalk. MADE GROUND		
					(0 60)		Soft greenish grey mottled brown slightly gravelly SILT with frequent orange oxida ion pockets. Gravel is sub-rounded to angular fine to medium of limestone. WEST MELBURY MARLY CHALK FORMATION		
				169.40	1 00		Firm greenish grey mottled brown slightly sandy SILT. Sand is fine. WEST MELBURY MARLY CHALK FORMATION		
					(1 00)		*From 1.60m becoming stiff.*		
							From 1.90m becoming very stiff.		
				168.40	2 00		End of Borehole at 2 00m		

1 2 3 4 5

Start & End of Shift Observations

Date	Time	Depth (m)	Casing (m)	Water (m)
11-11-2020	08:30			
11-11-2020	17:00			

Installation

Ref	Top (m)	Base (m)	Type	Diameter (mm)
Pipe1	0.00	1.00	PLAIN	50
Pipe1	1.00	2.00	SLOTTED	50

Remarks:

1) Hand excavated inspection pit advanced to 1.20m bgl.
2) No Groundwater encountered.

Windowless Sample Run Details

Test Number	Diameter (mm)	Depth Top (m)	Depth Base (m)	Recovery (%)
1	102	1.20	2.00	100

Casing

Depth (m)	Diameter (mm)

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Contract Name: [redacted] - Swindon		Client: RPS Newark		Borehole ID: BH203
Contract Number: JER8749	Start Date: 11/11/2020	End Date: 11/11/2020	Checked By: MH	Status: DRAFT
Windowless Borehole Log	Easting: 416618.8	Northing: 180600.2	Ground Level: 170.55mOD	Plant Used: Dando Terrier
Logged By: TF	Scale: 1:25	Sheet 1 of 1		
Weather: Fine	Termination: Terminated upon refusal at 2.00m bgl.			

Samples & In Situ Testing				Strata Details				Groundwater	
Depths	Type/ Ref	SPT	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
				170 37	0.18		ASPHALT		
					(0 57)		Light brown sandy sub-angular to angular fine to coarse GRAVEL of limestone. Sand is fine to coarse MADE GROUND		
				169 80	0.75		Firm greenish grey slightly gravelly SILT including rare rootlets, rare orange oxidation pockets and frequent black specs. Gravel is sub-rounded to angular fine to medium of siltstone. WEST MELBURY MARLY CHALK FORMATION		
				169 55	1 00		Firm greenish grey mottled brown slightly sandy SILT. Sand is fine. WEST MELBURY MARLY CHALK FORMATION		
					(1 00)		*From 1.20m to 1.60m, frequent rootlets and pockets of orange brown oxidation.*		
							From 1.60m becoming stif		
							From 1.90m becoming very stiff.		
				168 55	2 00		End of Borehole at 2 00m		

1 2 3 4 5

Start & End of Shift Observations				
Date	Time	Depth (m)	Casing (m)	Water (m)
11-11-2020	08:30			
11-11-2020	17:00			

Installation				
Ref	Top (m)	Base (m)	Type	Diameter (mm)
Pipe1	0.00	1.00	PLAIN	50
Pipe1	1.00	2.00	SLOTTED	50

Remarks:
1) Hand excavated inspection pit advanced to 1.20m bgl.
2) No Groundwater encountered.

Windowless Sample Run Details				
Test Number	Diameter (mm)	Depth Top (m)	Depth Base (m)	Recovery (%)
1	102	1.20	2.00	100

Casing	
Depth (m)	Diameter (mm)

Water Strikes					
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Contract Name: [redacted] Swindon			Client: RPS Newark		Borehole ID: BH204
Contract Number: JER8749	Start Date: 11/11/2020	End Date: 11/11/2020	Checked By: MH	Status: DRAFT	Sheet 1 of 1
Windowless Borehole Log	Easting: 416585.4	Northing: 180572.9	Ground Level: 171.01mOD	Plant Used: Dando Terrier	Logged By: TF	Scale: 1:25
Weather: Fine	Termination: Terminated upon refusal at 1.70m bgl.				

Samples & In Situ Testing				Strata Details				Groundwater	
Depths	Type/ Ref	SPT	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
				170 81	0 20		Soft brown CLAY including frequent roo lets. TOPSOIL		
					(0 80)		Pale light brownish grey silty sub-angular to angular fine to coarse GRAVEL of chalk and limestone. MADE GROUND		
				170 01	1 00		Stiff pale grey slightly sandy slightly gravelly SILT with rare orange oxidation pockets. Gravel is angular, fine of siltstone. Sand is fine. WEST MELBURY MARLY CHALK FORMATION		
					(0 65)				
				169 36	1 65		Very stiff pale grey SILT with frequent black specs. WEST MELBURY MARLY CHALK FORMATION		
				169 31	1.70		End of Borehole at 1.70m		

1
2
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4
5

Start & End of Shift Observations				
Date	Time	Depth (m)	Casing (m)	Water (m)
11-11-2020	08:30			
11-11-2020	17:00			

Installation				
Ref	Top (m)	Base (m)	Type	Diameter (mm)
Pipe1	0.00	0.70	PLAIN	50
Pipe1	0.70	1.70	SLOTTED	50

Remarks:
1) Hand excavated inspection pit advanced to 1.20m bgl.
2) No Groundwater encountered.

Windowless Sample Run Details				
Test Number	Diameter (mm)	Depth Top (m)	Depth Base (m)	Recovery (%)
1	102	1.20	1.70	100

Casing	
Depth (m)	Diameter (mm)

Water Strikes					
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

SOIL INFILTRATION TEST RATE

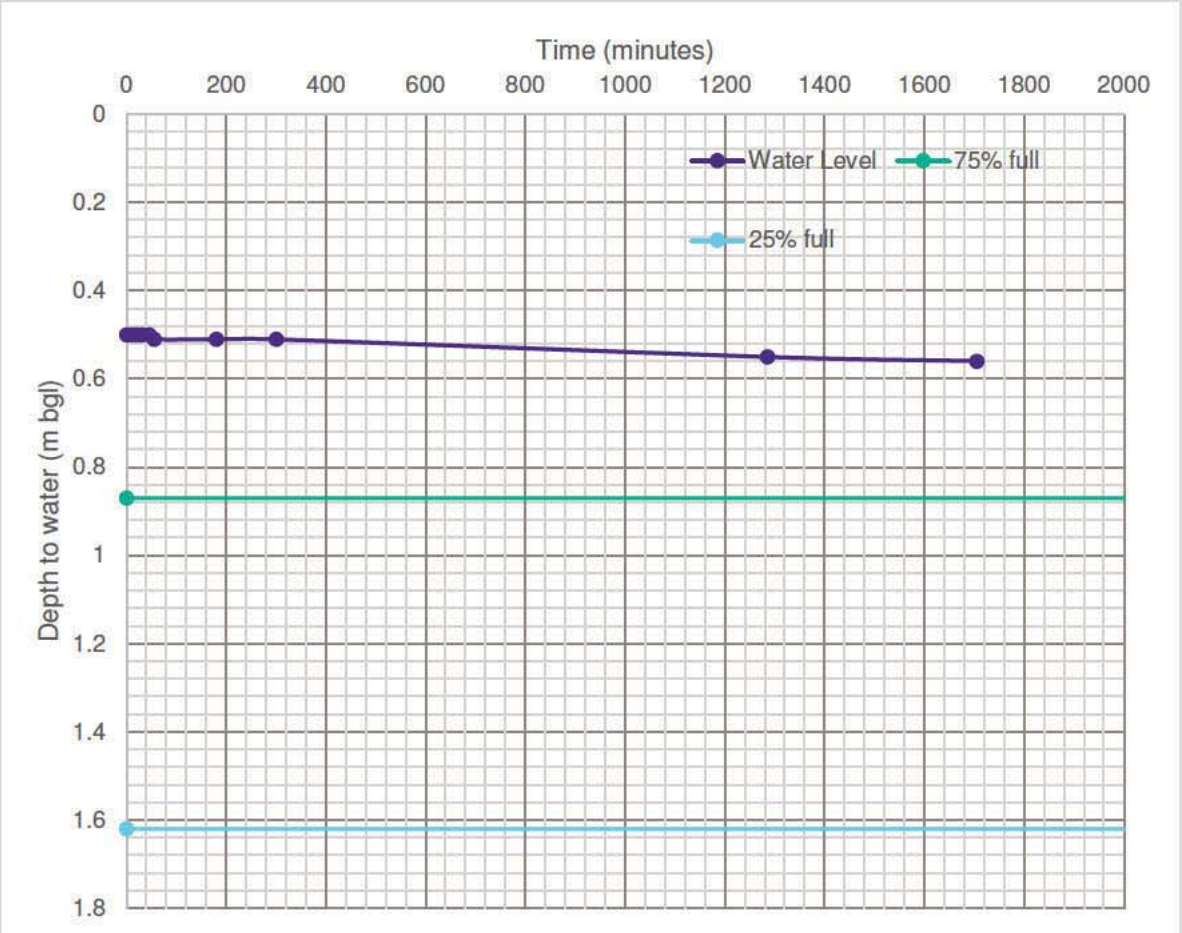
In accordance with BRE Digest 365 (2016)

Job Name:	[redacted] (Swindon)	Date:	05.10.20
Client: RPS Newark	Job Number: JER8749	Test Pit Reference.:	TP113
Trial pit filled with gravel to prevent instability in pit walls?:	No	Test No.:	1

Pit Dimensions (m)	
Depth	2.00
Width	0.50
Length	1.70
Height of pipe above ground level (if applicable)	0.00

Start % for calculations:	75% full
End % for calculations:	25% full

Soil Infiltration Rate (f)	
n/a	**m/s**



Remarks: Water level only fell 6cm over test duration (1705mins) and as such the test did not fully meet the requirements to comply with the BRE calculation model.

SOIL INFILTRATION TEST RATE

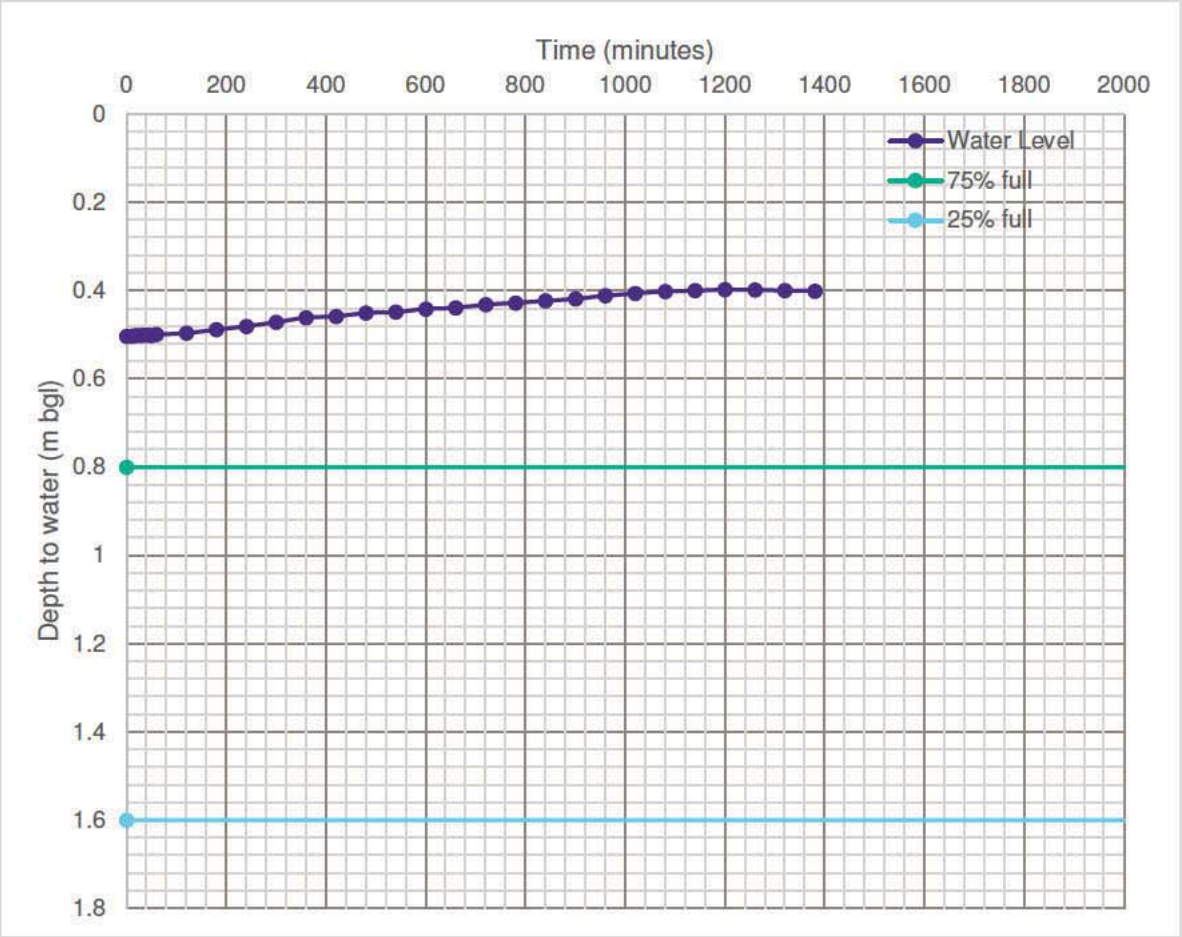
In accordance with BRE Digest 365 (2016)

Job Name:	[redacted] (Swindon)	Date:	06.10.20
Client: RPS Newark	Job Number: JER8749	Test Pit Reference.:	TP113
Trial pit filled with gravel to prevent instability in pit walls?:	No	Test No.:	2

Pit Dimensions (m)	
Depth	2.00
Width	0.50
Length	1.70
Height of pipe above ground level (if applicable)	0.00

Start % for calculations:	75% full
End % for calculations:	25% full

Soil Infiltration Rate (f)	
n/a	**m/s**



Remarks: Water level did not drain during test and as such the test did not fully meet the requirements to comply with the BRE calculation model.

SOIL INFILTRATION TEST RATE

In accordance with BRE Digest 365 (2016)

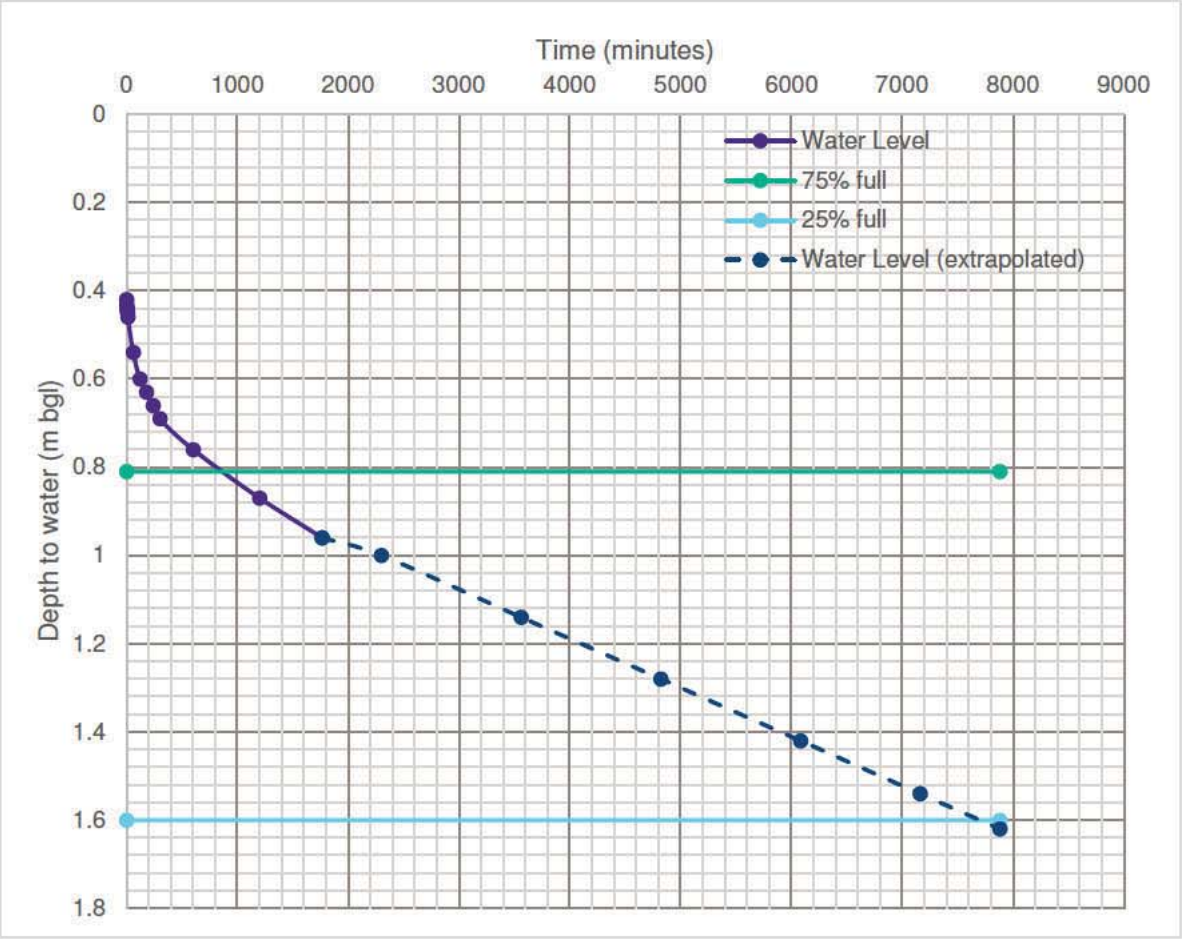
Job Name:	[redacted] (Swindon)	Date:	05.10.20
Client: RPS Newark	Job Number: JER8749	Test Pit Reference.:	TP114
Trial pit filled with gravel to prevent instability in pit walls?:	No	Test No.:	1

Pit Dimensions (m)	
Depth	2.00
Width	0.50
Length	1.60
Height of pipe above ground level (if applicable)	0.00

Start % for calculations:	75% full
End % for calculations:	Extrapolated 25% full

Soil Infiltration Rate (f)	
3.82E-07	**m/s**

Note: Estimated rate based on 75% full to extrapolated 25% full as test not completed to 25% full.



Remarks: Water level only fell 54cm over test duration (1765mins) and as such the test did not fully meet the requirements to comply with the BRE calculation model.

SOIL INFILTRATION TEST RATE

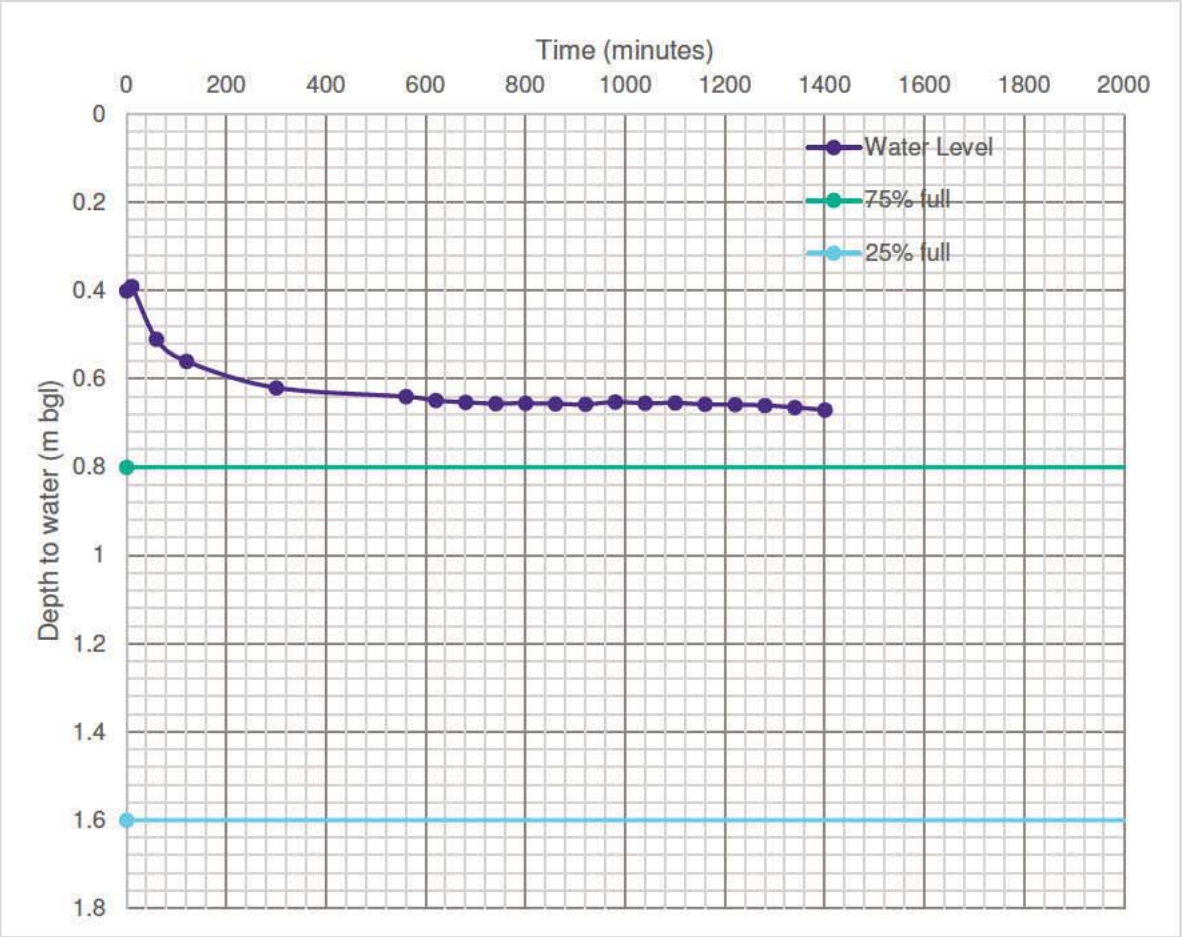
In accordance with BRE Digest 365 (2016)

Job Name:	[redacted] (Swindon)	Date:	06.10.20
Client:	RPS Newark	Job Number: JER8749	Test Pit Reference.: TP114
Trial pit filled with gravel to prevent instability in pit walls?:	No	Test No.:	2

Pit Dimensions (m)	
Depth	2.00
Width	0.50
Length	1.60
Height of pipe above ground level (if applicable)	0.00

Start % for calculations:	75% full
End % for calculations:	25% full

Soil Infiltration Rate (f)	
n/a	**m/s**



Remarks: Water level only fell 27cm over test duration (1400mins) and as such the test did not fully meet the requirements to comply with the BRE calculation model.

SOIL INFILTRATION TEST RATE

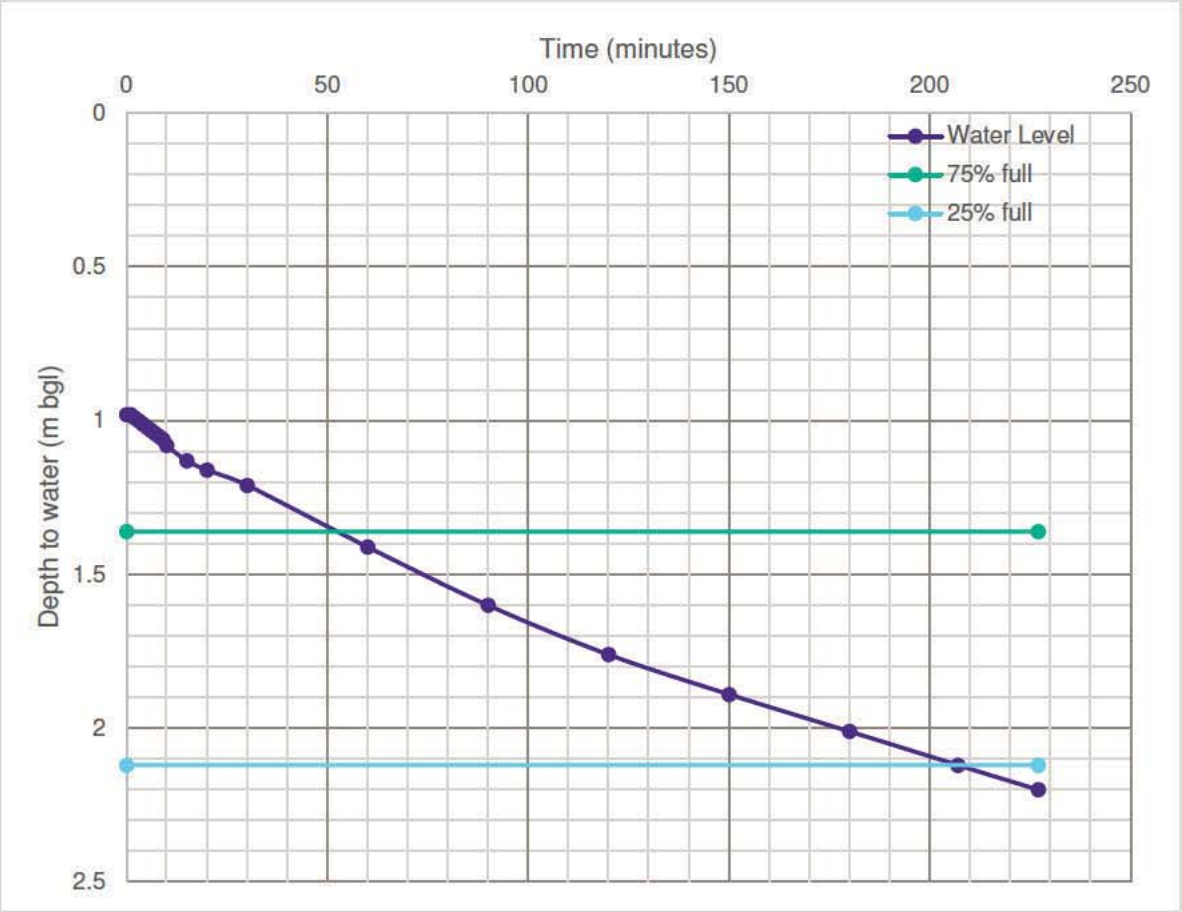
In accordance with BRE Digest 365 (2016)

Job Name:	[redacted] (Swindon)	Date:	05.10.20
Client: RPS Newark	Job Number: JER8749	Test Pit Reference.:	TP115
Trial pit filled with gravel to prevent instability in pit walls?:	No	Test No.:	1

Pit Dimensions (m)	
Depth	2.50
Width	0.60
Length	1.80
Height of pipe above ground level (if applicable)	0.00

Start % for calculations:	75% full
End % for calculations:	25% full

Soil Infiltration Rate (f)	
1.87E-05	**m/s**



Remarks:

SOIL INFILTRATION TEST RATE

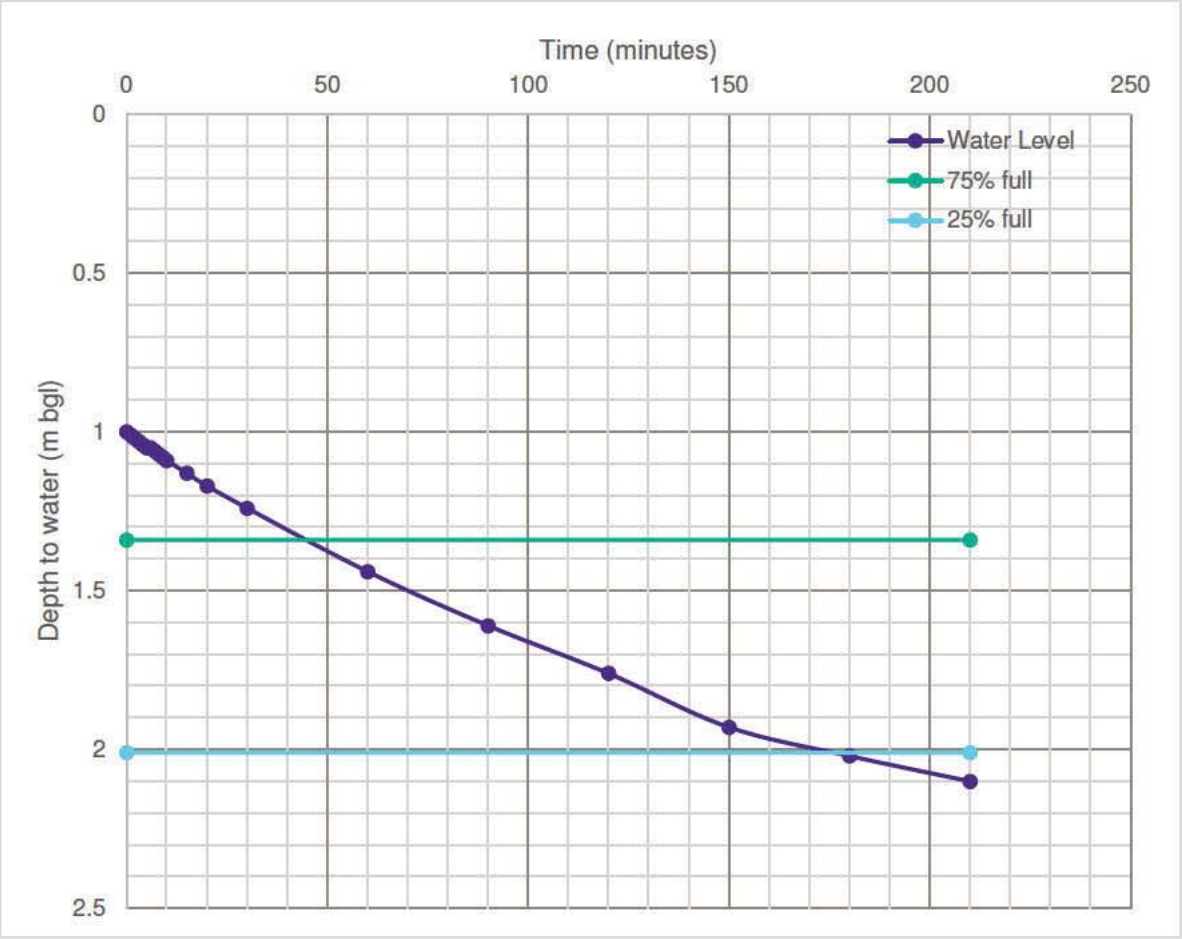
In accordance with BRE Digest 365 (2016)

Job Name:	[redacted] (Swindon)	Date:	06.10.20
Client: RPS Newark	Job Number: JER8749	Test Pit Reference.:	TP115
Trial pit filled with gravel to prevent instability in pit walls?: No		Test No.:	2

Pit Dimensions (m)	
Depth	2.35
Width	0.60
Length	1.80
Height of pipe above ground level (if applicable)	0.00

Start % for calculations:	75% full
End % for calculations:	25% full

Soil Infiltration Rate (f)	
2.05E-05	**m/s**



Remarks:

SOIL INFILTRATION TEST RATE

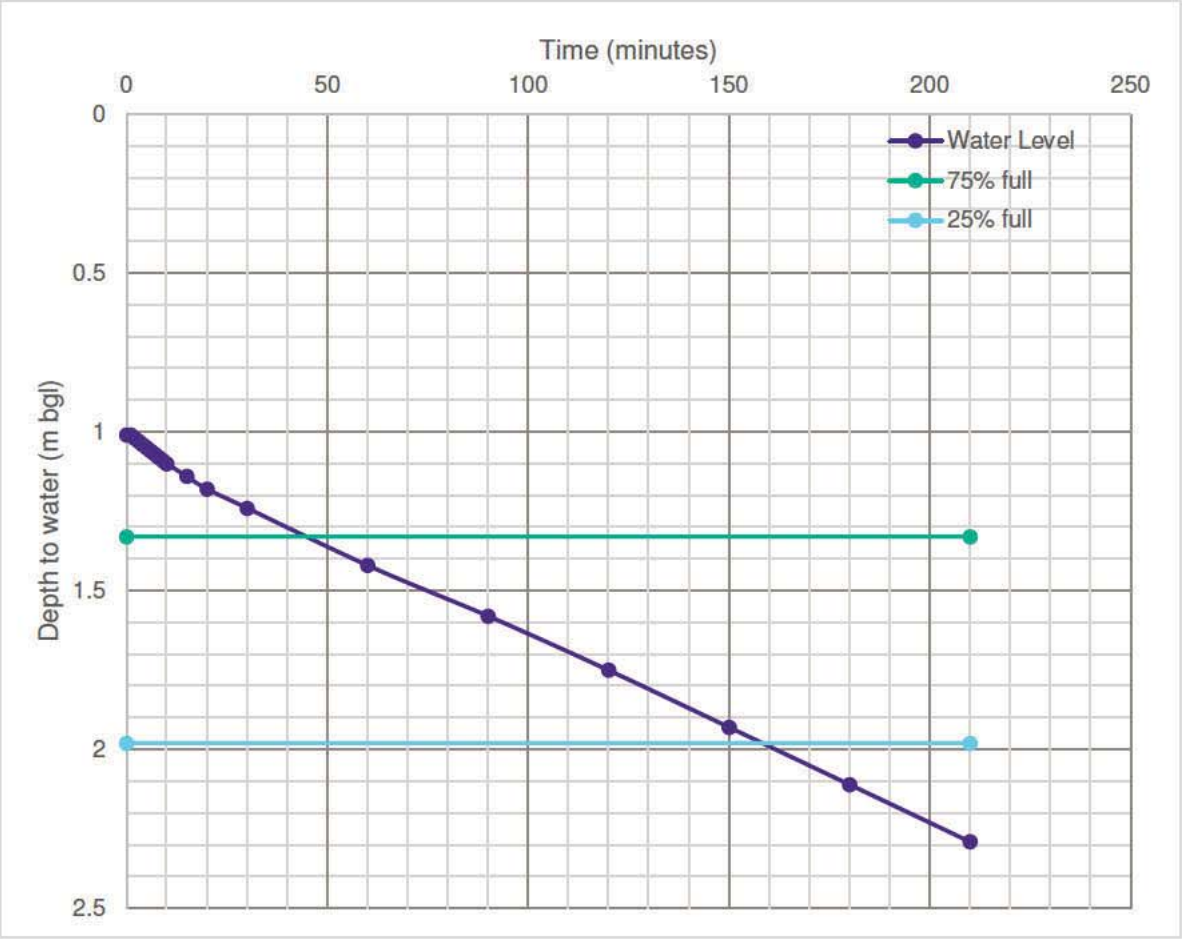
In accordance with BRE Digest 365 (2016)

Job Name:	[redacted] (Swindon)	Date:	06.10.20
Client: RPS Newark	Job Number: JER8749	Test Pit Reference.:	TP115
Trial pit filled with gravel to prevent instability in pit walls?:	No	Test No.:	3

Pit Dimensions (m)	
Depth	2.30
Width	0.60
Length	1.80
Height of pipe above ground level (if applicable)	0.00

Start % for calculations:	75% full
End % for calculations:	25% full

Soil Infiltration Rate (f)	
2.44E-05	**m/s**



Remarks:

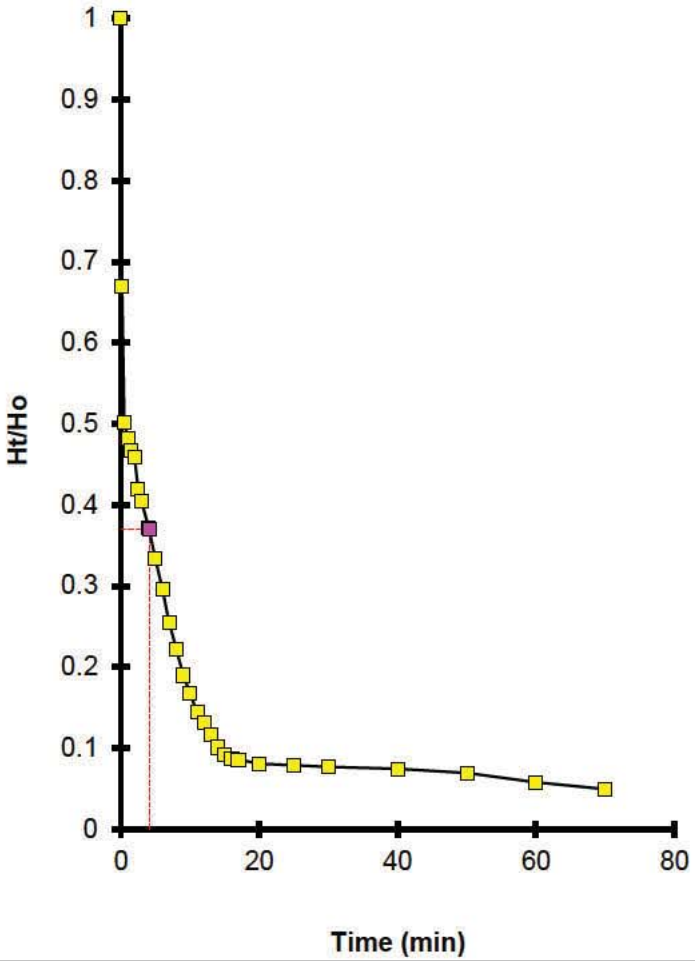
Variable Head Permeability Test

Project No.:	JER8749
Project Name:	[redacted] - Swindon
Client:	RPS Newark
Borehole No.:	BH201 Test 1
Compiled By	TF
Date	16/11/2020
Checked By	MH
Date	17/11/2020

TEST RESPONSE ZONE DETAILS:

Top (m):	3.00
Bottom (m):	10.00
Length (m):	7.00
Diameter (m):	0.050
Initial Standing Water Level (m below top of casing):	9.68
Height of casing or standpipe : above ground level (m)	0.00
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)	Ht/Ho
0	0.15	1.00
0.166	3.3	0.67
0.5	4.9	0.50
1	5.08	0.48
1.5	5.23	0.47
2	5.3	0.46
2.5	5.68	0.42
3	5.83	0.40
4	6.13	0.37
5	6.5	0.33
6	6.86	0.30
7	7.25	0.25
8	7.56	0.22
9	7.87	0.19
10	8.08	0.17
11	8.31	0.14
12	8.43	0.13
13	8.57	0.12
14	8.72	0.10
15	8.81	0.09
16	8.85	0.09
17	8.86	0.09
20	8.91	0.08
25	8.93	0.08
30	8.95	0.08
40	8.97	0.07
50	9.02	0.07
60	9.13	0.06
70	9.21	0.05



Cross Sectional Area of Test Zone	A=	0.00196
Shape Factor (Case D)	F=	7.80547
Time to reach Ht/Ho = 0.37 (sec)	T=	244
Permeability (m/s)	K=	1.03E-06

MAKING COMPLEX EASY

Comments

* Depth to water below top of casing/standpipe

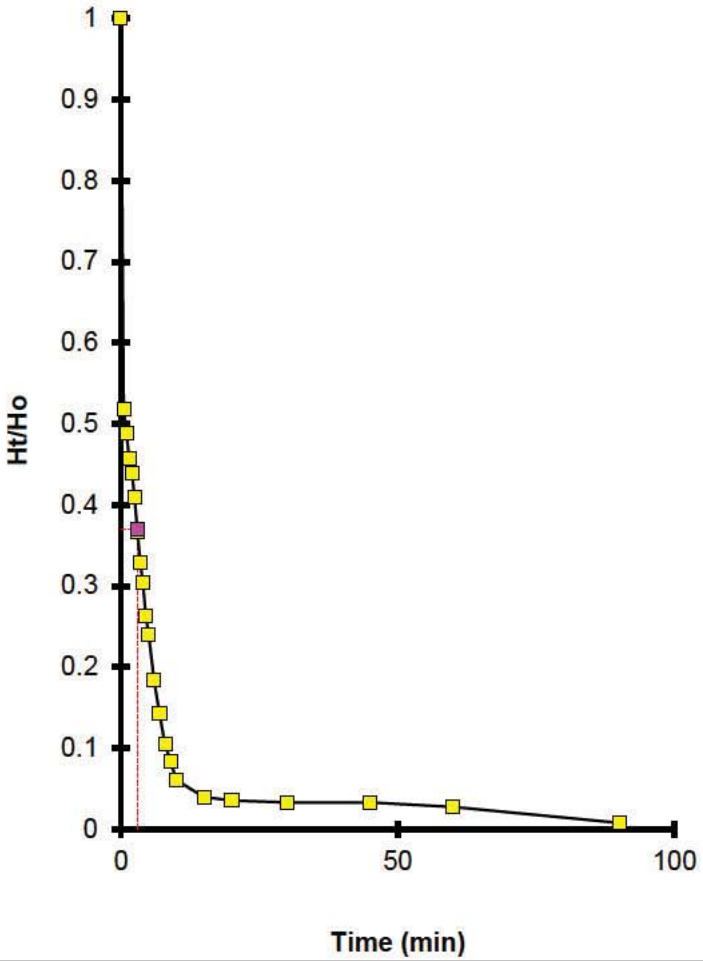
Variable Head Permeability Test

Project No.:	JER8749
Project Name:	Swindon
Client:	RPS Newark
Borehole No.:	BH201 Test 2
Compiled By	TF
Date	16/11/2020
Checked By	MH
Date	17/11/2020

TEST RESPONSE ZONE DETAILS:

Top (m):	3.00
Bottom (m):	10.00
Length (m):	7.00
Diameter (m):	0.050
Initial Standing Water Level (m below top of casing):	9.25
Height of casing or standpipe : above ground level (m)	0.00
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)	Ht/Ho
0	0.15	1.00
0.5	4.54	0.52
1	4.8	0.49
1.5	5.09	0.46
2	5.25	0.44
2.5	5.52	0.41
3	5.91	0.37
3.5	6.26	0.33
4	6.48	0.30
4.5	6.85	0.26
5	7.06	0.24
6	7.58	0.18
7	7.95	0.14
8	8.3	0.10
9	8.49	0.08
10	8.7	0.06
15	8.89	0.04
20	8.93	0.04
30	8.95	0.03
45	8.95	0.03
60	9	0.03
90	9.18	0.01



Cross Sectional Area of Test Zone	A=	0.00196
Shape Factor (Case D)	F=	7.80547
Time to reach Ht/Ho = 0.37 (sec)	T=	178
Permeability (m/s)	K=	1.41E-06

MAKING COMPLEX EASY

Comments

* Depth to water below top of casing/standpipe

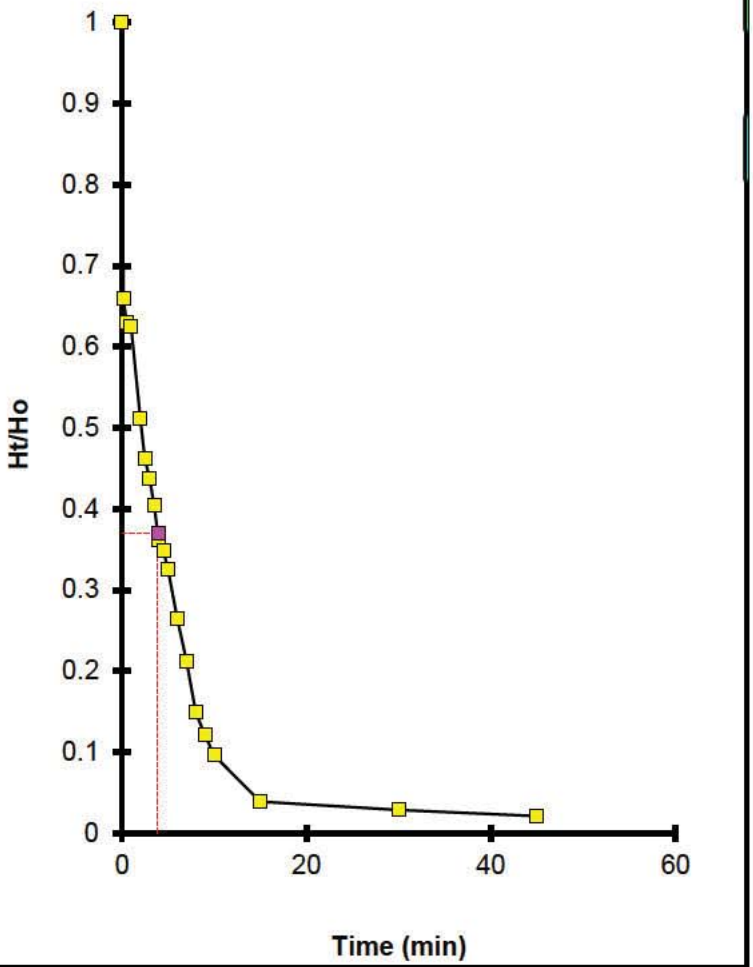
Variable Head Permeability Test

Project No.:	JER8749
Project Name:	Swindon
Client:	RPS Newark
Borehole No.:	BH201 Test 3
Compiled By	TF
Date	16/11/2020
Checked By	MH
Date	17/11/2020

TEST RESPONSE ZONE DETAILS:

Top (m):	3.00
Bottom (m):	10.00
Length (m):	7.00
Diameter (m):	0.050
Initial Standing Water Level (m below top of casing):	9.20
Height of casing or standpipe : above ground level (m)	0.00
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)	Ht/Ho
0	0.15	1.00
0.166	3.23	0.66
0.5	3.5	0.63
1	3.54	0.63
2	4.57	0.51
2.5	5.02	0.46
3	5.24	0.44
3.5	5.54	0.40
4	5.92	0.36
4.5	6.05	0.35
5	6.25	0.33
6	6.8	0.27
7	7.28	0.21
8	7.85	0.15
9	8.1	0.12
10	8.33	0.10
15	8.85	0.04
30	8.94	0.03
45	9.01	0.02



Cross Sectional Area of Test Zone	A=	0.00196
Shape Factor (Case D)	F=	7.80547
Time to reach Ht/Ho = 0.37 (sec)	T=	234
Permeability (m/s)	K=	1.07E-06

MAKING COMPLEX EASY

Comments

* Depth to water below top of casing/standpipe

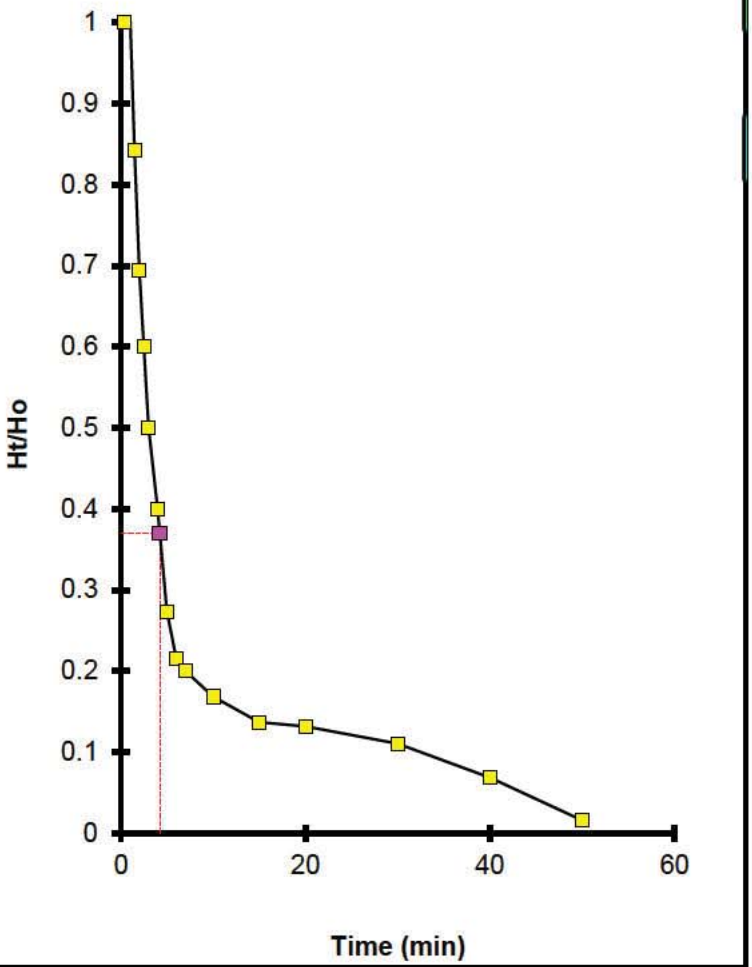
Variable Head Permeability Test

Project No.:	JER8749
Project Name:	Swindon
Client:	RPS Newark
Borehole No.:	BH201 Test 4
Compiled By	TF
Date	16/11/2020
Checked By	MH
Date	17/11/2020

TEST RESPONSE ZONE DETAILS:

Top (m):	3.00
Bottom (m):	10.00
Length (m):	7.00
Diameter (m):	0.050
Initial Standing Water Level (m below top of casing):	9.20
Height of casing or standpipe : above ground level (m)	0.00
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)	Ht/Ho
0.333	7.3	1.00
0.5	7.15	1.08
1	7.28	1.01
1.5	7.6	0.84
2	7.88	0.69
2.5	8.06	0.60
3	8.25	0.50
4	8.44	0.40
5	8.68	0.27
6	8.79	0.22
7	8.82	0.20
10	8.88	0.17
15	8.94	0.14
20	8.95	0.13
30	8.99	0.11
40	9.07	0.07
50	9.17	0.02



Cross Sectional Area of Test Zone	A=	0.00196
Shape Factor (Case D)	F=	7.80547
Time to reach Ht/Ho = 0.37 (sec)	T=	252
Permeability (m/s)	K=	9.97E-07

MAKING COMPLEX EASY

Comments

* Depth to water below top of casing/standpipe

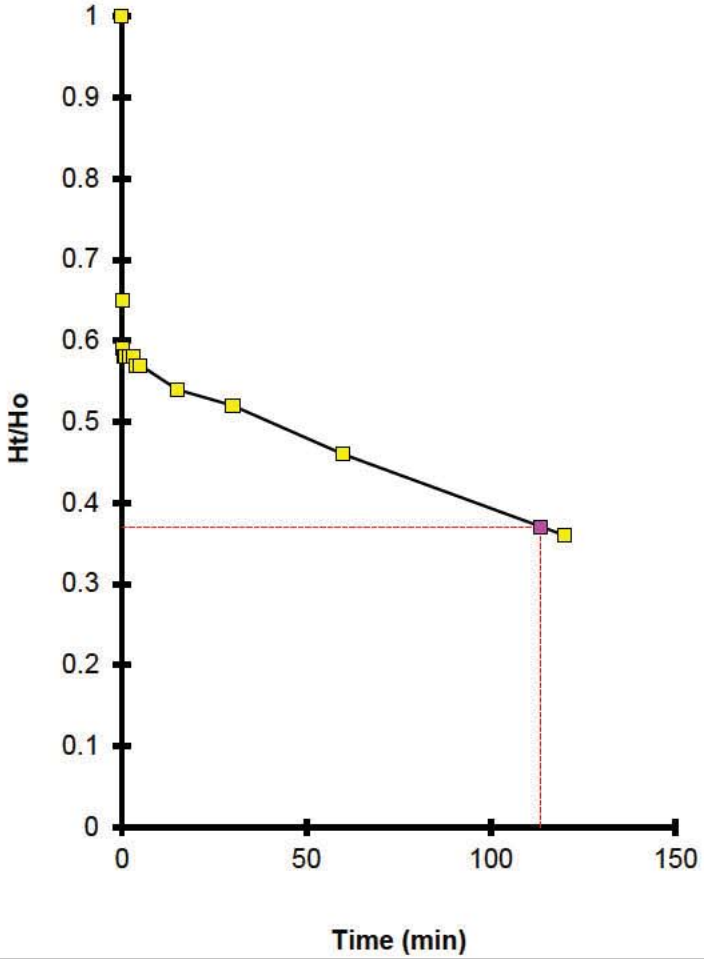
Variable Head Permeability Test

Project No.:	JER8749
Project Name:	Swindon
Client:	RPS Newark
Borehole No.:	BH202 Test 1
Compiled By	TF
Date	16/11/2020
Checked By	MH
Date	17/11/2020

TEST RESPONSE ZONE DETAILS:

Top (m):	1.00
Bottom (m):	2.00
Length (m):	1.00
Diameter (m):	0.050
Initial Standing Water Level (m below top of casing):	1.10
Height of casing or standpipe : above ground level (m)	0.00
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)	Ht/Ho
0	0.1	1.00
0.166	0.45	0.65
0.333	0.51	0.59
0.5	0.52	0.58
1	0.52	0.58
2	0.52	0.58
3	0.52	0.58
4	0.53	0.57
5	0.53	0.57
15	0.56	0.54
30	0.58	0.52
60	0.64	0.46
120	0.74	0.36



Cross Sectional Area of Test Zone	A=	0.00196
Shape Factor (Case D)	F=	1.70299
Time to reach Ht/Ho = 0.37 (sec)	T=	6798
Permeability (m/s)	K=	1.70E-07

MAKING COMPLEX EASY

Comments

* Depth to water below top of casing/standpipe

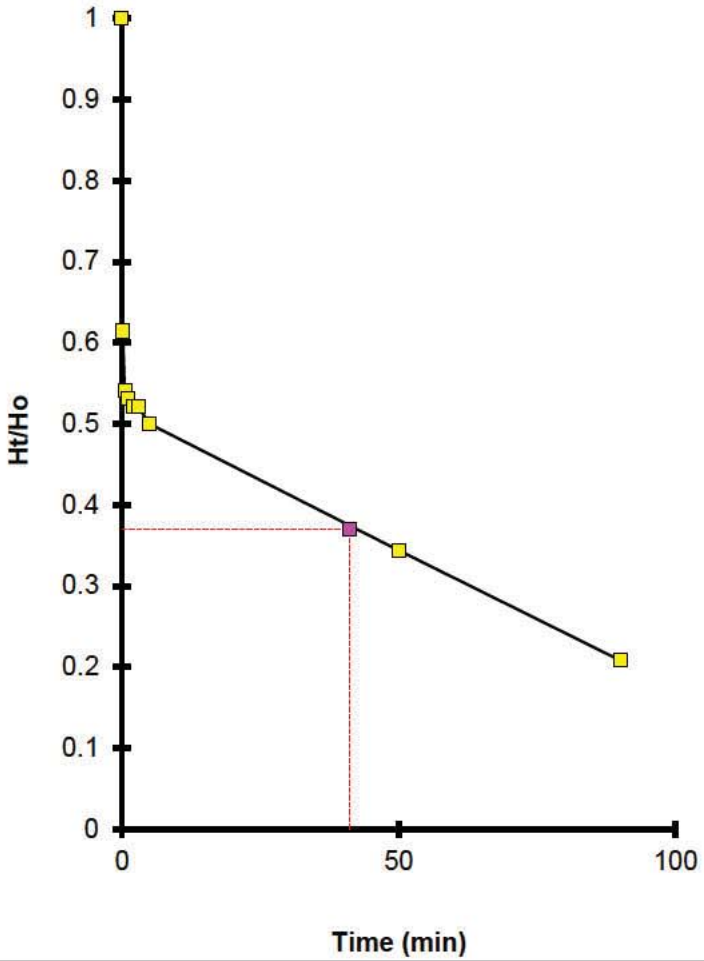
Variable Head Permeability Test

Project No.:	JER8749
Project Name:	Swindon
Client:	RPS Newark
Borehole No.:	BH202 Test 2
Compiled By	TF
Date	16/11/2020
Checked By	MH
Date	17/11/2020

Elapsed Time (mins)	Depth to Water* (m)	Ht/Ho
0	0.1	1.00
0.166	0.47	0.61
0.5	0.54	0.54
1	0.55	0.53
2	0.56	0.52
3	0.56	0.52
5	0.58	0.50
50	0.73	0.34
90	0.86	0.21

TEST RESPONSE ZONE DETAILS:

Top (m):	1.00
Bottom (m):	2.00
Length (m):	1.00
Diameter (m):	0.050
Initial Standing Water Level (m below top of casing):	1.06
Height of casing or standpipe : above ground level (m)	0.00
Falling or Rising Head Test?	Falling



Cross Sectional Area of Test Zone	A=	0.00196
Shape Factor (Case D)	F=	1.70299
Time to reach Ht/Ho = 0.37 (sec)	T=	2470
Permeability (m/s)	K=	4.67E-07

MAKING COMPLEX EASY

Comments

* Depth to water below top of casing/standpipe

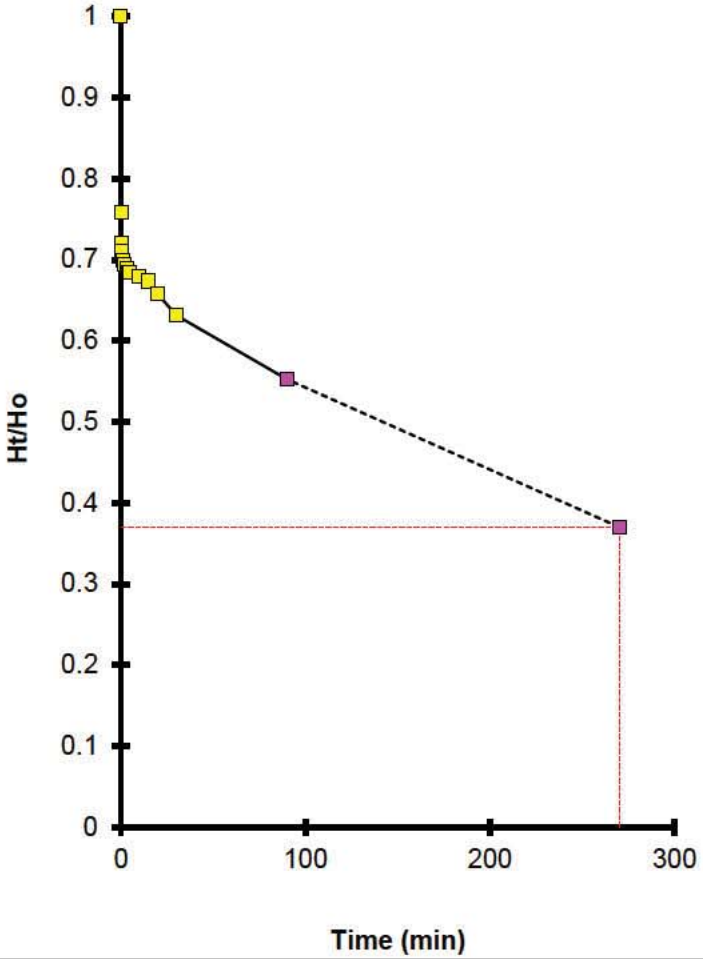
Variable Head Permeability Test

Project No.:	JER8749
Project Name:	Swindon
Client:	RPS Newark
Borehole No.:	BH203 Test 1
Compiled By	TF
Date	16/11/2020
Checked By	MH
Date	17/11/2020

TEST RESPONSE ZONE DETAILS:

Top (m):	1.00
Bottom (m):	2.00
Length (m):	1.00
Diameter (m):	0.050
Initial Standing Water Level (m below top of casing):	2.00
Height of casing or standpipe : above ground level (m)	0.00
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)	Ht/Ho
0	0.1	1.00
0.166	0.56	0.76
0.333	0.63	0.72
0.5	0.65	0.71
1	0.67	0.70
2	0.68	0.69
3	0.69	0.69
4	0.7	0.68
5	0.7	0.68
10	0.71	0.68
15	0.72	0.67
20	0.75	0.66
30	0.8	0.63
90	0.95	0.55



Cross Sectional Area of Test Zone	A=	0.00196
Shape Factor (Case D)	F=	1.70299
Time to reach Ht/Ho = 0.37 (sec)	T=	16216
Permeability (m/s) Based on interpolation of data	K=	7.11E-08

MAKING COMPLEX EASY

Comments

* Depth to water below top of casing/standpipe

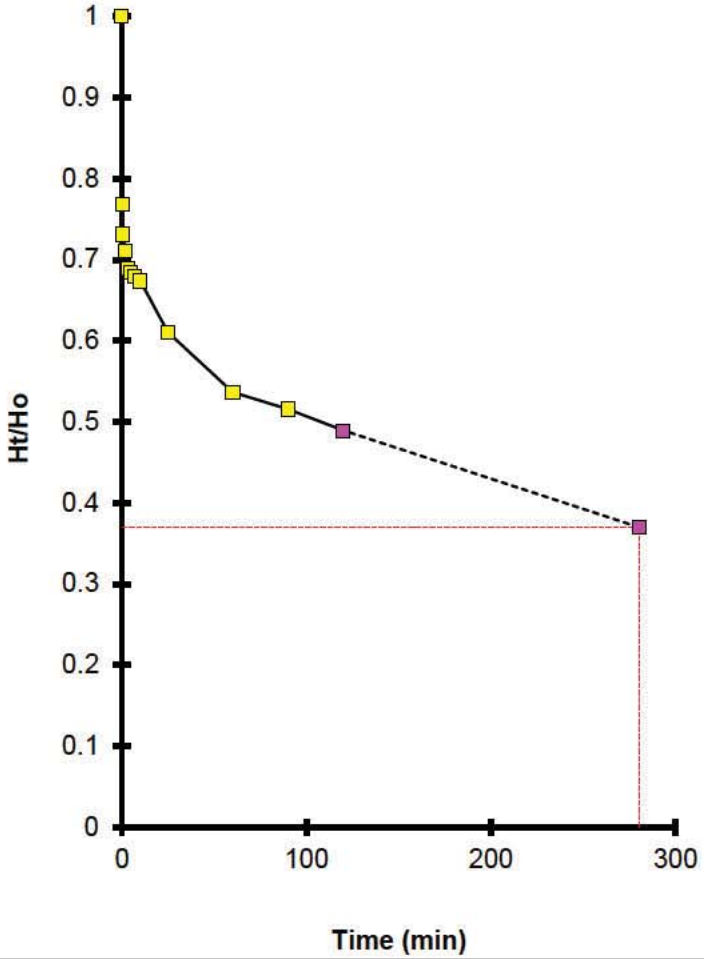
Variable Head Permeability Test

Project No.:	JER8749
Project Name:	Swindon
Client:	RPS Newark
Borehole No.:	BH203 Test 2
Compiled By	TF
Date	16/11/2020
Checked By	MH
Date	17/11/2020

TEST RESPONSE ZONE DETAILS:

Top (m):	1.00
Bottom (m):	2.00
Length (m):	1.00
Diameter (m):	0.050
Initial Standing Water Level (m below top of casing):	2.00
Height of casing or standpipe : above ground level (m)	0.00
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)	Ht/Ho
0	0.1	1.00
0.166	0.54	0.77
0.5	0.61	0.73
2	0.65	0.71
3	0.69	0.69
5	0.7	0.68
7	0.71	0.68
10	0.72	0.67
25	0.84	0.61
60	0.98	0.54
90	1.02	0.52
120	1.07	0.49



Cross Sectional Area of Test Zone	A=	0.00196
Shape Factor (Case D)	F=	1.70299
Time to reach Ht/Ho = 0.37 (sec)	T=	16818
Permeability (m/s) Based on interpolation of data	K=	6.86E-08

MAKING COMPLEX EASY

Comments

* Depth to water below top of casing/standpipe

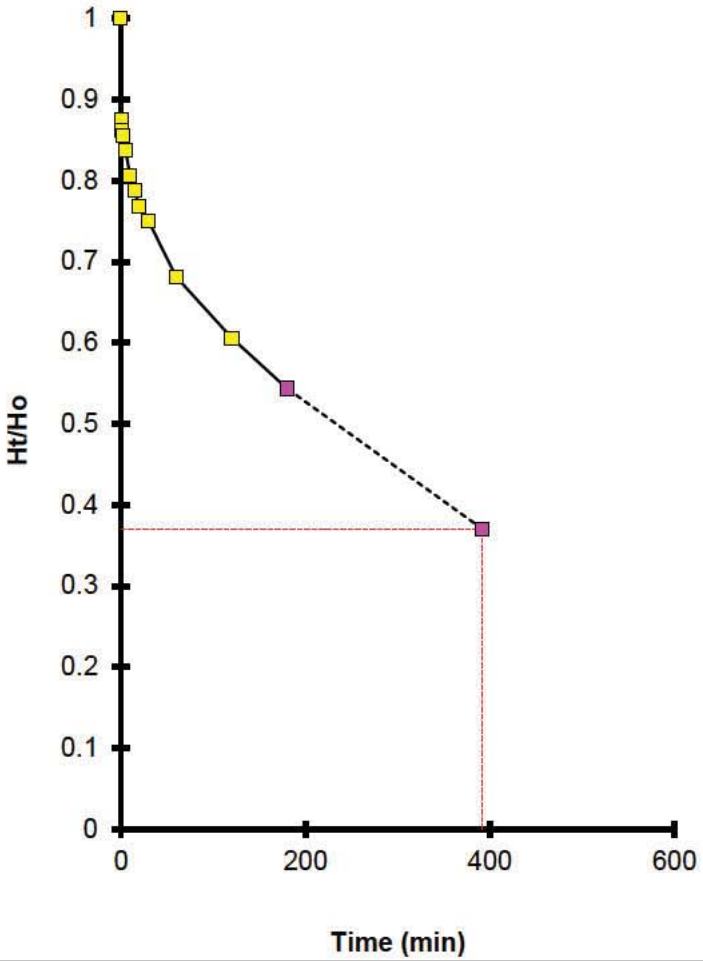
Variable Head Permeability Test

Project No.:	JER8749
Project Name:	Swindon
Client:	RPS Newark
Borehole No.:	BH204 Test 1
Compiled By	TF
Date	16/11/2020
Checked By	MH
Date	17/11/2020

Elapsed Time (mins)	Depth to Water* (m)	Ht/Ho
0	0.1	1.00
0.166	0.3	0.88
0.333	0.32	0.86
0.5	0.32	0.86
1	0.32	0.86
2	0.33	0.86
5	0.36	0.84
10	0.41	0.81
15	0.44	0.79
20	0.47	0.77
30	0.5	0.75
60	0.61	0.68
120	0.73	0.61
180	0.83	0.54

TEST RESPONSE ZONE DETAILS:

Top (m):	0.70
Bottom (m):	1.70
Length (m):	1.00
Diameter (m):	0.050
Initial Standing Water Level (m below top of casing):	1.70
Height of casing or standpipe : above ground level (m)	0.00
Falling or Rising Head Test?	Falling



Cross Sectional Area of Test Zone	A=	0.00196
Shape Factor (Case D)	F=	1.70299
Time to reach Ht/Ho = 0.37 (sec)	T=	23538
Permeability (m/s)	K=	4.90E-08
Based on interpolation of data		

MAKING COMPLEX EASY

Comments

* Depth to water below top of casing/standpipe

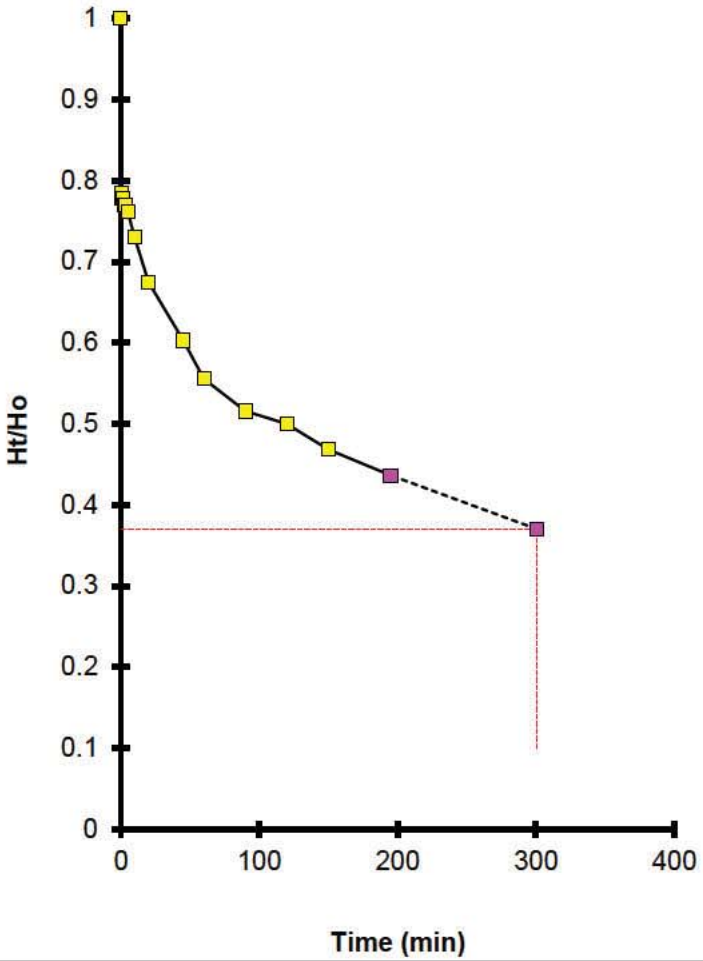
Variable Head Permeability Test

Project No.:	JER8749
Project Name:	Swindon
Client:	RPS Newark
Borehole No.:	BH204 Test 2
Compiled By	TF
Date	16/11/2020
Checked By	MH
Date	17/11/2020

Elapsed Time (mins)	Depth to Water* (m)	Ht/Ho
0	0.1	1.00
0.166	0.37	0.79
0.5	0.38	0.78
1	0.38	0.78
2	0.39	0.77
3	0.39	0.77
5	0.4	0.76
10	0.44	0.73
20	0.51	0.67
45	0.6	0.60
60	0.66	0.56
90	0.71	0.52
120	0.73	0.50
150	0.77	0.47
195	0.81	0.44

TEST RESPONSE ZONE DETAILS:

Top (m):	0.70
Bottom (m):	1.70
Length (m):	1.00
Diameter (m):	0.050
Initial Standing Water Level (m below top of casing):	1.70
Height of casing or standpipe : above ground level (m)	0.15
Falling or Rising Head Test?	Falling



Cross Sectional Area of Test Zone	A=	0.00196
Shape Factor (Case D)	F=	1.70299
Time to reach Ht/Ho = 0.37 (sec)	T=	18057
Permeability (m/s) Based on interpolation of data	K=	6.39E-08

MAKING COMPLEX EASY

Comments

* Depth to water below top of casing/standpipe

Annex D

Geotechnical Laboratory Certificates

BS EN ISO 17892-12 : 2018

SUMMARY OF LIQUID AND PLASTIC LIMIT TESTS

Location	Depth m	Sample Ref	Sample Type	Description	Water Content BS EN ISO 17892-1 : 2014 %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Percentage Passing 425µm %	Atterberg Classification	Test Type	Sample Condition
TP107	0.10		B	Light brown and brown clayey SILT wi h rare gravel and brick fragments.	23.0	50	29	21	51	MI	2	3
TP110	0.20		B	Dark brown and light brown clayey SILT with some gravel sized brick fragments and roots.	23.9	~	~	~	~	~	~	~
TP110	1.20		B	Greyish brown and light greyish clayey SILT with rare gravel.	21.9	49	33	16	59	MI	2	3
TP111	0.10		B	Dark brown clayey SILT with rare gravel and rare rootlets.	29.4	58	36	22	75	MH	2	3
TP111	0.50		B	Dark brown and light brown clayey SILT with some gravel sized brick fragments, mudstone and roots.	23.2	~	~	~	~	~	~	~
TP113	0.50		B	Dark grey and greyish brown fine sandy CLAY with rare gravel.	28.8	52	28	24	98	CH	2	1
TP114	0.50		B	Brownish grey and light brown mot led reddish brown slightly fine sandy silty CLAY with rare silt gravel.	26.5	59	27	32	98	CH	2	1

Test Type:
1 - 1 point 80g / 30° fall cone method.
2 - 4 point 80g / 30° fall cone method.
3 - Non plastic determination.

Sample condition:
1 - As Received
2 - Air Dried
3 - Washed & Air Dried

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] **- SWINDON**

JER8749

GEOLABS

UKAS TESTING 1982

BS1377 : Part 2 : 1990 : Clause 3.3

SATURATION MOISTURE CONTENT OF CHALK

Location	Depth m	Sample Ref	Sample Type	Description	Water Content BS EN ISO 17892-1 : 2014 %	Bulk Density Mg/m³	Dry Density Mg/m³	Saturation Moisture Content %	Porosity %
TP101	3.00		B	Light greyish brown weathered intact CHALK.	17.8	2.13	1.81	18	33
TP111	3.20		B	Light greyish brown weathered intact CHALK.	20.3	2.01	1.67	23	38

Notes

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] **- SWINDON**

JER8749

GEOLABS®

1128 - Particle Density Summary - 31963.XLSM

BS1377: Part 2:1990 / BS EN ISO 17892-3 : 2015

PARTICLE DENSITY

Location	Depth (m)	Sample Ref	Sample Type	Description	Particle Density Mg/m³	Test Method
TP101	0.50		B	Brown clayey SILT.	2.60	2
TP101	1.50		B	Light grey weathered intact and structureless CHALK.	2.57	2
TP102	3.00		B	Light grey weathered intact CHALK.	2.58	2
TP104	0.30		B	Dark brown and greyish brown clayey SILT with some gravel sized brick fragments and rare rootlets.	2.64	2
TP104	1.50-2.00		amal	Light grey weathered intact and stuctureless CHALK.	2.61	2
TP105	0.70-1.50		amal	Light grey weathered stuctureless and intact CHALK.	2.62	2
TP106	0.30		B	Dark brown and greyish brown clayey SILT with some gravel sized brick fragments and rare rootlets.	2.62	2
TP106	1.20-3.00		amal	Light grey weathered stuctureless and intact CHALK.	2.63	2

Notes

Test Method
1. Gas jar : BS1377 : Part 2 : 1990 Clause 8.2
2. Pycnometer : BS EN ISO 17892-3:2015 (UKAS Accredited)

Version 00.991230

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] **- SWINDON**

JER8749

GEOLABS

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

Location	TP102
Depth (m)	1.50
Sample Type	B

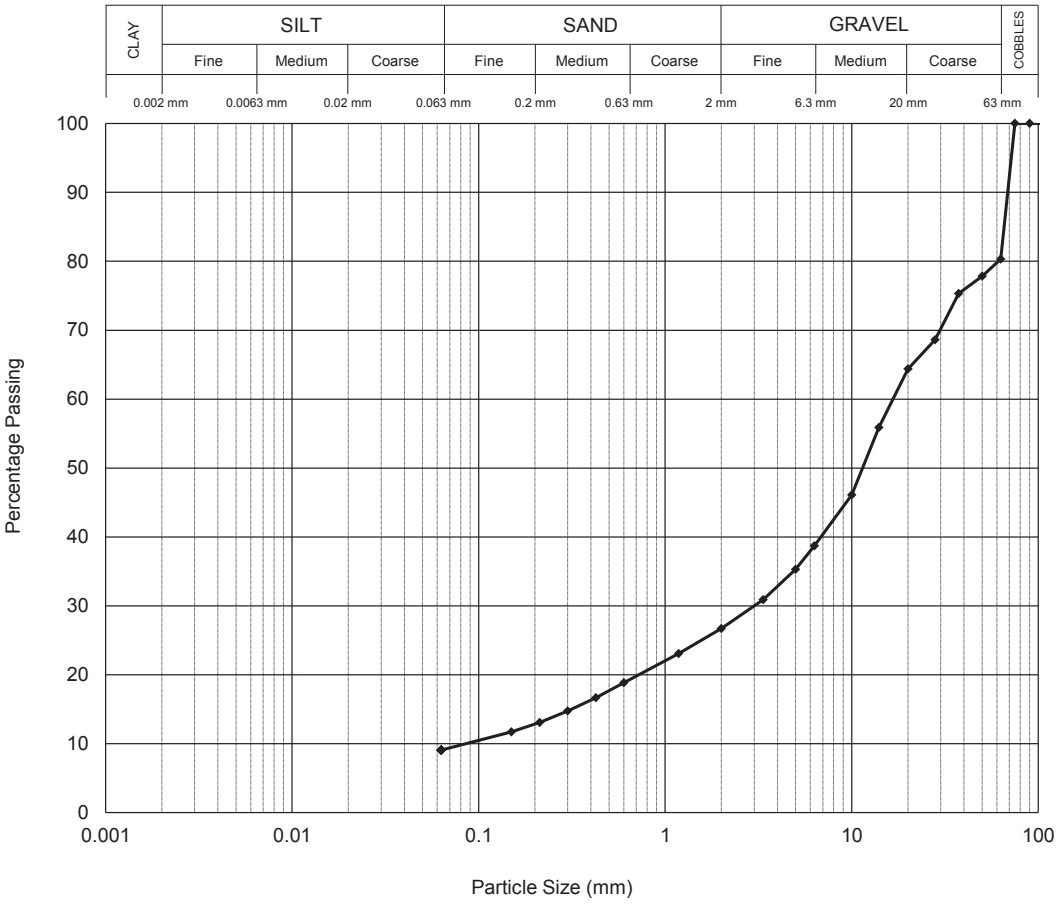
Description

Greyish brown clayey silty sandy GRAVEL with some cobbles. Gravel and cobbles include crushed concrete, brick and wood.

Remarks Insuffcient sample supplied to comply with BS EN ISO 17892-4 : 2016 minimum mass requirements

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	80
50.0 mm	78
37.5 mm	75
28.0 mm	69
20.0 mm	64
14.0 mm	56
10.0 mm	46
6.30 mm	39
5.00 mm	35
3.35 mm	31
2.00 mm	27
1.18 mm	23
600 µm	19
425 µm	17
300 µm	15
212 µm	13
150 µm	12
63 µm	9



Particle Proportions	
Cobbles	19.7
Gravel	53.6
Sand	17.7
Silt & Clay	9.0

Processed by CC
Checked and Approved by

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] - SWINDON

JER8749

GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

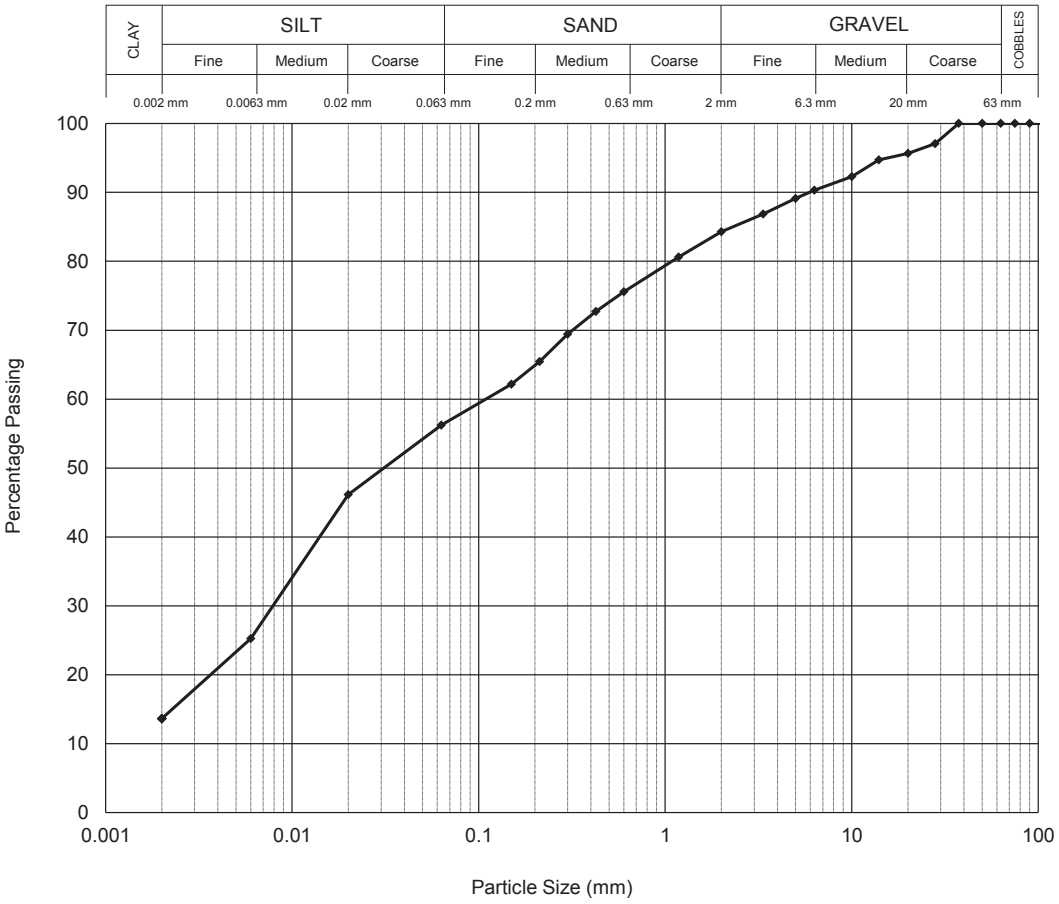
Location	TP109
Depth (m)	0.10
Sample Type	B

Description

Brown and greyish brown slightly gravelly slightly sandy silty CLAY with roots. Gravel includes brick fragments and crushed concrete.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	97
20.0 mm	96
14.0 mm	95
10.0 mm	92
6.30 mm	90
5.00 mm	89
3.35 mm	87
2.00 mm	84
1.18 mm	81
600 µm	76
425 µm	73
300 µm	69
212 µm	65
150 µm	62
63 µm	56



Sedimentation	
No Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	46
6 µm	25
2 µm	14

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0.0
Gravel	15.7
Sand	28.1
Silt	42.6
Clay	13.6

Processed by CC
Checked and Approved by

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] - SWINDON

JER8749

GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

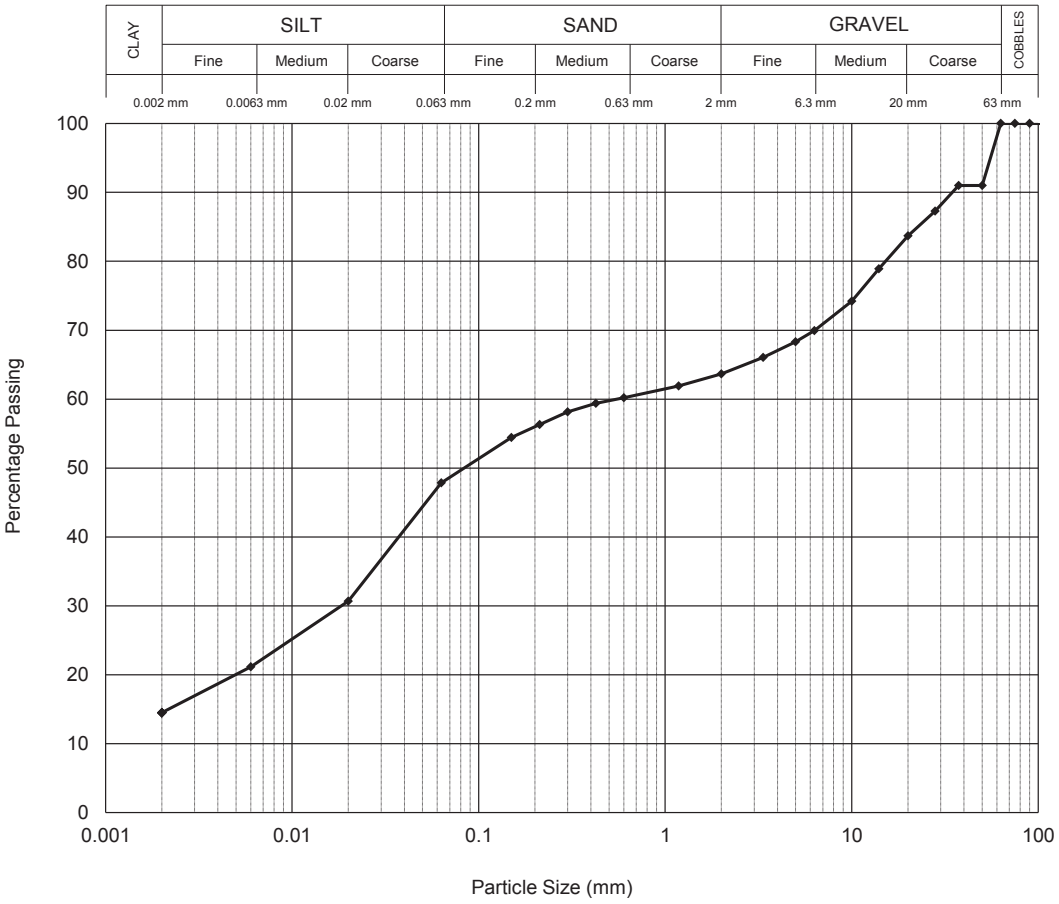
Location	TP111
Depth (m)	1.70
Sample Type	B

Description

Dark grey and light grey slightly sandy gravelly silty CLAY with roots. Gravel includes mudstone, brick and crushed concrete.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	91
37.5 mm	91
28.0 mm	87
20.0 mm	84
14.0 mm	79
10.0 mm	74
6.30 mm	70
5.00 mm	68
3.35 mm	66
2.00 mm	64
1.18 mm	62
600 µm	60
425 µm	59
300 µm	58
212 µm	56
150 µm	54
63 µm	48



Sedimentation	
No Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	31
6 µm	21
2 µm	14

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0.0
Gravel	36.3
Sand	15.8
Silt	33.4
Clay	14.5

Processed by CC
Checked and Approved by

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted]- SWINDON

JER8749

GEOLABS

UKAS TESTING 1982

BS1377:Part 4:1990 Clause 3.3

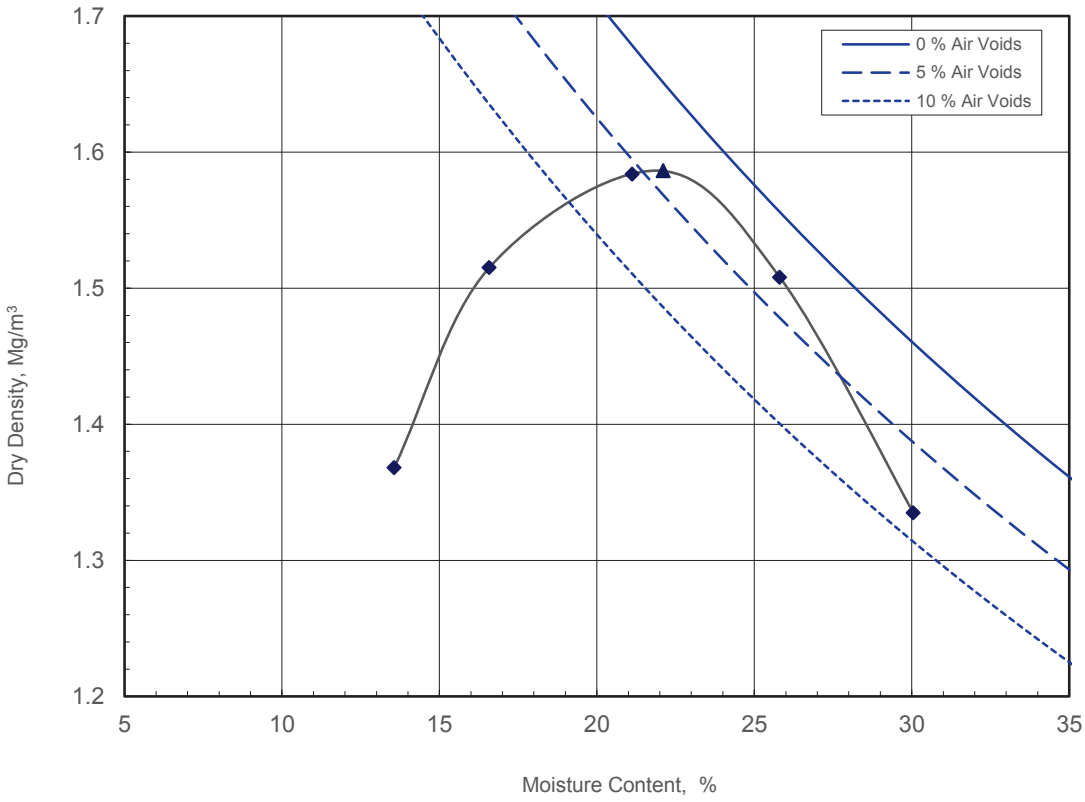
MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location	TP101
Depth (m)	0.50
Sample Type	B

Description:

Brown clayey SILT.

Preparation		Oven dried
Test Method		2.5kg Rammer for soils with particles up to medium-gravel size
Samples Used		Single
Mass Retained on 37.5 mm Sieve	%	-
Mass Retained on 20.0 mm Sieve	%	-
Particle Density - Measured	Mg/m³	2.60
Maximum Dry Density	Mg/m³	1.59
Optimum Moisture Content	%	22.1



Determination		1	2	3	4	5
Moisture Content	%	13.6	16.6	21.1	25.8	30.0
Dry Density	Mg/m³	1.37	1.52	1.58	1.51	1.33

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] **- SWINDON**

JER8749

GEOLABS

UKAS TESTING 1992

BS1377:Part 4:1990 Clause 3.3

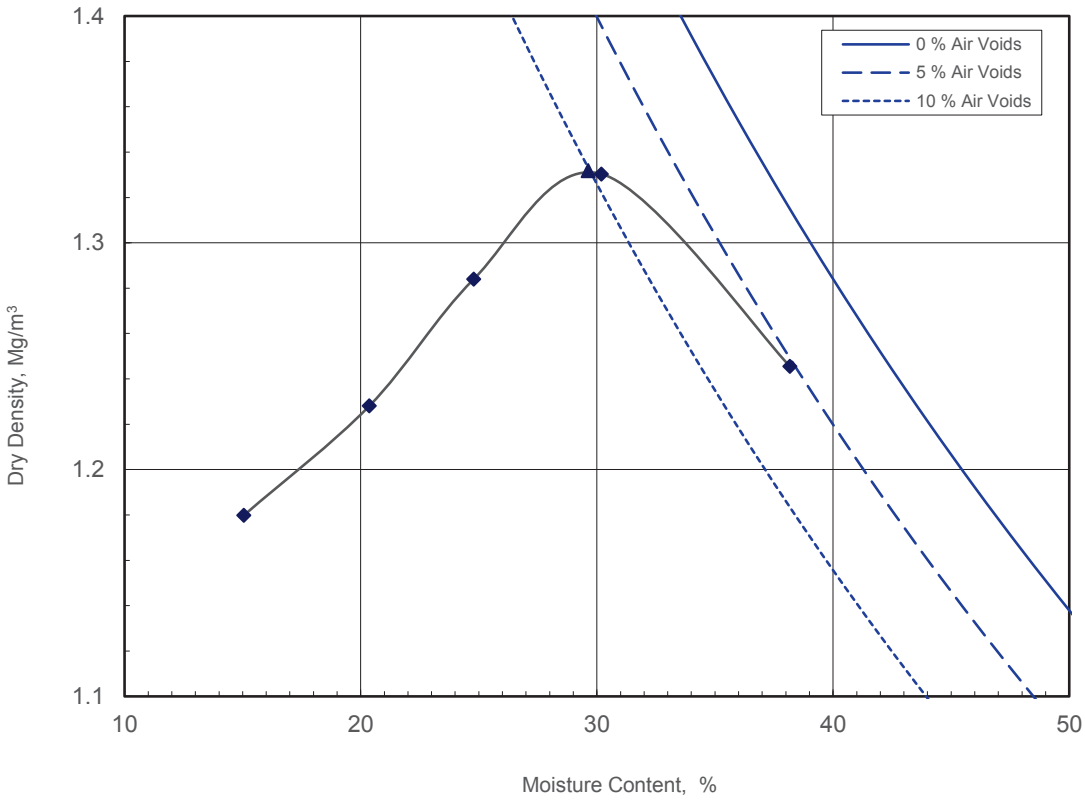
MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location	TP104
Depth (m)	0.30
Sample Type	B

Description:

Dark brown and greyish brown clayey SILT with some gravel sized brick fragments and rare rootlets.

Preparation		Oven dried
Test Method		2.5kg Rammer for soils with particles up to medium-gravel size
Samples Used		Single
Mass Retained on 37.5 mm Sieve	%	-
Mass Retained on 20.0 mm Sieve	%	1
Particle Density - Measured	Mg/m³	2.64
Maximum Dry Density	Mg/m³	1.33
Optimum Moisture Content	%	29.6



Determination		1	2	3	4	5
Moisture Content	%	15.1	20.4	24.8	30.2	38.2
Dry Density	Mg/m³	1.18	1.23	1.28	1.33	1.25

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] **- SWINDON**

JER8749

BS1377:Part 4:1990 Clause 3.6

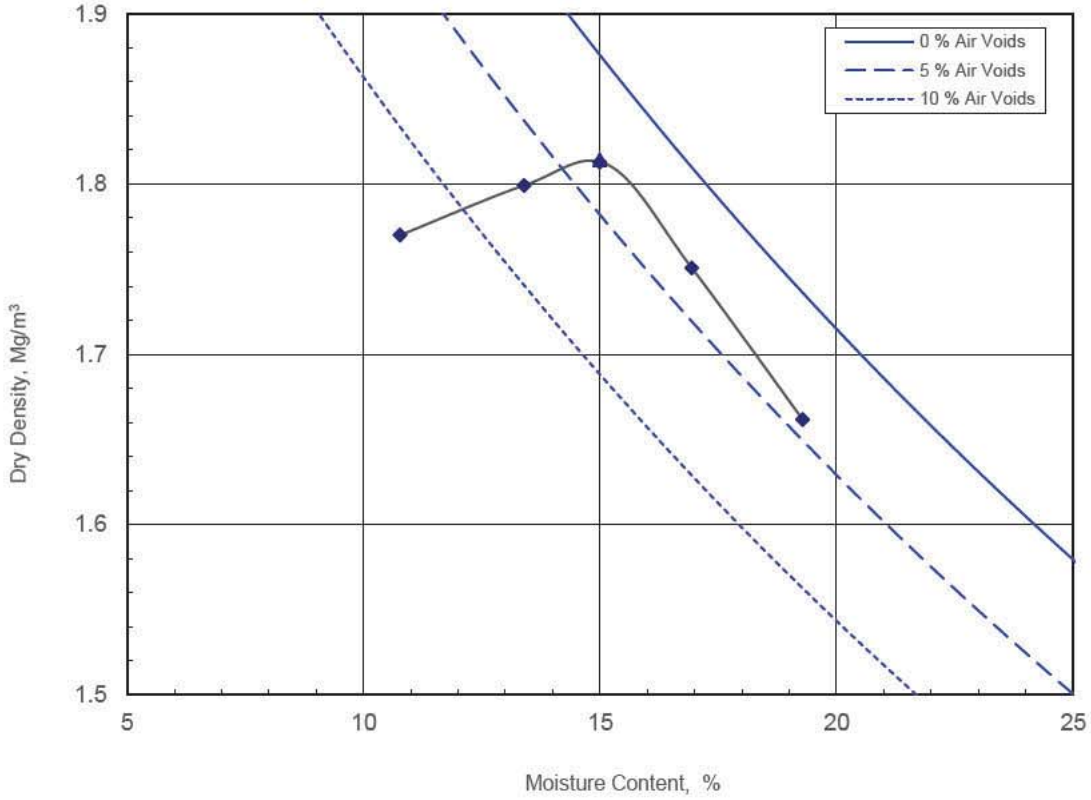
MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location	TP104
Depth (m)	1.50-2.00
Sample Type	amal

Description:

Light grey weathered intact and stuctureless CHALK.

Preparation		Oven dried
Test Method		4.5kg Rammer for soils with some coarse gravel-size particles
Samples Used		Single
Mass Retained on 37.5 mm Sieve	%	20
Mass Retained on 20.0 mm Sieve	%	20
Particle Density - Measured	Mg/m³	2.61
Maximum Dry Density	Mg/m³	1.81
Optimum Moisture Content	%	15.0



Determination		1	2	3	4	5
Moisture Content	%	10.8	13.4	15.0	16.9	19.3
Dry Density	Mg/m³	1.77	1.80	1.81	1.75	1.66

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] **- SWINDON**

JER8749

GEOLABS

UKAS TESTING 1992

BS1377:Part 4:1990 Clause 3.5

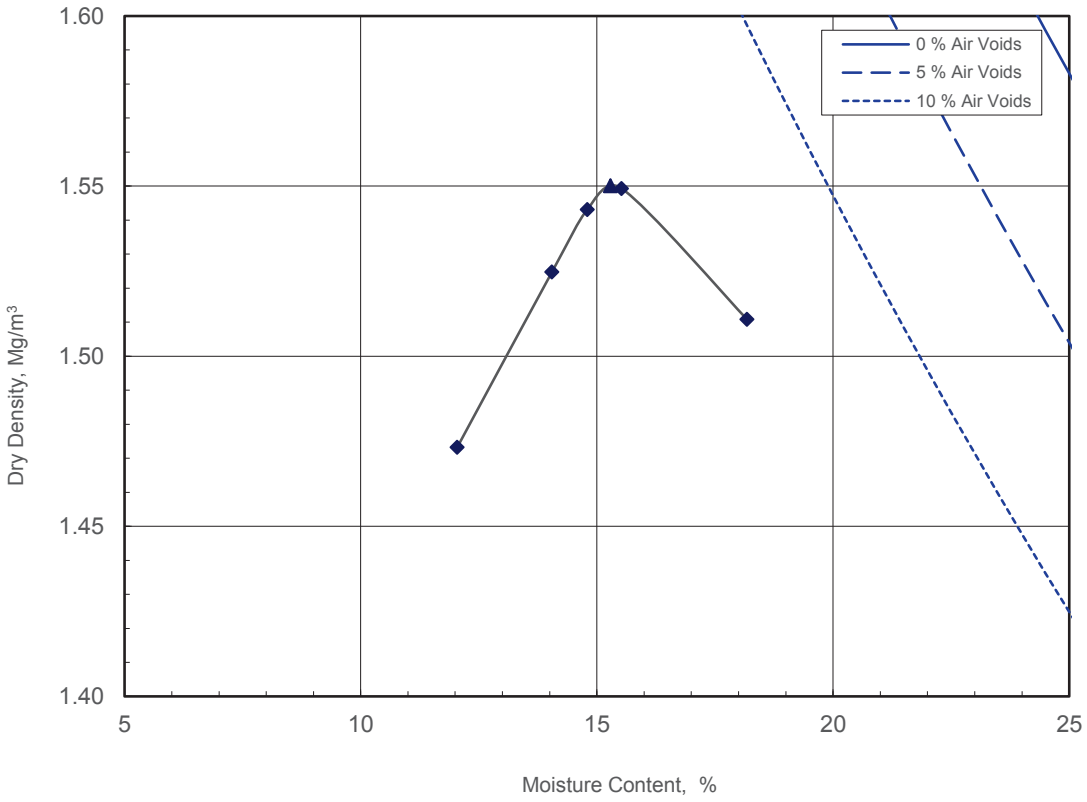
MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location	TP105
Depth (m)	0.70-1.50
Sample Type	amal

Description:

Light grey weathered stuctureless and intact CHALK.

Preparation		Oven dried
Test Method		4.5kg Rammer for soils with particles up to medium-gravel size
Samples Used		Single
Mass Retained on 37.5 mm Sieve	%	5
Mass Retained on 20.0 mm Sieve	%	19
Particle Density - Measured	Mg/m³	2.62
Maximum Dry Density	Mg/m³	1.55
Optimum Moisture Content	%	15.3



Determination		1	2	3	4	5
Moisture Content	%	12.0	14.0	14.8	15.5	18.2
Dry Density	Mg/m³	1.47	1.52	1.54	1.55	1.51

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] **- SWINDON**

JER8749

GEOLABS

UKAS TESTING 1992

BS1377:Part 4:1990 Clause 3.3

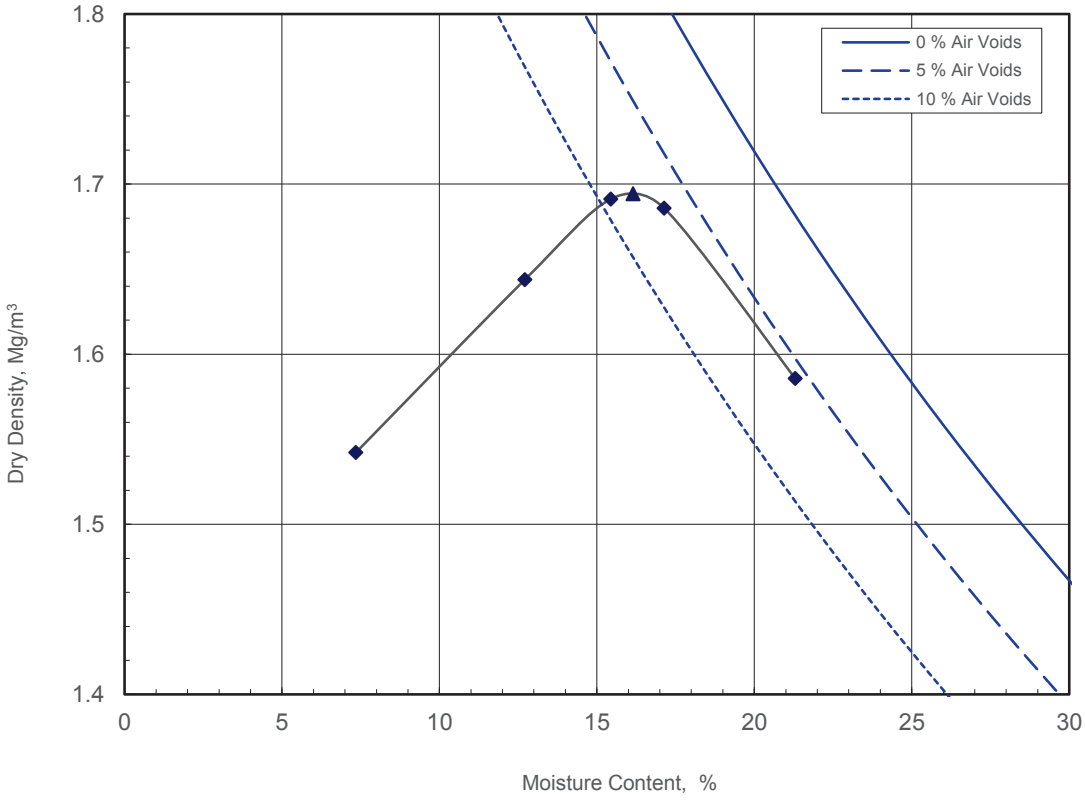
MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location	TP106
Depth (m)	0.30
Sample Type	B

Description:

Dark brown and greyish brown clayey SILT with some gravel sized brick fragments and rare rootlets.

Preparation		Oven dried
Test Method		2.5kg Rammer for soils with particles up to medium-gravel size
Samples Used		Single
Mass Retained on 37.5 mm Sieve	%	-
Mass Retained on 20.0 mm Sieve	%	5
Particle Density - Measured	Mg/m³	2.62
Maximum Dry Density	Mg/m³	1.69
Optimum Moisture Content	%	16.1



Determination		1	2	3	4	5
Moisture Content	%	7.3	12.7	15.4	17.1	21.3
Dry Density	Mg/m³	1.54	1.64	1.69	1.69	1.59

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] - SWINDON

JER8749

BS1377:Part 4:1990 Clause 3.6

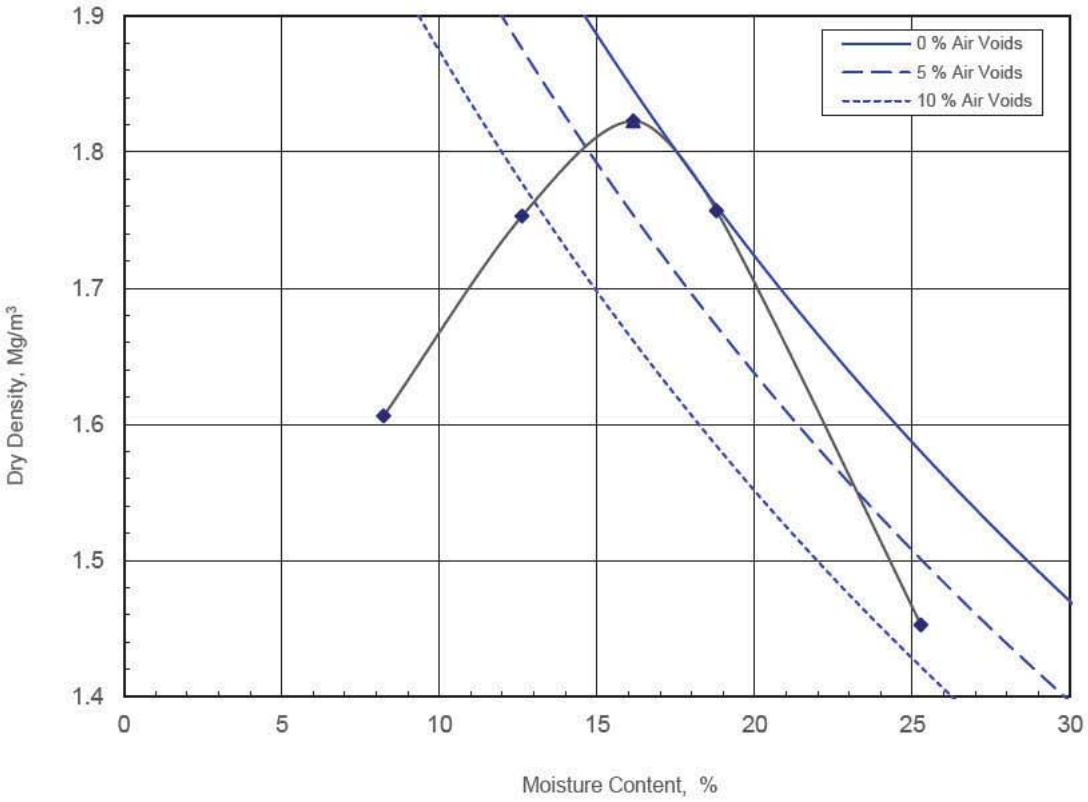
MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location	TP106
Depth (m)	1.20-3.00
Sample Type	amal

Description:

Light grey weathered stuctureless and intact CHALK.

Preparation		Oven dried
Test Method		4.5kg Rammer for soils with some coarse gravel-size particles
Samples Used		Single
Mass Retained on 37.5 mm Sieve	%	50
Mass Retained on 20.0 mm Sieve	%	12
Particle Density - Measured	Mg/m³	2.63
Maximum Dry Density	Mg/m³	1.82
Optimum Moisture Content	%	16.2



Determination		1	2	3	4	5
Moisture Content	%	8.2	12.6	16.2	18.8	25.3
Dry Density	Mg/m³	1.61	1.75	1.82	1.76	1.45

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] **- SWINDON**

JER8749

GEOLABS

UKAS TESTING 1992

BS1377:Part 4:1990 Clause 3.6

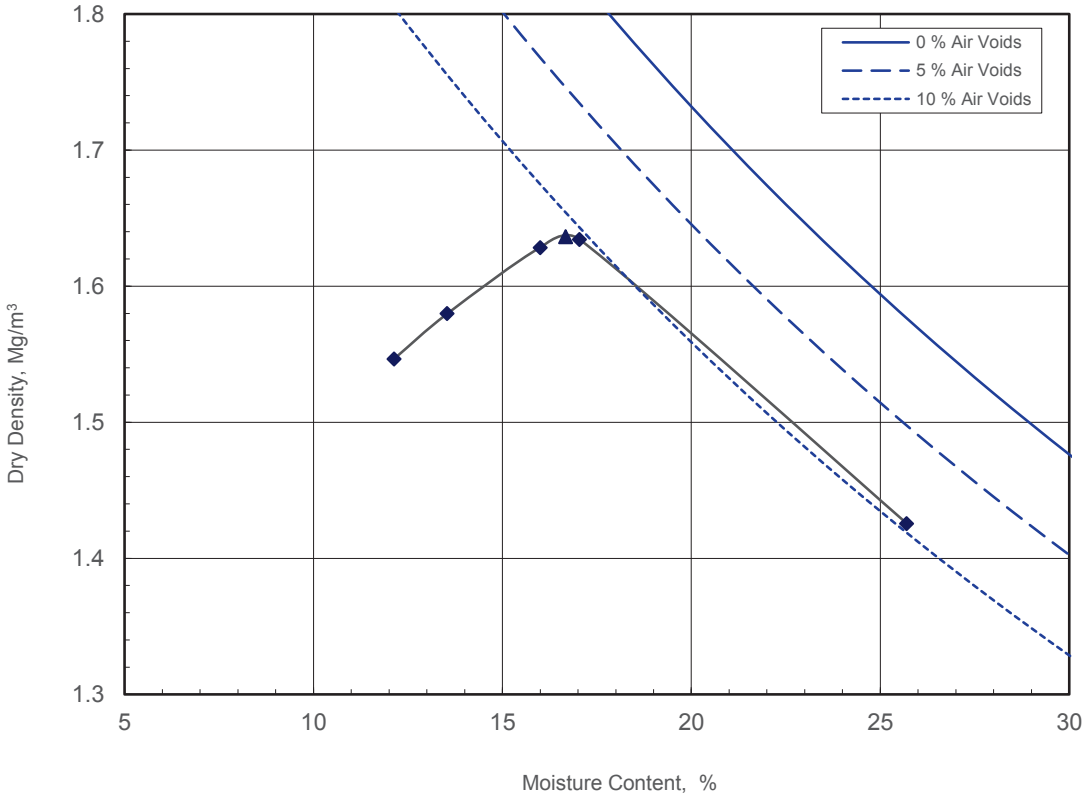
MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location	TP107
Depth (m)	2.30-3.00
Sample Type	amal

Description:

Grey weathered strutureless and intact CHALK.

Preparation		Oven dried
Test Method		4.5kg Rammer for soils with some coarse gravel-size particles
Samples Used		Multiple
Mass Retained on 37.5 mm Sieve	%	31
Mass Retained on 20.0 mm Sieve	%	13
Particle Density - Assumed	Mg/m³	2.65
Maximum Dry Density	Mg/m³	1.64
Optimum Moisture Content	%	16.7



Determination		1	2	3	4	5
Moisture Content	%	12.1	13.5	16.0	17.0	25.7
Dry Density	Mg/m³	1.55	1.58	1.63	1.63	1.43

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO / 31963

Project Name:

[redacted] **- SWINDON**

JER8749

GEOLABS

UKAS TESTING 1992

Test Report By GEOLABS Limited Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX

Client : RPS Consulting Ltd, 20 Farringdon Street, London, EC4 4AB

(Ref 1605196046)

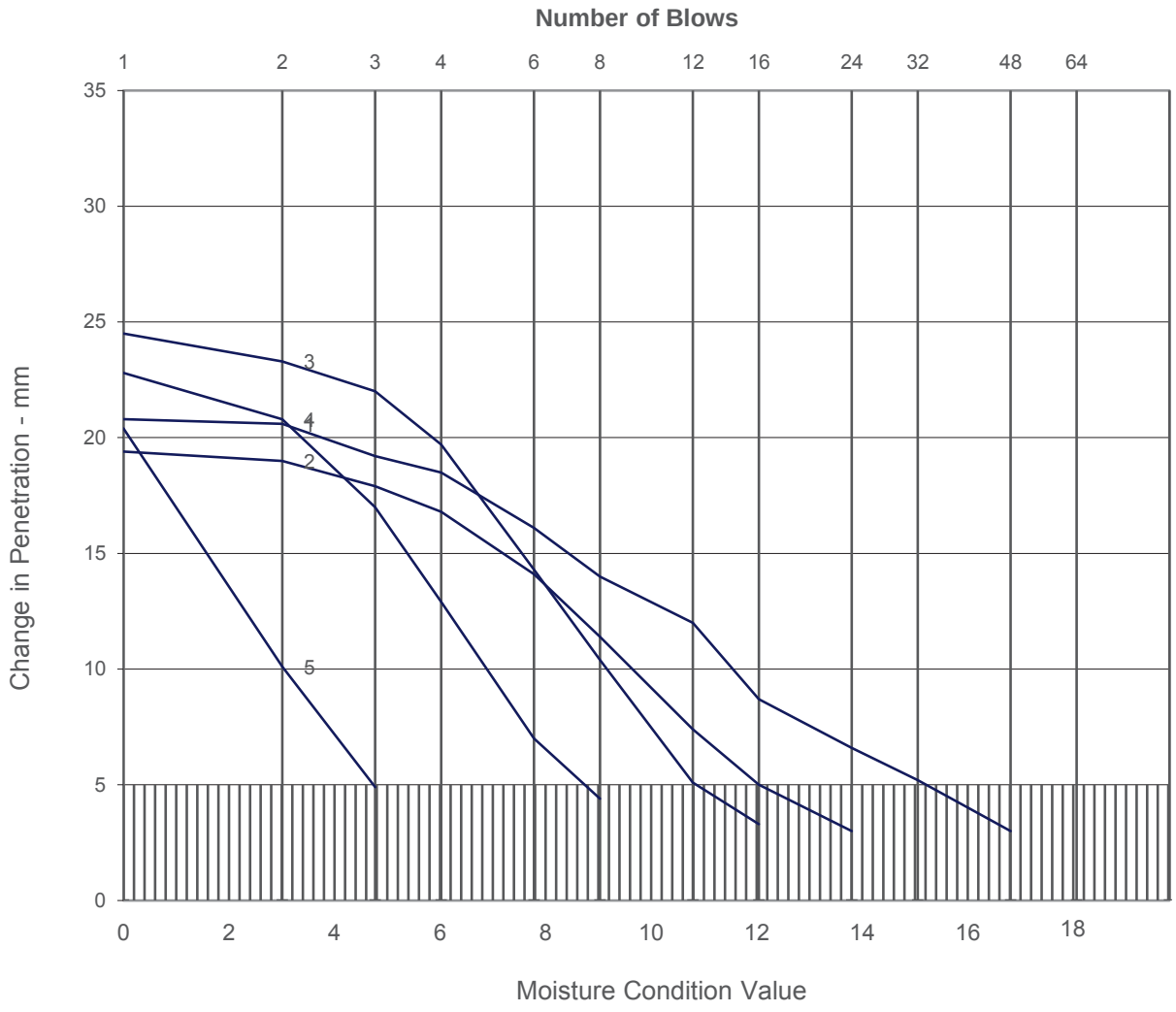
BS1377:Part 4:1990 Clause 5.5

MOISTURE CONDITION VALUE

Location	TP103
Depth (m)	2.00
Sample Type	B

Description:

Brownish grey silty CLAY with rare gravel sized crushed brick, concrete and roots.



Material retained on 20mm test sieve	%	3.1				
Determination No		1	2	3	4	5
Moisture condition value		15.3	12.5	11.3	8.8	4.7
Moisture content	%	20.5	23.3	26.1	27.3	32.0
Method of interpretation of the test curve		Best-fit line	Best-fit line	Best-fit line	Best-fit line	Best-fit line

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO/31963

Project Name:

[redacted] **- SWINDON**

JER8749

GEOLABS

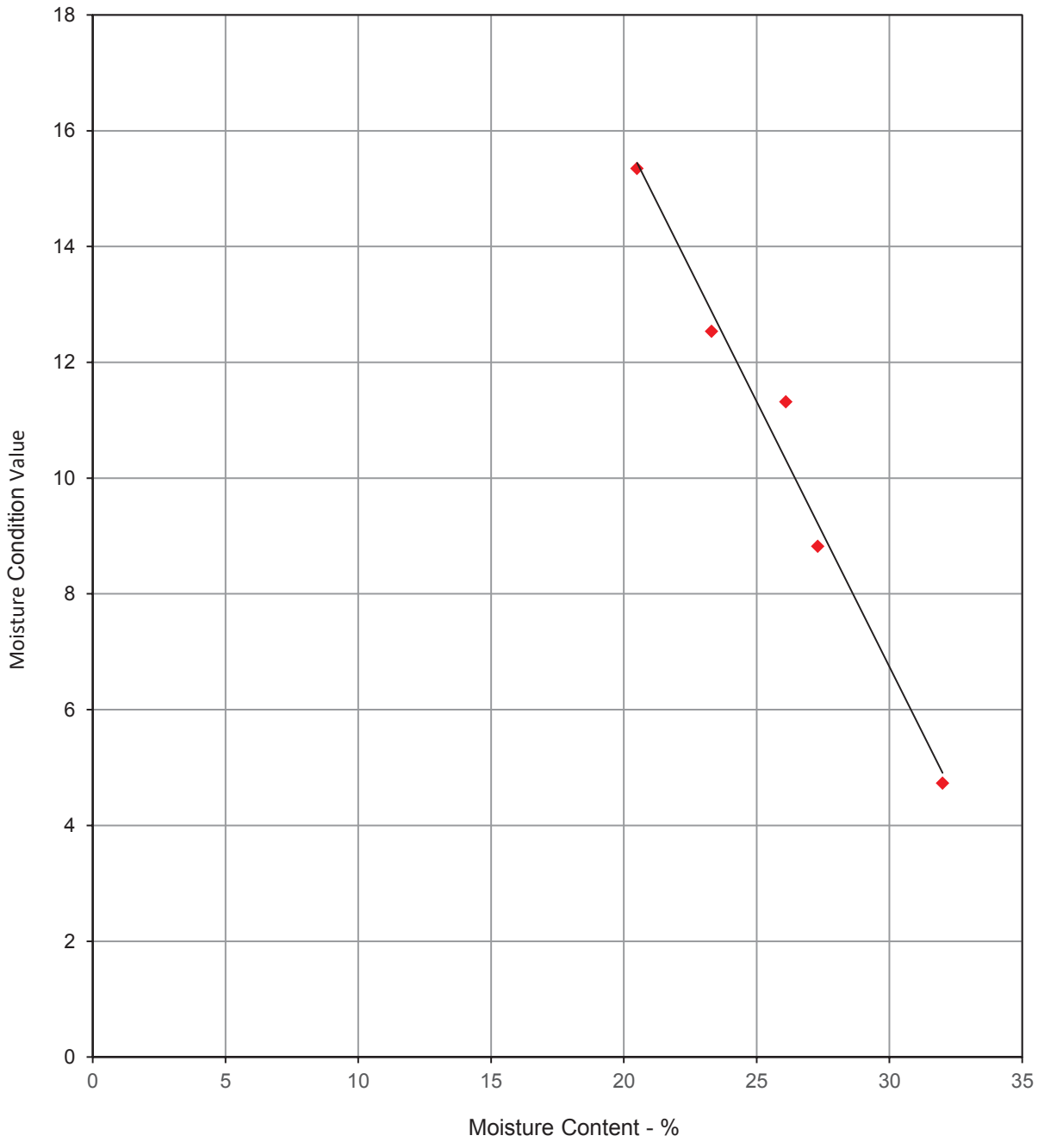
BS1377:Part 4:1990 Clause 5.5

MOISTURE CONDITION VALUE

Location	TP103
Depth (m)	2.00
Sample Type	B

Description:

Brownish grey silty CLAY with rare gravel sized crushed brick, concrete and roots.



Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:

GEO/31963

Project Name:

[redacted] **- SWINDON**

JER8749

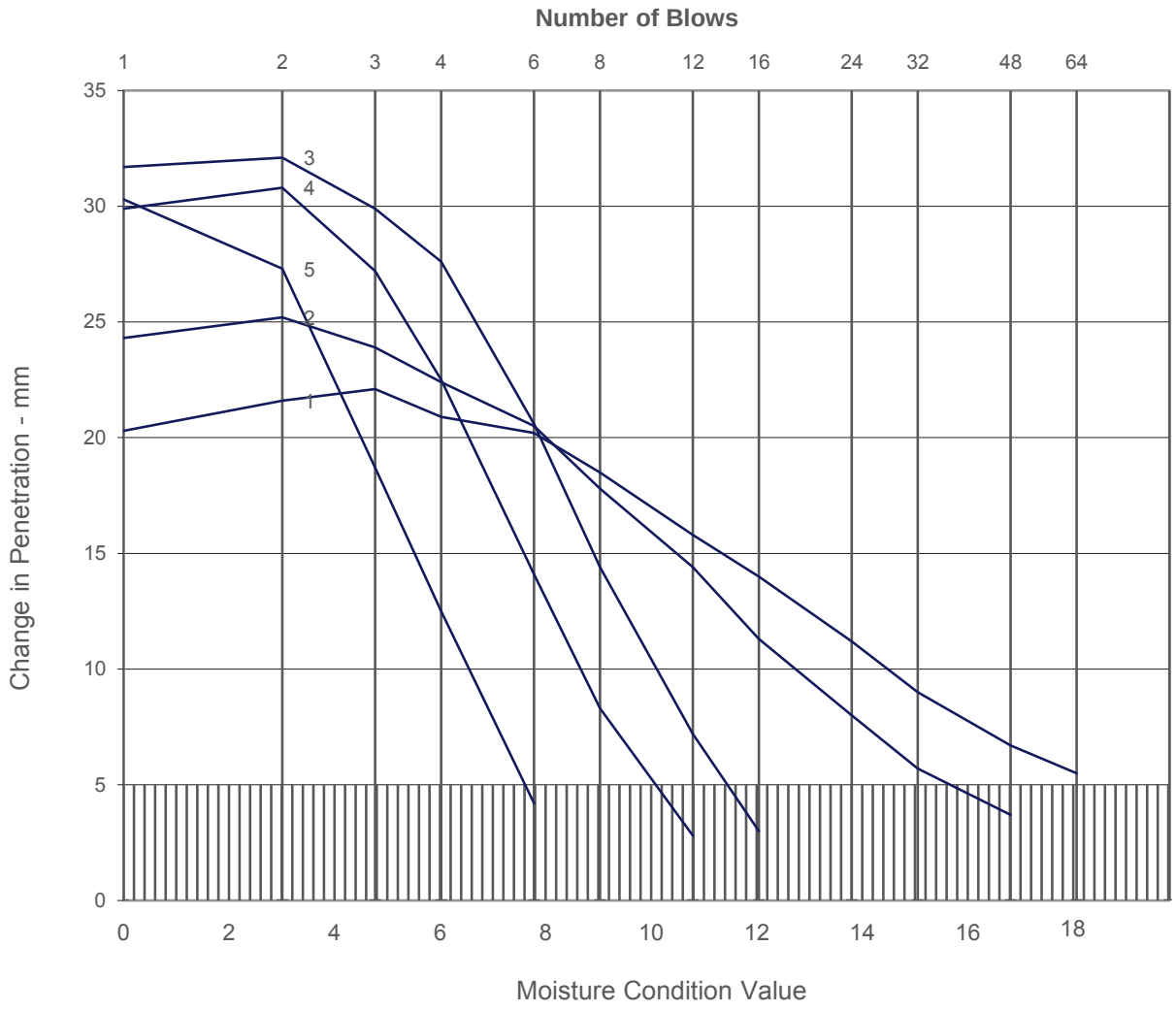
GEOLABS

BS1377:Part 4:1990 Clause 5.5

MOISTURE CONDITION VALUE

Location	TP105
Depth (m)	0.00
Sample Type	B

Description:
Light brown and dark brown mottled CLAY with some roots.



Material retained on 20mm test sieve	%	0.0				
Determination No		1	2	3	4	5
Moisture condition value		18.7	16.0	11.5	10.2	7.6
Moisture content	%	16.7	17.8	21.6	24.3	27.4
Method of interpretation of the test curve		Best-fit line	Best-fit line	Best-fit line	Best-fit line	Best-fit line

Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:
GEO/31963

Project Name:
[redacted] **- SWINDON**
JER8749

GEOLABS

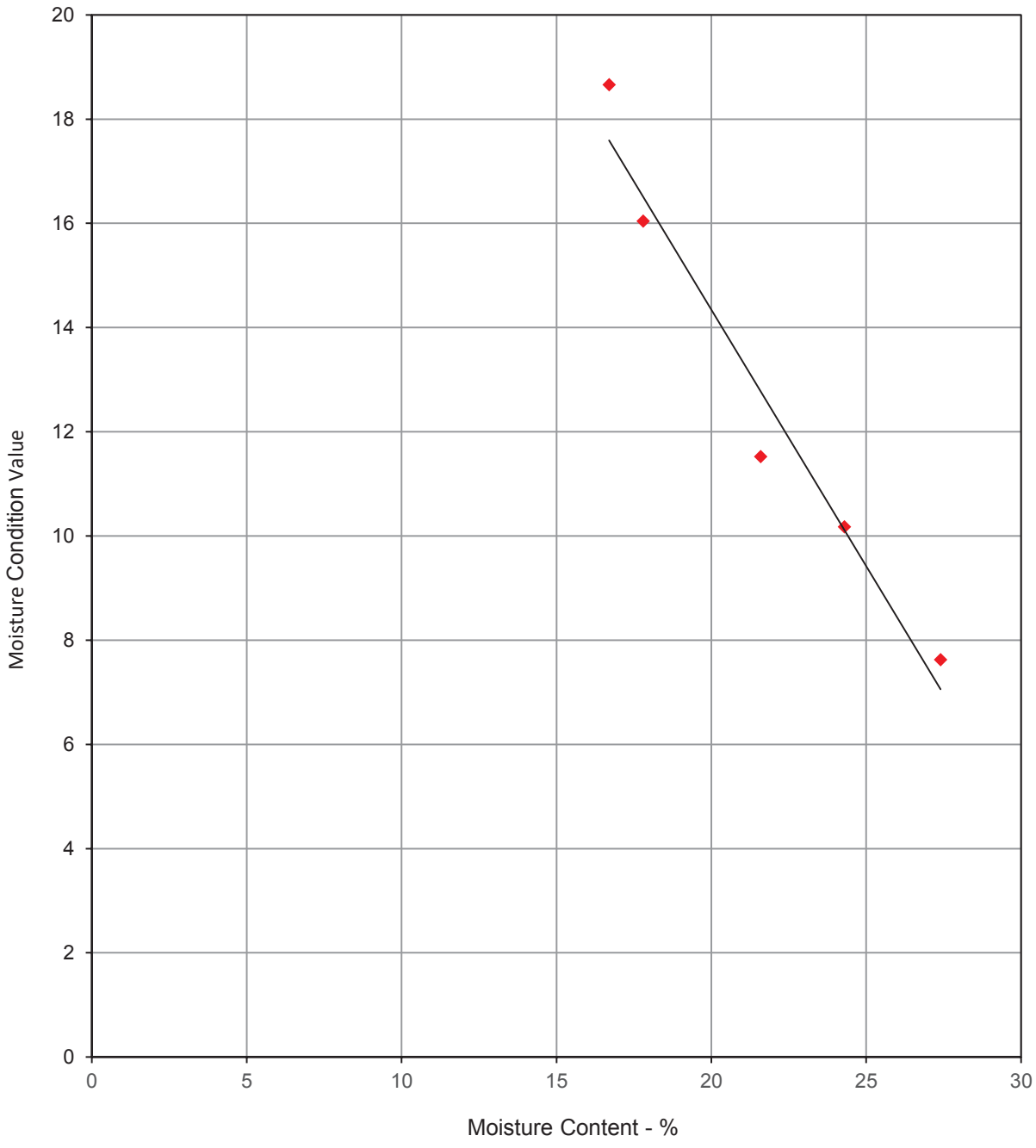
1430 - MCV TP105 00.00 B - 31963-373428.XLSM

BS1377:Part 4:1990 Clause 5.5

MOISTURE CONDITION VALUE

Location	TP105
Depth (m)	0.00
Sample Type	B

Description:
Light brown and dark brown mottled CLAY with some roots.



Checked and Approved by:

J Sturges - Operations Manager
12/11/2020

Project Number:
GEO/31963

Project Name:
[redacted] **- SWINDON**
JER8749

GEOLABS

Version 21.200618

Annex E

Field Monitoring Data

Project: [redacted] (Swind
Job ref.: JER8749

Monitored by:

09.10.20	MH
18.10.20	JG
21.10.20	MH

BH	Date	Response zone (m)	Depth m		Atmospheric Pressure (mbar)	Flow Rate (q l/h)		Methane CH_4 (% v/v)		Carbon dioxide CO_2 (% v/v)		Oxygen % v/v (Low)	PID ppm	Carbon monoxide CO ppm (Peak)	Hydrogen sulphide H_2S ppm (Peak)	Gas Screening Values				Comments
			Water	Base		Initial	Steady	Peak	Steady	Peak	Steady					CH_4 Peak	CH_4 Steady	CO_2 Peak	CO_2 Steady	
BH01	09/10/2020	1.00 to 10.00	Dry	9.88	997	0.0	0.0	-0.3	-0.3	0.9	0.9	19.7	0.0	0.0	0.0	0.0000	0.0000	0.0000	0.0000	
	18/10/2020	1.00 to 10.00	Dry	9.88	989	3.0	0.0	-0.5	-0.5	1.7	1.7	18.7	0.0	0.0	0.0	-0.0150	0.0000	0.0000	0.0000	
	21/10/2020	1.00 to 10.00	Dry	9.88	972	0.0	0.0	-0.4	-0.4	0.1	0.1	20.5	0.6	0.0	0.0	0.0000	0.0000	0.0000	0.0000	
BH04	09/10/2020	1.00 to 10.00	Dry	9.91	997	0.0	0.0	-0.5	-0.5	2.3	2.3	15.0	0.1	0.0	0.0	0.0000	0.0000	0.0000	0.0000	
	18/10/2020	1.00 to 10.00	Dry	9.91	990	0.0	0.0	-0.5	-0.5	2.7	2.7	14.6	1.4	0.0	0.0	0.0000	0.0000	0.0000	0.0000	
	21/10/2020	1.00 to 10.00	Dry	9.91	972	0.0	0.0	-0.4	-0.4	2.6	2.6	15.4	1.0	0.0	0.0	0.0000	0.0000	0.0000	0.0000	
BH05	09/10/2020	1.25 to 10.00	Dry	10.05	996	0.0	0.0	-0.5	-0.5	1.9	1.9	18.8	0.0	0.0	0.0	0.0000	0.0000	0.0000	0.0000	
	18/10/2020	1.25 to 10.00	Dry	10.05	989	0.4	0.0	-0.5	-0.5	2.6	2.6	17.6	0.6	0.0	0.0	-0.0020	0.0000	0.0000	0.0000	
	21/10/2020	1.25 to 10.00	Dry	10.06	971	0.0	0.0	-0.4	-0.4	3.9	3.9	17.0	0.2	0.0	0.0	0.0000	0.0000	0.0000	0.0000	

Negative flow rates converted to positive for GSV assessment
0.1 less that machine detection limit

Annex F

Comparison of Analytical Data to Assessment Criteria

Project Name	[redacted] - Swindon
Project Number	JER8749
Date	Oct-20
Assessment Criteria	Commercial (1% SOM)

Chemcial Of Concern	Units	Limit of detection	Number of samples	min	max	mean	GAC	Number exceed GAC
Asbetsos								
Asbestos Fibres	Type	N/A	16	N/A	N/A	N/A	If Present	8
Asbestos ACM	Type	N/A	16	N/A	N/A	N/A	-	-
Asbestos Type	Type	N/A	16	N/A	N/A	N/A	-	-
Asbestos Level Screen	Type	N/A	16	N/A	N/A	N/A	-	-
Natural Moisture Content	%	0.1	16	17.10	34.10	26.36	-	-
pH - Automated	pH Units	0.01	16	7 66	8 86	8 31	-	-
Total Cyanide	mg/kg	0.5	16	0 50	0 50	0 50	53	0
Hexavalent Chromium	mg/kg	0.3	16	0 30	0 30	0 30	33	0
Total Sulphate as SO_4	mg/kg	1.50	16	1 50	123.80	27.64	-	-
Sulphide	mg/kg	10	16	10.00	10.00	10.00	-	-
Organic Matter	%	0.2	8	0 90	4 20	2 25	-	-
Total Phenols (monohydric)	mg/kg	0.15	16	0.15	0.15	0.15	440	0
Metals								
Arsenic	mg/kg	0.5	16	3 20	15.40	7.71	640	0
Cadmium	mg/kg	0.1	16	0.10	1.70	0 24	190	0
Chromium	mg/kg	0.3	16	12.10	61.10	30.19	8600	0
Copper	mg/kg	1	16	8 00	23.00	13.69	68000	0
Lead	mg/kg	5	16	8 00	92.00	30.69	2300	0
Mercury	mg/kg	0.1	16	0.10	0 20	0.11	58	0
Nickel	mg/kg	0.7	16	10.70	33.70	17.88	980	0
Selenium	mg/kg	1	16	1 00	1 00	1 00	12000	0
Zinc	mg/kg	5	16	44.00	233.00	88.81	730000	0
PAH MS								
Naphthalene	mg/kg	0.04	16	0 04	0 21	0 07	190	0
Acenaphthylene	mg/kg	0.03	16	0 03	0 58	0.13	83000	0
Acenaphthene	mg/kg	0.05	16	0 05	0 27	0 08	84000	0
Fluorene	mg/kg	0.04	16	0 04	0 27	0 07	63000	0
Phenanthrene	mg/kg	0.03	16	0 03	3 04	0 68	22000	0
Anthracene	mg/kg	0.04	16	0 04	1 52	0 34	520000	0
Fluoranthene	mg/kg	0.03	16	0 03	9 64	2 00	23000	0
Pyrene	mg/kg	0.03	16	0 03	8 61	1.76	54000	0
Benzo(a)anthracene	mg/kg	0.06	16	0 06	3 99	0 90	170	0
Chrysene	mg/kg	0.02	16	0 02	4.41	0 98	350	0
Benzo(bk)fluoranthene	mg/kg	0.07	16	0 07	8 68	2 00	-	-
Benzo(a)pyrene	mg/kg	0.04	16	0 04	5 28	1.19	35	0
Indeno(1,2,3-cd)pyrene	mg/kg	0.04	16	0 04	3 80	0 88	500	0
Dibenz(a,h)anthracene	mg/kg	0.04	16	0 04	0 64	0.15	3.5	0
Benzo(ghi)perylene	mg/kg	0.04	16	0 04	4 09	0 93	3900	0
Benzo(b)fluoranthene	mg/kg	0.05	16	0 05	6 25	1.44	44	0
Benzo(k)fluoranthene	mg/kg	0.02	16	0 02	2.43	0 56	1200	0
TPH CWG								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	16	0.10	0.10	0.10	3200	0
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	16	0.10	0.10	0.10	7800	0
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	16	0.10	0.10	0.10	2000	0
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	0.2	16	0 20	0 20	0 20	9700	0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	4	16	4 00	6 00	4.13	59000	0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	7	16	7 00	26.00	9 31	1600000	0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	7	16	7 00	787.00	66.94	1600000	0
Total aliphatics C5-35	mg/kg	19	16	19.00	812.00	78.00	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	16	0.10	0.10	0.10	26000	0
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	16	0.10	0.10	0.10	56000	0
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	16	0.10	0.10	0.10	3500	0
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	0.2	16	0 20	0 20	0 20	16000	0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	4	16	4 00	5 00	4 06	36000	0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	7	16	7 00	54.00	14.44	28000	0
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	7	16	7 00	476.00	102.19	28000	0
Total aromatics C5-35	mg/kg	19	16	19.00	497.00	115.56	-	-
Total TPH	mg/kg	38	16	38.00	1309.00	184.06	-	-
MTBE	ug/kg	5	15	5 00	5 00	5 00	-	-
Benzene	ug/kg	5	15	5 00	5 00	5 00	27000	0
Toluene	µg/kg	5	15	5 00	5 00	5 00	56000000	0
Ethylbenzene	µg/kg	5	15	5 00	5 00	5 00	5700000	0
p & m-xylene	µg/kg	5	15	5 00	5 00	5 00	5900000	0
o-xylene	µg/kg	5	15	5 00	5 00	5 00	6600000	0
VOC MS								
Dichlorodifluoromethane	ug/kg	2	1	2 00	2 00	2 00	-	-
Methyl Tertiary Butyl Ether	ug/kg	2	1	2 00	2 00	2 00	7900000	0
Chloromethane	ug/kg	3	1	3 00	3 00	3 00	1000	0
Vinyl Chloride	ug/kg	2	1	2 00	2 00	2 00	59	0
Bromomethane	ug/kg	1	1	1 00	1 00	1 00	-	-
Chloroethane	ug/kg	2	1	2 00	2 00	2 00	960000	0
Trichlorofluoromethane	ug/kg	2	1	2 00	2 00	2 00	-	-
1,1-Dichloroethene (1,1 DCE)	ug/kg	6	1	6 00	6 00	6 00	-	-
Dichloromethane (DCM)	ug/kg	30	1	30.00	30.00	30.00	-	-
trans-1-2-Dichloroethene	ug/kg	3	1	3 00	3 00	3 00	22000	0
1,1-Dichloroethane	ug/kg	3	1	3 00	3 00	3 00	280000	0
cis-1-2-Dichloroethene	ug/kg	3	1	3 00	3 00	3 00	14000	0
2,2-Dichloropropane	ug/kg	4	1	4 00	4 00	4 00	-	-

Soil type	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Sample Reference	TP113	TP115	TP110	TP111	TP112	TP104	TP103	TP107	TP105	TP106	TP108	TP101	TP104	HP101	HP102	TP114
Depth (m)	0.25	0.45	0.20	2.00	0.25	0.20	0.35	0.25	0.20	0.25	0.30	0.20	0.40	0.50	0.50	0.30
Date Sampled	05/10/2020	05/10/2020	06/10/2020	06/10/2020	06/10/2020	06/10/2020	07/10/2020	07/10/2020	07/10/2020	07/10/2020	08/10/2020	08/10/2020	44112	44113	44113	44109
Asbestos Fibres	Fibre Bundles	NAD	Fibre Bundles	NAD	Fibre Bundles	NAD	Fibre Bundles	Fibre Bundles	NAD	NAD	Fibre Bundles	Fibre Bundles	NAD	Fibre Bundles	NAD	NAD
Asbestos ACM	NAD	NAD	NAD	NAD	NAD	NAD	NAD	ACM Debris	NAD	NAD	ACM Debris	ACM Debris	NAD	Asbestos Cement Debris	NAD	NAD
Asbestos Type	Chrysotile	NAD	Chrysotile	NAD	Chrysotile	NAD	Chrysotile	Chrysotile, Crocidolite, Amosite	NAD	NAD	Amosite	Chrysotile	NAD	Chrysotile	NAD	NAD
Asbestos Level Screen	less than 0.1%	NAD	NAD	NAD	less than 0.1%	NAD	less than 0.1%	Quantification required.	NAD	NAD	Quantification required.	Quantification required.	NAD	less than 0.1%	NAD	NAD
Natural Moisture Content	33	26.3	24.3	29.1	17.3	25.9	25.9	17.1	29	32.1	34.1	31.4	20.6	21.8	28.6	25.2
pH - Automated	8.41	8.18	8.26	8.52	8.86	8.47	8.31	8.57	7.66	7.99	7.94	8	8.33	8.45	8.42	8.54
Total Cyanide	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Hexavalent Chromium	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total Sulphate as SO_4	12.2	21	3.4	123.8	51.3	6.7	7.1	9.4	3.6	3.6	1.5	19.3	49.5	6.8	1.5	121.5
Sulphide	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Organic Matter	NDP	1.9	NDP	2.5	NDP	0.9	NDP	NDP	4.2	1.2	NDP	NDP	2.1	NDP	2	3.2
Total Phenols (monohydric)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Arsenic	6.9	6.6	5.8	6	9.5	11.3	8.7	3.2	15.4	5.3	8.4	8.3	7.6	5.4	8.8	6.2
Cadmium	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.7	0.1	0.3	0.3	0.2	0.2	0.1	0.1
Chromium	25.5	35.9	18.3	24.1	17.5	38.4	22.4	12.1	61.1	40.3	22.4	27.3	33.5	16.7	43.8	43.7
Copper	12	8	11	14	14	14	11	9	15	11	21	21	15	23	8	12
Lead	36	13	15	17	23	16	23	8	28	14	70	38	36	49	13	92
Mercury	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Nickel	18	13.4	15.4	12	12	21.7	15.1	10.7	21.1	26	18.4	22.7	12.3	13.2	20.4	33.7
Selenium	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Zinc	117	44	71	53	233	61	81	66	100	56	131	135	69	95	54	55
Naphthalene	0.15	0.04	0.04	0.09	0.07	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.21	0.04	0.04	0.08
Acenaphthylene	0.04	0.58	0.03	0.05	0.32	0.03	0.08	0.03	0.03	0.03	0.08	0.03	0.47	0.11	0.03	0.06
Acenaphthene	0.15	0.15	0.05	0.08	0.12	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.27	0.05	0.05	0.05
Fluorene	0.12	0.14	0.04	0.08	0.12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.27	0.04	0.04	0.05
Phenanthrene	1.64	2.49	0.05	0.66	1.16	0.03	0.13	0.15	0.03	0.09	0.2	0.07	3.04	0.51	0.03	0.53
Anthracene	0.48	1.48	0.04	0.25	0.81	0.04	0.08	0.06	0.04	0.04	0.13	0.04	1.52	0.21	0.04	0.21
Fluoranthene	2.67	9.64	0.2	1.1	4.97	0.15	0.5	0.49	0.05	0.25	0.62	0.21	8.67	1.44	0.03	0.99
Pyrene	2.27	8.61	0.19	0.9	4.41	0.16	0.45	0.43	0.05	0.22	0.58	0.2	7.47	1.27	0.03	0.88
Benzo(a)anthracene	1.32	3.99	0.15	0.39	2.56	0.13	0.28	0.23	0.06	0.16	0.34	0.12	3.51	0.58	0.06	0.55
Chrysene	1.36	4.41	0.14	0.36	2.6	0.13	0.31	0.26	0.02	0.17	0.39	0.13	3.96	0.78	0.02	0.56
Benzo(bk)fluoranthene	2.58	8.68	0.3	0.71	5.63	0.28	0.72	0.53	0.07	0.34	0.79	0.29	8.35	1.35	0.07	1.23
Benzo(a)pyrene	1.46	5.28	0.19	0.41	3.43	0.18	0.39	0.29	0.04	0.18	0.47	0.17	5.03	0.71	0.04	0.73
Indeno(1,2,3-cd)pyrene	1.02	3.8	0.14	0.28	2.7	0.1	0.3	0.22	0.04	0.13	0.3	0.12	3.79	0.52	0.04	0.56
Dibenz(a,h)anthracene	0.23	0.64	0.04	0.04	0.47	0.04	0.06	0.04	0.04	0.04	0.04	0.04	0.46	0.07	0.04	0.1
Benzo(ghi)perylene	1.08	4.09	0.15	0.3	2.99	0.11	0.35	0.26	0.04	0.13	0.32	0.13	3.8	0.52	0.04	0.59
Benzo(b)fluoranthene	1.86	6.25	0.22	0.51	4.05	0.2	0.52	0.38	0.05	0.24	0.57	0.21	6.01	0.97	0.05	0.89
Benzo(k)fluoranthene	0.72	2.43	0.08	0.2	1.58	0.08	0.2	0.15	0.02	0.1	0.22	0.08	2.34	0.38	0.02	0.34
TPH-CWG - Aliphatic >EC5 - EC6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TPH-CWG - Aliphatic >EC6 - EC8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TPH-CWG - Aliphatic >EC8 - EC10	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TPH-CWG - Aliphatic >EC10 - EC12	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
TPH-CWG - Aliphatic >EC12 - EC16	4	4	4	4	4	4	4	4	4	4	4	4	4	6	4	4
TPH-CWG - Aliphatic >EC16 - EC21	7	7	7	7	7	7	7	7	7	7	7	25	7	26	7	7
TPH-CWG - Aliphatic >EC21 - EC35	7	7	7	9	21	7	7	70	18	7	7	787	18	85	7	7
Total aliphatics C5-35	19	19	19	19	21	19	19	70	19	19	19	812	19	117	19	19
TPH-CWG - Aromatic >EC5 - EC7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TPH-CWG - Aromatic >EC7 - EC8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TPH-CWG - Aromatic >EC8 - EC10	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TPH-CWG - Aromatic >EC10 - EC12	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
TPH-CWG - Aromatic >EC12 - EC16	4	4	4	4	5	4	4	4	4	4	4	4	4	4	4	4
TPH-CWG - Aromatic >EC16 - EC21	7	7	7	14	54	7	7	37	7	7	7	21	22	13	7	7
TPH-CWG - Aromatic >EC21 - EC35	63	7	70	70	235	7	63	189	7	50	58	476	159	96	7	78
Total aromatics C5-35	63	19	70	84	294	19	63	226	19	50	58	497	181	109	19	78
Total TPH	63	38	70	84	315	38	63	296	38	50	58	1309	181	226	38	78
MTBE	5	5	5	NA	5	5	5	5	5	5	5	5	5	5	5	5
Benzene	5	5	5	NA	5	5	5	5	5	5	5	5	5	5	5	5
Toluene	5	5	5	NA	5	5	5	5	5	5	5	5	5	5	5	5
Ethylbenzene	5	5	5	NA	5	5	5	5	5	5	5	5	5	5	5	5
p & m-xylene	5	5	5	NA	5	5	5	5	5	5	5	5	5	5	5	5
o-xylene	5	5	5	NA	5	5	5	5	5	5	5	5	5	5	5	5
Dichlorodifluoromethane	NA	NA	NA	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Tertiary Butyl Ether	NA	NA	NA	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene (1,1 DCE)	NA	NA	NA	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane (DCM)	NA	NA	NA	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1-2-Dichloroethene	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1-2-Dichloroethene	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2-Dichloropropane	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Project Name	[redacted] - Swindon
Project Number	JER8749
Date	Oct-20
Assessment Criteria	Commercial (1% SOM)

Chemcial Of Concern	Units	Limit of detection	Number of samples	min	max	mean	GAC	Number exceed GAC	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
								Sample Reference	TP113	TP115	TP110	TP111	TP112	TP104	TP103	TP107	TP105	TP106	TP108	TP101	TP104	HP101	HP102	TP114
								Depth (m)	0.25	0.45	0.20	2.00	0.25	0.20	0.35	0.25	0.20	0.25	0.30	0.20	0.40	0.50	0.50	0.30
								Date Sampled	05/10/2020	05/10/2020	06/10/2020	06/10/2020	06/10/2020	06/10/2020	07/10/2020	07/10/2020	07/10/2020	07/10/2020	08/10/2020	08/10/2020	44112	44113	44113	44109
Bromochloromethane	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloropropene	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ug/kg	5	1	3.00	3.00	3.00	27000	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene (TCE)	ug/kg	3	1	3.00	3.00	3.00	1200	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	ug/kg	6	1	6.00	6.00	6.00	3300	0	NA	NA	NA	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromomethane	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	ug/kg	3	1	3.00	3.00	3.00	2100	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1-3-Dichloropropene	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	ug/kg	3	1	3.00	3.00	3.00	56000000	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1-3-Dichloropropene	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	ug/kg	3	1	3.00	3.00	3.00	94000	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene (PCE)	ug/kg	3	1	3.00	3.00	3.00	19000	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichloropropane	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	ug/kg	3	1	3.00	3.00	3.00	56000	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1,2-Tetrachloroethane	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	ug/kg	3	1	3.00	3.00	3.00	5700000	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m/p-Xylene	ug/kg	5	1	5.00	5.00	5.00	5900000	0	NA	NA	NA	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	ug/kg	3	1	3.00	3.00	3.00	6600000	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	ug/kg	3	1	3.00	3.00	3.00	3300000	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	ug/kg	3	1	3.00	3.00	3.00	760000	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	ug/kg	3	1	3.00	3.00	3.00	1400000	0	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromobenzene	ug/kg	2	1	2.00	2.00	2.00	97000	0	NA	NA	NA	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Propylbenzene	ug/kg	4	1	4.00	4.00	4.00	4100000	0	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorotoluene	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorotoluene	ug/kg	3	1	3.00	3.00	3.00	-	-	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	ug/kg	5	1	5.00	5.00	5.00	-	-	NA	NA	NA	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	ug/kg	6	1	6.00	6.00	6.00	42000	0	NA	NA	NA	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Isopropyltoluene	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	ug/kg	7	1	7.00	7.00	7.00	220000	-	NA	NA	NA	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	ug/kg	4	1	4.00	4.00	4.00	-	-	NA	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	ug/kg	27	1	62.00	62.00	62.00	190	0	NA	NA	NA	62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	ug/kg	7	1	7.00	7.00	7.00	-	-	NA	NA	NA	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs																								
Total PCBs	ug/kg	60	2	60.00	60.00	60.00	240000	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	60	60	NA

Less than laboratory detection
Greater than GAC

Annex G

Laboratory Analytical Certificates

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

RPS
6th Floor
20 Farringdon Street
London
EC4A 4AB

Attention :	Matthew Hemus
Date :	20th October, 2020
Your reference :	JER8749
Our reference :	Test Report 20/13974 Batch 1
Location :	Swindon
Date samples received :	10th October, 2020
Status :	Final report
Issue :	1

Twenty four samples were received for analysis on 10th October, 2020 of which sixteen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc
Senior Project Manager

Client Name: RPS
Reference: JER8749
Location: Swindon
Contact: Matthew Hemus
EMT Job No: 20/13974

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	4-6	7-9	10-12	16-18	19-21	22-23	27-29	30-32	33-35	39-41	LOD/LOR	Units	Method No.
Sample ID	TP113	TP115	TP110	TP111	TP112	TP104	TP103	TP107	TP105	TP106			
Depth	0 25	0.45	0 20	2 00	0 25	0 20	0 35	0 25	0 20	0 25			
COC No / misc													
Containers	V J B	V J B	V J B	V J B	V J B	J T	V J B	V J B	V J B	V J B			
Sample Date	05/10/2020	05/10/2020	06/10/2020	06/10/2020	06/10/2020	06/10/2020	07/10/2020	07/10/2020	07/10/2020	07/10/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020			
Arsenic #	-	6.6	-	6.0	-	11 3	-	-	15.4	5.3	<0.5	mg/kg	TM30/PM15
Cadmium #	-	0.1	-	0.1	-	0.1	-	-	1.7	<0.1	<0.1	mg/kg	TM30/PM15
Chromium #	-	35 9	-	24.1	-	38.4	-	-	61.1	40 3	<0.5	mg/kg	TM30/PM15
Copper #	-	8	-	14	-	14	-	-	15	11	<1	mg/kg	TM30/PM15
Lead #	-	13	-	17	-	16	-	-	28	14	<5	mg/kg	TM30/PM15
Mercury #	-	<0.1	-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Nickel #	-	13.4	-	12 0	-	21.7	-	-	21.1	26 0	<0.7	mg/kg	TM30/PM15
Selenium #	-	<1	-	<1	-	<1	-	-	1	<1	<1	mg/kg	TM30/PM15
Zinc #	-	44	-	53	-	61	-	-	100	56	<5	mg/kg	TM30/PM15
Arsenic	6.9	-	5.8	-	9.5	-	8.7	3.2	-	-	<0.5	mg/kg	TM30/PM62
Cadmium	0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	-	-	<0.1	mg/kg	TM30/PM62
Chromium	25 5	-	18 3	-	17 5	-	22.4	12.1	-	-	<0.5	mg/kg	TM30/PM62
Copper	12	-	11	-	14	-	11	9	-	-	<1	mg/kg	TM30/PM62
Lead	36	-	15	-	23	-	23	8	-	-	<5	mg/kg	TM30/PM62
Mercury	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	-	-	<0.1	mg/kg	TM30/PM62
Nickel	18 0	-	15.4	-	12 0	-	15.1	10.7	-	-	<0.7	mg/kg	TM30/PM62
Selenium	<1	-	<1	-	<1	-	<1	<1	-	-	<1	mg/kg	TM30/PM62
Zinc	117	-	71	-	233	-	81	66	-	-	<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene #	0.15	<0.04	<0.04	0 09	0 07	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	0 04	0 58	<0.03	0 05	0 32	<0.03	0 08	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	0.15	0.15	<0.05	0 08	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	0.12	0.14	<0.04	0 08	0.12	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	1 64	2.49	0 05	0 66	1.16	<0.03	0.13	0.15	<0.03	0 09	<0.03	mg/kg	TM4/PM8
Anthracene #	0.48	1.48	<0.04	0 25	0 81	<0.04	0 08	0 06	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	2 67	9 64	0 20	1.10	4 97	0.15	0 50	0.49	0 05	0 25	<0.03	mg/kg	TM4/PM8
Pyrene #	2 27	8 61	0.19	0 90	4.41	0.16	0.45	0.43	0 05	0 22	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	1 32	3 99	0.15	0 39	2 56	0.13	0 28	0 23	<0.06	0.16	<0.06	mg/kg	TM4/PM8
Chrysene #	1 36	4.41	0.14	0 36	2 60	0.13	0 31	0 26	<0.02	0.17	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	2 58	8 68	0 30	0.71	5 63	0 28	0.72	0 53	<0.07	0 34	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	1.46	5 28	0.19	0.41	3.43	0.18	0 39	0 29	<0.04	0.18	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	1 02	3 80	0.14	0 28	2.70	0.10	0 30	0 22	<0.04	0.13	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0 23	0 64	<0.04	<0.04	0.47	<0.04	0 06	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	1 08	4 09	0.15	0 30	2 99	0.11	0 35	0 26	<0.04	0.13	<0.04	mg/kg	TM4/PM8
PAH 16 Total	16 6	54 0	1.5	5.7	32.4	1.2	3.7	2.9	<0.6	1.7	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	1 86	6 25	0 22	0 51	4 05	0 20	0 52	0 38	<0.05	0 24	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.72	2.43	0 08	0 20	1 58	0 08	0 20	0.15	<0.02	0.10	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	86	81	87	85	88	89	95	92	90	<0	%	TM4/PM8
Methyl Tertiary Butyl Ether #	-	-	-	<2	-	-	-	-	-	-	<2	ug/kg	TM15/PM10
Benzene #	-	-	-	<3	-	-	-	-	-	-	<3	ug/kg	TM15/PM10
Toluene #	-	-	-	<3	-	-	-	-	-	-	<3	ug/kg	TM15/PM10
Ethylbenzene #	-	-	-	<3	-	-	-	-	-	-	<3	ug/kg	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Client Name: RPS
Reference: JER8749
Location: Swindon
Contact: Matthew Hemus
EMT Job No: 20/13974

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	4-6	7-9	10-12	16-18	19-21	22-23	27-29	30-32	33-35	39-41	LOD/LOR	Units	Method No.
Sample ID	TP113	TP115	TP110	TP111	TP112	TP104	TP103	TP107	TP105	TP106			
Depth	0 25	0.45	0 20	2 00	0 25	0 20	0 35	0 25	0 20	0 25			
COC No / misc													
Containers	V J B	V J B	V J B	V J B	V J B	J T	V J B	V J B	V J B	V J B			
Sample Date	05/10/2020	05/10/2020	06/10/2020	06/10/2020	06/10/2020	06/10/2020	07/10/2020	07/10/2020	07/10/2020	07/10/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020			
m/p-Xylene #	-	-	-	<5	-	-	-	-	-	-	<5	ug/kg	TM15/PM10
o-Xylene #	-	-	-	<3	-	-	-	-	-	-	<3	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	-	-	-	89	-	-	-	-	-	-	<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	-	-	-	79	-	-	-	-	-	-	<0	%	TM15/PM10
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	9	21	<7	<7	70	18	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	<19	<19	<19	<19	21	<19	<19	70	<19	<19	<19	mg/kg	M5 M36 M8 M 2 M 6
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0 2 SV	<0.2	<0.2	<0.2	<0 2 SV	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4 SV	5	<4	<4	<4 SV	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	14 SV	54	<7	<7	37 SV	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	63	<7	70	70 SV	235	<7	63	189 SV	<7	50	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 #	63	<19	70	84	294	<19	63	226	<19	50	<19	mg/kg	M5 M36 M8 M 2 M 6
Total aliphatics and aromatics(C5-35)	63	<38	70	84	315	<38	63	296	<38	50	<38	mg/kg	M5 M36 M8 M 2 M 6
MTBE #	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Benzene #	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Toluene #	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
PCB 77	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 81	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 105	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 114	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 118	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 123	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 126	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 156	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 157	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 167	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 169	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8

Client Name: RPS
Reference: JER8749
Location: Swindon
Contact: Matthew Hemus
EMT Job No: 20/13974

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	4-6	7-9	10-12	16-18	19-21	22-23	27-29	30-32	33-35	39-41	LOD/LOR	Units	Method No.
Sample ID	TP113	TP115	TP110	TP111	TP112	TP104	TP103	TP107	TP105	TP106			
Depth	0 25	0.45	0 20	2 00	0 25	0 20	0 35	0 25	0 20	0 25			
COC No / misc													
Containers	V J B	V J B	V J B	V J B	V J B	J T	V J B	V J B	V J B	V J B			
Sample Date	05/10/2020	05/10/2020	06/10/2020	06/10/2020	06/10/2020	06/10/2020	07/10/2020	07/10/2020	07/10/2020	07/10/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020			
PCB 189	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
Total 12 PCBs	-	-	-	-	-	-	-	-	-	-	<60	ug/kg	TM17/PM8
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	mg/kg	TM26/PM21
Natural Moisture Content	33 0	26 3	24 3	29.1	17 3	25 9	25 9	17.1	29 0	32.1	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	-	0.0210	-	0.1238	-	0.0067	-	-	0.0036	0.0036	<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	0.0122	-	0.0034	-	0.0513	-	0.0071	0.0094	-	-	<0.0015	g/l	TM38/PM60
Total Cyanide #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	TM89/PM45
Organic Matter	NDP	1.9	NDP	2.5	NDP	0.9	NDP	NDP	4.2	1.2	<0.2	%	TM21/PM24
Sulphide	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM107/PM45
pH #	8.41	8.18	8 26	8 52	8 86	8.47	8 31	8 57	7 66	7 99	<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: RPS
Reference: JER8749
Location: Swindon
Contact: Matthew Hemus
EMT Job No: 20/13974

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	42-44	48-50	53-55	59-61	62-64	68-70					LOD/LOR	Units	Method No.
Sample ID	TP108	TP101	TP104	HP101	HP102	TP114							
Depth	0 30	0 20	0.40	0 50	0 50	0 30							
COC No / misc													
Containers	V J B	V J B	V J B	V J B	V J B	V J B							
Sample Date	08/10/2020	08/10/2020	08/10/2020	09/10/2020	09/10/2020	05/10/2020							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020							
Arsenic #	-	-	7.6	-	8.8	6.2					<0.5	mg/kg	TM30/PM15
Cadmium #	-	-	0.2	-	<0.1	0.1					<0.1	mg/kg	TM30/PM15
Chromium #	-	-	33 5	-	43 8	43.7					<0.5	mg/kg	TM30/PM15
Copper #	-	-	15	-	8	12					<1	mg/kg	TM30/PM15
Lead #	-	-	36	-	13	92					<5	mg/kg	TM30/PM15
Mercury #	-	-	<0.1	-	<0.1	0.2					<0.1	mg/kg	TM30/PM15
Nickel #	-	-	12 3	-	20.4	33.7					<0.7	mg/kg	TM30/PM15
Selenium #	-	-	<1	-	<1	<1					<1	mg/kg	TM30/PM15
Zinc #	-	-	69	-	54	55					<5	mg/kg	TM30/PM15
Arsenic	8.4	8.3	-	5.4	-	-					<0.5	mg/kg	TM30/PM62
Cadmium	0.3	0.3	-	0.2	-	-					<0.1	mg/kg	TM30/PM62
Chromium	22.4	27 3	-	16.7	-	-					<0.5	mg/kg	TM30/PM62
Copper	21	21	-	23	-	-					<1	mg/kg	TM30/PM62
Lead	70	38	-	49	-	-					<5	mg/kg	TM30/PM62
Mercury	<0.1	<0.1	-	<0.1	-	-					<0.1	mg/kg	TM30/PM62
Nickel	18.4	22.7	-	13 2	-	-					<0.7	mg/kg	TM30/PM62
Selenium	<1	1	-	<1	-	-					<1	mg/kg	TM30/PM62
Zinc	131	135	-	95	-	-					<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene #	<0.04	<0.04	0 21	<0.04	<0.04	0 08					<0.04	mg/kg	TM4/PM8
Acenaphthylene	0 08	<0.03	0.47	0.11	<0.03	0 06					<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	0 27	<0.05	<0.05	<0.05					<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	0 27	<0.04	<0.04	0 05					<0.04	mg/kg	TM4/PM8
Phenanthrene #	0 20	0 07	3 04	0 51	<0.03	0 53					<0.03	mg/kg	TM4/PM8
Anthracene #	0.13	<0.04	1 52	0 21	<0.04	0 21					<0.04	mg/kg	TM4/PM8
Fluoranthene #	0 62	0 21	8 67	1.44	<0.03	0 99					<0.03	mg/kg	TM4/PM8
Pyrene #	0 58	0 20	7.47	1 27	<0.03	0 88					<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0 34	0.12	3 51	0 58	<0.06	0 55					<0.06	mg/kg	TM4/PM8
Chrysene #	0 39	0.13	3 96	0.78	<0.02	0 56					<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.79	0 29	8 35	1 35	<0.07	1 23					<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.47	0.17	5 03	0.71	<0.04	0.73					<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	0 30	0.12	3.79	0 52	<0.04	0 56					<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	0.46	0 07	<0.04	0.10					<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0 32	0.13	3 80	0 52	<0.04	0 59					<0.04	mg/kg	TM4/PM8
PAH 16 Total	4.2	1.4	50 8	8.1	<0.6	7.1					<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0 57	0 21	6 01	0 97	<0.05	0 89					<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0 22	0 08	2 34	0 38	<0.02	0 34					<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	91	92	91	90	92	89					<0	%	TM4/PM8
Methyl Tertiary Butyl Ether #	-	-	-	-	-	-					<2	ug/kg	TM15/PM10
Benzene #	-	-	-	-	-	-					<3	ug/kg	TM15/PM10
Toluene #	-	-	-	-	-	-					<3	ug/kg	TM15/PM10
Ethylbenzene #	-	-	-	-	-	-					<3	ug/kg	TM15/PM10

Client Name: RPS
Reference: JER8749
Location: Swindon
Contact: Matthew Hemus
EMT Job No: 20/13974

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	42-44	48-50	53-55	59-61	62-64	68-70					LOD/LOR	Units	Method No.
Sample ID	TP108	TP101	TP104	HP101	HP102	TP114							
Depth	0 30	0 20	0.40	0 50	0 50	0 30							
COC No / misc													
Containers	V J B	V J B	V J B	V J B	V J B	V J B							
Sample Date	08/10/2020	08/10/2020	08/10/2020	09/10/2020	09/10/2020	05/10/2020							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020							
m/p-Xylene #	-	-	-	-	-	-					<5	ug/kg	TM15/PM10
o-Xylene #	-	-	-	-	-	-					<3	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	-	-	-	-	-	-					<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	-	-	-	-	-	-					<0	%	TM15/PM10
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	6	<4	<4					<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	25	<7	26	<7	<7					<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	787	18	85	<7	<7					<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	<19	812	<19	117	<19	<19					<19	mg/kg	M5 M36 M8 M 2 M 8
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4					<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	21	22	13	<7	<7					<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	58	476	159	96	<7	78					<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 #	58	497	181	109	<19	78					<19	mg/kg	M5 M36 M8 M 2 M 8
Total aliphatics and aromatics(C5-35)	58	1309	181	226	<38	78					<38	mg/kg	M5 M36 M8 M 2 M 8
MTBE #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM36/PM12
Benzene #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM36/PM12
Toluene #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM36/PM12
PCB 77	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
PCB 81	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
PCB 105	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
PCB 114	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
PCB 118	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
PCB 123	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
PCB 126	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
PCB 156	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
PCB 157	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
PCB 167	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
PCB 169	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8

Element Materials Technology

Client Name: RPS
Reference: JER8749
Location: Swindon
Contact: Matthew Hemus
EMT Job No: 20/13974

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	42-44	48-50	53-55	59-61	62-64	68-70					LOD/LOR	Units	Method No.
Sample ID	TP108	TP101	TP104	HP101	HP102	TP114							
Depth	0 30	0 20	0.40	0 50	0 50	0 30							
COC No / misc													
Containers	V J B	V J B	V J B	V J B	V J B	V J B							
Sample Date	08/10/2020	08/10/2020	08/10/2020	09/10/2020	09/10/2020	05/10/2020							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020	10/10/2020							
PCB 189	-	-	-	<5	<5	-					<5	ug/kg	TM17/PM8
Total 12 PCBs	-	-	-	<60	<60	-					<60	ug/kg	TM17/PM8
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15					<0.15	mg/kg	TM26/PM21
Natural Moisture Content	34.1	31.4	20 6	21 8	28 6	25 2					<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	-	-	0.0495	-	0.0015	0.1215					<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	<0.0015	0.0193	-	0.0068	-	-					<0.0015	g/l	TM38/PM60
Total Cyanide #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	mg/kg	TM89/PM45
Organic Matter	NDP	NDP	2.1	NDP	2.0	3.2					<0.2	%	TM21/PM24
Sulphide	<10	<10	<10	<10	<10	<10					<10	mg/kg	TM107/PM45
pH #	7 94	8 00	8 33	8.45	8.42	8 54					<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

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Client Name: RPS
Reference: JER8749
Location: Swindon
Contact: Matthew Hemus
EMT Job No: 20/13974

VOC Report : **Solid**

EMT Sample No.	16-18												
Sample ID	TP111												
Depth	2.00												
COC No / misc													
Containers	V J B												
Sample Date	06/10/2020												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	10/10/2020												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2										<2	ug/kg	TM15/PM10
Methyl Tertiary Butyl Ether #	<2										<2	ug/kg	TM15/PM10
Chloromethane #	<3										<3	ug/kg	TM15/PM10
Vinyl Chloride	<2										<2	ug/kg	TM15_A/PM10
Bromomethane	<1										<1	ug/kg	TM15/PM10
Chloroethane #	<2										<2	ug/kg	TM15/PM10
Trichlorofluoromethane #	<2										<2	ug/kg	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<6										<6	ug/kg	TM15/PM10
Dichloromethane (DCM) #	<30										<30	ug/kg	TM15/PM10
trans-1-2-Dichloroethene #	<3										<3	ug/kg	TM15/PM10
1,1-Dichloroethane #	<3										<3	ug/kg	TM15/PM10
cis-1-2-Dichloroethene #	<3										<3	ug/kg	TM15/PM10
2,2-Dichloropropane	<4										<4	ug/kg	TM15/PM10
Bromochloromethane #	<3										<3	ug/kg	TM15/PM10
Chloroform #	<3										<3	ug/kg	TM15/PM10
1,1,1-Trichloroethane #	<3										<3	ug/kg	TM15/PM10
1,1-Dichloropropene #	<3										<3	ug/kg	TM15/PM10
Carbon tetrachloride #	<4										<4	ug/kg	TM15/PM10
1,2-Dichloroethane #	<4										<4	ug/kg	TM15/PM10
Benzene #	<3										<3	ug/kg	TM15/PM10
Trichloroethene (TCE) #	<3										<3	ug/kg	TM15/PM10
1,2-Dichloropropane #	<6										<6	ug/kg	TM15/PM10
Dibromomethane #	<3										<3	ug/kg	TM15/PM10
Bromodichloromethane #	<3										<3	ug/kg	TM15/PM10
cis-1-3-Dichloropropene	<4										<4	ug/kg	TM15/PM10
Toluene #	<3										<3	ug/kg	TM15/PM10
trans-1-3-Dichloropropene	<3										<3	ug/kg	TM15/PM10
1,1,2-Trichloroethane #	<3										<3	ug/kg	TM15/PM10
Tetrachloroethene (PCE) #	<3										<3	ug/kg	TM15/PM10
1,3-Dichloropropane #	<3										<3	ug/kg	TM15/PM10
Dibromochloromethane #	<3										<3	ug/kg	TM15/PM10
1,2-Dibromoethane #	<3										<3	ug/kg	TM15/PM10
Chlorobenzene #	<3										<3	ug/kg	TM15/PM10
1,1,1,2-Tetrachloroethane #	<3										<3	ug/kg	TM15/PM10
Ethylbenzene #	<3										<3	ug/kg	TM15/PM10
m/p-Xylene #	<5										<5	ug/kg	TM15/PM10
o-Xylene #	<3										<3	ug/kg	TM15/PM10
Styrene	<3										<3	ug/kg	TM15_A/PM10
Bromoform	<3										<3	ug/kg	TM15/PM10
Isopropylbenzene #	<3										<3	ug/kg	TM15/PM10
1,1,2,2-Tetrachloroethane #	<3										<3	ug/kg	TM15/PM10
Bromobenzene	<2										<2	ug/kg	TM15/PM10
1,2,3-Trichloropropane #	<4										<4	ug/kg	TM15/PM10
Propylbenzene #	<4										<4	ug/kg	TM15/PM10
2-Chlorotoluene	<3										<3	ug/kg	TM15/PM10
1,3,5-Trimethylbenzene #	<3										<3	ug/kg	TM15/PM10
4-Chlorotoluene	<3										<3	ug/kg	TM15/PM10
tert-Butylbenzene #	<5										<5	ug/kg	TM15/PM10
1,2,4-Trimethylbenzene #	<6										<6	ug/kg	TM15/PM10
sec-Butylbenzene #	<4										<4	ug/kg	TM15/PM10
4-Isopropyltoluene #	<4										<4	ug/kg	TM15/PM10
1,3-Dichlorobenzene #	<4										<4	ug/kg	TM15/PM10
1,4-Dichlorobenzene #	<4										<4	ug/kg	TM15/PM10
n-Butylbenzene #	<4										<4	ug/kg	TM15/PM10
1,2-Dichlorobenzene #	<4										<4	ug/kg	TM15/PM10
1,2-Dibromo-3-chloropropane #	<4										<4	ug/kg	TM15/PM10
1,2,4-Trichlorobenzene #	<7										<7	ug/kg	TM15/PM10
Hexachlorobutadiene	<4										<4	ug/kg	TM15/PM10
Naphthalene	62										<27	ug/kg	TM15/PM10
1,2,3-Trichlorobenzene #	<7										<7	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	89										<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	79										<0	%	TM15/PM10

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Reference: JER8749
Location: Swindon
Contact: Matthew Hemus

Note

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/13974	1	TP113	0.25	6	16/10/2020	**General Description (Bulk Analysis)**	Soil/Stones
					16/10/2020	**Asbestos Fibres**	Fibre Bundles
					16/10/2020	**Asbestos ACM**	NAD
					16/10/2020	**Asbestos Type**	Chrysotile
					16/10/2020	**Asbestos Level Screen**	less than 0.1%
20/13974	1	TP115	0.45	9	16/10/2020	**General Description (Bulk Analysis)**	Soil/Stones
					16/10/2020	**Asbestos Fibres**	NAD
					16/10/2020	**Asbestos ACM**	NAD
					16/10/2020	**Asbestos Type**	NAD
					16/10/2020	**Asbestos Level Screen**	NAD
20/13974	1	TP110	0.20	12	17/10/2020	**General Description (Bulk Analysis)**	soil-stones
					17/10/2020	**Asbestos Fibres**	Fibre Bundles
					17/10/2020	**Asbestos ACM**	NAD
					17/10/2020	**Asbestos Type**	Chrysotile
					17/10/2020	**Asbestos Level Screen**	NAD
20/13974	1	TP111	2.00	18	17/10/2020	**General Description (Bulk Analysis)**	soil-stones
					17/10/2020	**Asbestos Fibres**	NAD
					17/10/2020	**Asbestos ACM**	NAD
					17/10/2020	**Asbestos Type**	NAD
					17/10/2020	**Asbestos Level Screen**	NAD
20/13974	1	TP112	0.25	21	16/10/2020	**General Description (Bulk Analysis)**	Soil/Stones
					16/10/2020	**Asbestos Fibres**	Fibre Bundles
					16/10/2020	**Asbestos ACM**	NAD
					16/10/2020	**Asbestos Type**	Chrysotile
					16/10/2020	**Asbestos Level Screen**	less than 0.1%
20/13974	1	TP104	0.20	23	16/10/2020	**General Description (Bulk Analysis)**	Soil/Stones
					16/10/2020	**Asbestos Fibres**	NAD
					16/10/2020	**Asbestos ACM**	NAD
					16/10/2020	**Asbestos Type**	NAD
					16/10/2020	**Asbestos Level Screen**	NAD
20/13974	1	TP103	0.35	29	17/10/2020	**General Description (Bulk Analysis)**	soil-stones
					17/10/2020	**Asbestos Fibres**	Fibre Bundles
					17/10/2020	**Asbestos ACM**	NAD

Client Name: RPS
Reference: JER8749
Location: Swindon
Contact: Matthew Hemus

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/13974	1	TP103	0.35	29	17/10/2020	**Asbestos Type**	Chrysotile
					17/10/2020	**Asbestos Level Screen**	less than 0.1%
20/13974	1	TP107	0.25	32	17/10/2020	**General Description (Bulk Analysis)**	soil-stones
					17/10/2020	**Asbestos Fibres**	Fibre Bundles
					17/10/2020	**Asbestos Fibres (2)**	Fibre Bundles
					17/10/2020	**Asbestos Fibres (3)**	Fibre Bundles
					17/10/2020	**Asbestos ACM**	ACM Debris
					17/10/2020	**Asbestos ACM (2)**	ACM Debris
					17/10/2020	**Asbestos ACM (3)**	NAD
					17/10/2020	**Asbestos Type**	Chrysotile
					17/10/2020	**Asbestos Type (2)**	Crocidolite
					17/10/2020	**Asbestos Type (3)**	Amosite
					17/10/2020	**Asbestos Level Screen**	Asbestos level cannot be determined from Screen. Quantification required.
20/13974	1	TP105	0.20	35	17/10/2020	**General Description (Bulk Analysis)**	soil-stones
					17/10/2020	**Asbestos Fibres**	NAD
					17/10/2020	**Asbestos ACM**	NAD
					17/10/2020	**Asbestos Type**	NAD
					17/10/2020	**Asbestos Level Screen**	NAD
20/13974	1	TP106	0.25	41	16/10/2020	**General Description (Bulk Analysis)**	Soil/Stones
					16/10/2020	**Asbestos Fibres**	NAD
					16/10/2020	**Asbestos ACM**	NAD
					16/10/2020	**Asbestos Type**	NAD
					16/10/2020	**Asbestos Level Screen**	NAD
20/13974	1	TP108	0.30	44	16/10/2020	**General Description (Bulk Analysis)**	Soil/Stones
					16/10/2020	**Asbestos Fibres**	Fibre Bundles
					16/10/2020	**Asbestos ACM**	ACM Debris
					16/10/2020	**Asbestos Type**	Amosite
					16/10/2020	**Asbestos Level Screen**	Asbestos level cannot be determined from Screen. Quantification required.
20/13974	1	TP101	0.20	50	16/10/2020	**General Description (Bulk Analysis)**	Soil/Stones
					16/10/2020	**Asbestos Fibres**	Fibre Bundles
					16/10/2020	**Asbestos ACM**	ACM Debris
					16/10/2020	**Asbestos Type**	Chrysotile
					16/10/2020	**Asbestos Level Screen**	Asbestos level cannot be determined from Screen. Quantification required.
20/13974	1	TP104	0.40	55	16/10/2020	**General Description (Bulk Analysis)**	Soil/Stones
					16/10/2020	**Asbestos Fibres**	NAD
					16/10/2020	**Asbestos ACM**	NAD
					16/10/2020	**Asbestos Type**	NAD
					16/10/2020	**Asbestos Level Screen**	NAD
20/13974	1	HP101	0.50	61	16/10/2020	**General Description (Bulk Analysis)**	Soil/Stones
					16/10/2020	**Asbestos Fibres**	Fibre Bundles
					16/10/2020	**Asbestos ACM**	Asbestos Cement Debris
					16/10/2020	**Asbestos Type**	Chrysotile
					16/10/2020	**Asbestos Level Screen**	less than 0.1%
20/13974	1	HP102	0.50	64	16/10/2020	**General Description (Bulk Analysis)**	soil-stones
					16/10/2020	**Asbestos Fibres**	NAD

Client Name: RPS
Reference: JER8749
Location: Swindon
Contact: Matthew Hemus

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/13974	1	HP102	0.50	64	16/10/2020	**Asbestos ACM**	NAD
					16/10/2020	**Asbestos Type**	NAD
					16/10/2020	**Asbestos Level Screen**	NAD
20/13974	1	TP114	0.30	70	16/10/2020	**General Description (Bulk Analysis)**	Soil/Stones
					16/10/2020	**Asbestos Fibres**	NAD
					16/10/2020	**Asbestos ACM**	NAD
					16/10/2020	**Asbestos Type**	NAD
					16/10/2020	**Asbestos Level Screen**	NAD

Client Name: RPS

Reference: JER8749

Location: Swindon

Contact: Matthew Hemus

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
20/13974	1	TP113	0.25	4-6	TM21/PM24	Asbestos detected in sample
20/13974	1	TP110	0.20	10-12	TM21/PM24	Asbestos detected in sample
20/13974	1	TP112	0.25	19-21	TM21/PM24	Asbestos detected in sample
20/13974	1	TP103	0.35	27-29	TM21/PM24	Asbestos detected in sample
20/13974	1	TP107	0.25	30-32	TM21/PM24	Asbestos detected in sample
20/13974	1	TP108	0.30	42-44	TM21/PM24	Asbestos detected in sample
20/13974	1	TP101	0.20	48-50	TM21/PM24	Asbestos detected in sample
20/13974	1	HP101	0.50	59-61	TM21/PM24	Asbestos detected in sample

Client Name: RPS
Reference: JER8749
Location: Swindon
Contact: Matthew Hemus

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/13974						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 20/13974

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 20/13974

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5 2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5 2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCF D. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

EMT Job No: 20/13974

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev 2, Dec 1996; Modified BS EN ISO 11885:2009: SO LS by Modified USEP	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112 5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev 2, Dec 1996; Modified BS EN ISO 11885:2009: SO LS by Modified USEP	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-F D. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE re	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-F D. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE re	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365 2 (Rev.2 1993), TON 353.1 (Rev 2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0 2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365 2 (Rev.2 1993), TON 353.1 (Rev 2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0 2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365 2 (Rev.2 1993), TON 353.1 (Rev 2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM60	As received solid samples are extracted with deionised water in a 2:1 ratio of water to solid.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1 2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

EMT Job No: 20/13974

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
TM15_A	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds, Vinyl Chloride & Styrene by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

Annex H

Chalk Cavities Assessment

Your Ref: P020-640
Our Ref: 50111//CBH/JW/CNE/HG/JE Rev01

22 October 2020

RPS Group Plc,
20 Farringdon Street,
London,
EC4A 4AB

Attention of: Matthew Hemus

Dear Mr Hemus,

RE: STANTEC CAVITIES OCCURRENCE ASSESSMENT FOR THE SITE AT [redacted], BURDEROP ESTATE, BRIMBLE HILL, SWINDON, SN4 0QB.

We refer to your email dated 02 October 2020, regarding the above. We thank you for your instructions to carry out an extended cavities occurrence assessment for the above-named site.

The cavities databases search has been carried out for the site centred at National Grid Reference SU 16352 80489, as interpreted from the co-ordinates provided.

NATURAL CAVITY RECORDS

A search of the Stantec Natural Cavities Database indicated that there are no natural cavity records within 1 km of the site centre. The nearest Natural Cavity record is located about 1.3 km west south-west of the site and pertains to gulls and fissures due to cambering associated with the Gault and Upper Greensand Formations.

MINING CAVITY RECORDS

A search of the Stantec Mining Cavities Database indicated that there are no man-made mining cavity records within 1 km of the site centre. The closest Mining Cavity record is located approximately 5.8 km south south-west of the site and pertains to a chalkwell associated with Chalk Group strata.

Subject to the following note, according to Stantec Cavities Databases, no records pertaining to natural or mining cavities appear to be present within the site footprint. We draw your attention to the fact that the absence of, or the presence of, existing records for the site should not be considered conclusive – the information provided is indicative only. For any decision on investment, construction or any other actions relating to the project, further investigations will be required to confirm ground conditions.

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Registered in England No. 1188070

CAVITY OCCURRENCE ASSESSMENT

National Planning Policy Framework (NPPF 2019) Clause 178-181 requires an assessment for a site potentially at risk from ground instability. The aspects considered with regards to ground instability are related to: Natural hazards or former activities such as mining. Consideration is given below to the risk of these potential causes of instability arising from existing ground conditions across the site, as identified by the desk top data review.

Geology

With reference to online resources (www.bgs.ac.uk), and the British Geological Survey of England and Wales 1:50,000 scale geological map of the area (Sheet 266, 1974) of Marlborough, the site geology comprises Cretaceous age West Melbury Marly Chalk Formation, part of the Grey Chalk Subgroup. No superficial deposits are indicated to be present on the site itself, however, a narrow band of Quaternary age Alluvium and Head Deposits are shown to be present running along the southern margin of the site. The site lies close to the outcrop margin of the Chalk and so the Cretaceous aged Upper Greensand and Gault Formations are shown to outcrop beyond the chalk to the immediate north of the site.

A review of the available BGS borehole records was undertaken to further understand the geology surrounding the site. The closest available historical record, with relevance to the site, is a borehole undertaken by Geotechnical Engineering Ltd at Burderop Park (BGS Ref SU18SE65) in April 1977, approximately 160 m east south-east of the site. The borehole encountered Made Ground (Ground level to 0.4 m bgl) overlying chalk to a proven depth of 15.0 m bgl. The chalk is described as grey weathered fissured marly chalk (0.4 to 7.8 m bgl) and hard chalk below (7.8 to 12.75 m bgl). Below the chalk is a green to greenish grey weak sandstone with a clay band to the base of the borehole at 15m bgl (presumed to be Upper Greensand Formation).

The relative level of chalk is of significance as it will determine the hazard for natural and mining cavities to have formed.

Hydrogeology

The published hydrogeological map (Sheet 7): Hydrogeological Map of the South West Chilterns and the Berkshire and Marlborough Downs (1:100,000 scale – 1978) presents the conditions at the site showing that the water table level within the chalk aquifer lies between 140 – 150 m above Ordnance Datum (AOD).

Based on Ordnance Survey (OS) map contours, the site appears to be located upon relatively flat, high ground forming a ridge, between 170 and 175 m AOD. Beyond the northern site boundary land levels fall away sharply to the north-west. South of the site the land surface slopes to the south-east towards a small stream valley where the surface water level at source appears to be slightly above 165m AOD. On this basis, the chalk water table below the site appears to be present within 5 to 10 m of the the surface.

The groundwater level has implications for both the hazards posed by natural and mining cavities.

Geomorphology

Information provided from OS maps indicates that the site is situated upon relatively high ground forming a NE-SW oriented ridge feature. This creates a local watershed with a sharp slope to the north-west and a gentle slope to the south-east towards a small easterly flowing stream that rises from a source on the southern site boundary. Ground levels at the site are at approximately 170-175 m AOD. The ground level falls away quickly to the north-west from the site to about 130 m AOD over a distance of approximately 300 m and continues decreasing to about 100 m AOD at the River Ray, situated about 2.2 km north-west of the site. The ground level also reduces towards the southerly stream valley to about 140 m AOD in the valley floor about 1.2 km east of the site. Surface land drainage at the site would therefore appear to be directed from the site northwards and southwards away from the ridge feature.

The Chalk outcrop has undergone a variety of erosional and depositional episodes. It was tectonically uplifted, then the surface was subjected to sub-aerial erosion during the late Cretaceous/early Palaeogene. This area being >20kms distant from existing Palaeogene deposits may always have been beyond the limits of the marine incursions that were responsible for depositing the London Clay and Lambeth Group sequences. It is likely that the chalk surface has, locally, formed a topographical high point and been exposed over a long period, undergoing long term surface lowering by dissolution, erosion and retreat of the north-west facing chalk scarp face.

The Quaternary depositional environment was characterised by colder climatic conditions which occurred with glacial and periglacial episodes where ice cover would increase in thickness when water/sea levels fell. There were relatively short time periods at the onset and finish of glacial conditions when water table levels fell widely below the chalk surface level. During such times, downward percolation of ground water occurred through the Palaeogene, and newly formed Quaternary deposits, to initiate karstic weathering of the chalk surface where favourable circumstances allowed. Such conditions might also have allowed more intense dissolution to occur more widely along bedding planes and fissures at times when cold ground water was able to circulate through the chalk sequence. Colder ground water has the capacity to hold more dissolved carbon dioxide, making it more acidic. This karstic activity was only possible during times when the ground (and groundwater) was not frozen, such as spring thaws, summer periods or where taliks (year-round unfrozen ground often saturated with minerals salts) are present typically underlying surface water bodies.

During post-glacial times following thawing of permafrost within the Quaternary deposits when a temperate climate had returned, the land surface was subject to the re-establishment of normal patterns of surface water drainage, and related fluvial erosion that has cut down through the Palaeogene and Quaternary deposits where valleys have formed. While during cold climate periods the frozen ground conditions would probably have protected the exposed chalk scarp surface and reduced its retreat in the site vicinity, once thawing occurred then it is likely that the scarp has been weakened by cambering and ice wedge formation leading to scarp face instability, slumping and slope creep. Intermittent large-scale slope instability and erosion has probably been responsible for the development of the relatively wide, laterally thinning, chalk scarp slope basal platform seen today.

Each time as the climate warmed after glacial and periglacial episodes, land drainage patterns were re-established slowly. When thawing of the permafrost conditions occurred, this allowed the

infiltration of water, collecting upon cover deposits, to percolate downwards to initiate dissolution of the Chalk below. This is typically thought to have occurred through narrow pathways expected to have been created through taliks creating pipe like features or through cryoturbation deposits which were less well consolidated. As can be appreciated from the above events, there have been times when dissolution conditions were probably favourable, times when they were unfavourable and periods when solution features were actively destroyed by erosion.

Cavities Occurrence Assessment – Natural Cavities

In areas underlain by Chalk, under-drainage from the interface with cover deposits often forms a karstic horizon where solution features (swallow holes, sinkholes, and solution pipes) are found. The most prominent karstic horizon is the Palaeogene/Chalk interface. With the site being located at the margin of the chalk outcrop there are no Palaeogene covers present within 20 km of the site. Erosion of the chalk at the site location has been significant, there being only a thin veneer of chalk left above the underlying older Cretaceous strata (Upper Greensand and Gault Formations). The chalk that is present also belongs to the Grey Chalk Subgroup which has a relatively high clay content. Consequently, based on wider study of the chalk outcrop it is known that such chalk lithology is not favourable to the formation of solution features.

An assessment of the site has been undertaken regarding the potential for solution features to have formed in the geological, geomorphological, and hydrogeological setting of the site. This has taken into consideration the wider spatial area factors pertaining to solution feature hazards, resulting in a rating of **LOW**.

Whilst this preliminary karstic hazard rating broadly categorises the site based on the available desk-based assessment, this assessment should be revised as further exploratory investigations are undertaken in efforts to refine hazards and does not purport to predict subsidence potential. The assessment is intended to aid in the future specification of any planned ground investigations.

Cavities Occurrence Assessment – Mining Cavities

With reference to Aldiss et al. (2010) sand and gravel extraction from river terrace deposits is known to have taken place in the region. Additionally, chalk and flint have also been taken from multiple small open pits across the area. The chalk was used in brick manufacture, to make quicklime, or used as agricultural lime. Clay and sand are also noted to have been extracted for tile making from multiple small pits within the Quaternary deposits.

In the wider area chalk has been extracted by surface pitting and by means of underground mining. It should be noted, however, that whenever chalk mining took place in the past, it was always carried out in dry chalk above the water table. No instances are known where dewatering was employed to create dry chalk for mining. Consequently, with the chalk water table apparently being within 5 m to 10 m below the site surface, this creates conditions that are less favourable for historical chalk mining.

The historical OS 1924 1:2,500 scale map identified an area of earthworks and a chalk pit in the south-west of the site. In addition, there are multiple sand, gravel and chalk pits indicated in the wider surrounding area. Subsequently, considering the historical, geological, hydrogeology, and

geomorphological conditions pertaining to the site, the assessed potential for old chalk mines to be present is considered **LOW**.

RECOMMENDATIONS

Even though the ratings provided for the potential for dissolution features and mines to be present at the site are Low, it is recommended that a suitably designed ground investigation is undertaken to confirm the ratings. Furthermore, foundations and drainage will be required to be designed in accordance with CIRIA C574 (2002) "Engineering in chalk". If required, Stantec could provide further experienced assistance with the interpretation of the investigation and advise on implications for the foundation and drainage design process.

If during site investigation or construction, abnormal ground conditions, such as loose or very loose material or voiding are experienced, a geotechnical engineer should be consulted prior to continuing.

We trust that the information presented will assist you, but if you have any queries then please do not hesitate to contact the writer.

Yours sincerely,

p.p. 

James Weddle
Associate
on behalf of Stantec UK Ltd

PROPOSED REPLACEMENT DATA CENTRE

NOISE IMPACT ASSESSMENT

National Data Centre, Old Burderop Hospital Site, Brimble Hill, Wroughton, Swindon

Appendix 8.1

20305S-RPS-XX-XX-RP-P-9720

Replacement Data Centre
Noise Impact Assessment
Final
17 March 2021

rpsgroup.com

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1 INTRODUCTION

1.1 Purpose of the Report

1.1.1 This Noise Impact Assessment (NIA) has been prepared to support the planning application for the redevelopment of land at the National Data Centre. The NIA forms one of a suite of technical reports forming part of the application for the data centre and associated infrastructure. The Application Site is located at the Old Burderop Hospital Site, Brimble Hill in the administrative area of Swindon Borough Council (SBC).

1.2 Project Description

1.2.1 The proposed development is for a replacement data centre that will comprise a data hall; associated electrical and AHU plant rooms; a loading bay; maintenance and storage space; office administration areas and screened plant at roof level. The building will be supported by emergency generators and emission stacks; diesel tanks and filling area; an electrical switchroom; a water sprinkler pump room and storage tanks and other associated infrastructure. The Application Site will also include a gate house / security building, site access from the B4005 Brimble Hill and internal access roads, and hard and soft landscaping.

1.2.2 The main noise generating operational plant associated with the data centre will be the AHUs, exhausts and direct exchange units associated with the ongoing running of the building and the emergency generators and emission stacks.

1.2.3 It is noted that the proposed development is replacing three existing data centre buildings, Beta and Gamma in the north east of the Application Site and Alpha in the south west. The buildings were constructed in the early 1990s and ceased operation last year (2020). These buildings utilized emergency generators: at Beta/Gamma the generators comprised four 1,500 kVA and two 750kVA; and Alpha has three 3,000 kVA and one 1,000 kVA emergency generators. All of the emergency generators were tested on a monthly basis between two and four hours.

1.2.4 The existing generators and the buildings will be demolished and replaced with the proposed data centre which will have a 11 total emergency generator units.

1.3 Scope

1.3.1 This NIA considers the noise impact from the construction and operation of the proposed development on residential noise sensitive receptors (NSRs). Traffic generation associated with the development, once operational is low in the context of other traffic in the area; typically six HGVs arriving and departing each day (i.e. 12 movements in total) and 74 total car movements per day. Therefore, a traffic noise assessment has been scoped out of the noise impact assessment. Due to the distances between the site and the nearest noise sensitive receptors (NSRs), vibration impacts are unlikely during either the construction or operational phase and have therefore been scoped out of the assessment.

1.3.2 The Environmental Health Officer at SBC confirmed that they were happy with the approach taken in the assessment.

1.4 Authors and Credentials

1.4.1 The assessment is based upon appropriate information regarding the proposed development provided by the Applicant. RPS is a member of the Association of Noise Consultants (ANC), the

representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. The assessment has been undertaken with integrity, objectivity and honesty in accordance with the Code of Conduct of the Institute of Acoustics (IOA) and ethically, professionally and lawfully in accordance with the Code of Ethics of the ANC.

1.4.2 The technical content of this assessment has been provided by RPS personnel, all of whom are members of the IOA (the UK's professional body for those working in acoustics, noise and vibration). This report has been peer reviewed within the RPS team to ensure that it is technically robust and meets the requirements of our Integrated Management System.

2 LEGISLATION AND POLICY CONTEXT

2.1 Legislation

Control of Pollution Act, 1974

2.1.1 Part III of the Control of Pollution Act 1974 (CoPA) (The Stationary Office, 1974) is specifically concerned with pollution. With regards to noise it covers construction sites; noise in the street; noise abatement zones; codes of practice and best practicable means (BPM).

2.1.2 Section 60, Part III of the CoPA refers to the control of noise on construction sites. It provides legislation by which local authorities can control noise from construction sites to prevent noise disturbance occurring. The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015 approved British Standard (BS) 5228-1:2009+A1:2014 (British Standards Institution, 2014a) and BS 5228-2:2009+A1:2014 (British Standards Institution, 2014b) for the purpose of giving guidance on appropriate methods for minimising noise from construction and open sites in exercise of the powers conferred on the Secretary of State by sections 71(1)(b), (2) and (3) of the CoPA.

2.1.3 The CoPA enables a local authority, in whose area work is going to be undertaken, or is being undertaken, the power to serve a notice imposing requirements as to the way in which construction works are to be carried out. This notice can specify, the plant or machinery that is or is not to be used, the hours during which the construction work can be carried out, the level of noise and vibration that can be emitted from the premises in question or at any specified point on these premises or that can be emitted during specified hours, or for any change of circumstances.

2.1.4 Section 61, Part III of the CoPA refers to prior consent for work on construction sites. It provides a method by which a contractor can apply for consent to undertake construction works in advance. If consent is given, and the stated method and hours of work are complied with, then the local authority cannot take action under Section 60.

2.1.5 Section 71, Part III of the CoPA refers to the preparation and approval of codes of practice for minimising noise.

2.1.6 Section 72, Part III of the CoPA refers to BPM, which is defined as:

"reasonably practicable, having regards among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications'. Whilst 'Means' includes 'the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures".

2.1.7 If BPM is applied, then it can provide a defence against prosecution by the local authority.

Environmental Protection Act 1990, Part III (EPA)

2.1.8 The Environmental Protection Act 1990 (EPA) (The Stationary Office, 1990) deals with statutory nuisance, including noise.

2.1.9 Section 79, Part III of the EPA, 'Statutory nuisances and inspections therefor', places a duty on local authorities to regularly inspect their areas to detect whether statutory nuisances exist. This section also considers and defines the concept of 'Best Practicable Means' (BPM) which originates from Section 72, Part III of the Control of Pollution Act (CoPA), where BPM is defined as:

"reasonably practicable having regard, among other things, to local conditions and circumstances, to the current state of technical knowledge and to the financial implications".

2.1.10 Where the local authority is satisfied that a statutory nuisance does exist, or is likely to occur or recur, it must serve an abatement notice. Section 80, Part III of the EPA, 'Summary proceedings for statutory nuisances', provides local authorities with the power to serve an abatement notice requiring the abatement of the nuisance or prohibiting or restricting its occurrence or recurrence; and/or carrying out such works or other action necessary to abate the nuisance.

2.1.11 Section 82, Part III of the EPA, 'Summary proceedings by persons aggrieved by statutory nuisances', allows a Magistrates' court to act on a complaint made by any person on the grounds that he is aggrieved by a statutory nuisance, such as noise.

2.1.12 The procedures for appeals against abatement notices are detailed in the Statutory Nuisance (Appeals) Regulations 1995.

2.2 Planning Policy

National Policy

Noise Policy Statement for England

2.2.1 The Noise Policy Statement for England (NPSE) (Department for Environment, Food and Rural Affairs (Defra), 2010) aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.

2.2.2 Paragraph 1.6 of the NPSE sets out the long-term vision and aims of Government noise policy:

"Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life*."

2.2.3 The 'Noise Policy Aims' require that all reasonable steps should be taken to avoid, mitigate and minimise adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development, which include social, economic, environmental and health considerations.

2.2.4 With regard to the terms 'significant adverse' and 'adverse' included in the 'Noise Policy Aims', these are explained further in the 'Explanatory Note' that accompanies the NPSE as relating to established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation which are:

"NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on human health and quality of life due to noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected."

2.2.5 Defra has then extended these concepts for the purpose of the NPSE to introduce the concept of:

"SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur."

2.2.6 The accompanying explanation states:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

2.2.7 With regard to 'further evidence', Defra had commissioned research to identify the levels at which the above effects occur. However, this research has been largely inconclusive and varies with source. In the absence of alternative guidance and the lack of noise-specific guidance in the NPPF, the assessment methods and criteria from British Standards etc have been used.

National Planning Policy Framework

2.2.8 The National Planning Policy Framework (NPPF), (Ministry of Housing, Communities and Local Government, 2019a) sets out the Government's planning policies for England and how these are expected to be applied. The emphasis of the Framework is to allow development to proceed where it can be demonstrated to be sustainable. In relation to noise, Paragraph 180 of the Framework states:

"Planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum, potential adverse impacts resulting from noise from the development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

2.2.9 Point 'a)' refers to 'significant adverse impacts' which relates to the 'significant observed adverse effect level' (SOAEL) in the Noise Policy Statement for England (NPSE), although the term 'effect' is used instead of the term 'impact'. However, these have been deemed to be interchangeable in this context.

2.2.10 Paragraph 182 of the NPPF 2019 states that:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

Planning Practice Guidance - Noise

2.2.11 The Government has published Planning Practice Guidance on a range of subjects including noise. The guidance forms part of the NPPF and provides advice on how to deliver its policies. The Planning Practice Guidance for Noise (PPG-N) (Ministry of Housing, Communities and Local Government, last updated in 2019b) reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards (BSs) and contains examples of acoustic environments commensurate with various effect levels. Paragraph 006 of the PPG-N explains that:

"The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation."

2.2.12 According to the PPG-N factors that can influence whether noise could be of concern include:

- "*the source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;*
- *for a new noise making source, how the noise from it relates to the existing sound environment;*
- *for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;*
- *the spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise i.e. whether or not the noise contains particular tonal characteristics or other particular features); and*
- *the local arrangement of buildings, surfaces and green infrastructure, and the extent to which it reflects or absorbs noise."*

2.2.13 More specific factors to consider when relevant include:

- *"the cumulative impacts of more than one source;*
- *whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations;*
- *in cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur;*

- *Noise Action Plans (where they exist), and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations should be taken into account. Defra's website has information on Noise Action Plans and Important Areas. Local authority environmental health departments will also be able to provide information about Important Areas;*
- *the effect of noise on wildlife. Noise can adversely affect wildlife and ecosystems. Particular consideration needs to be given to the potential effects of noisy development on international, national and locally designated sites of importance for biodiversity;*
- *where external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended; and*
- *some commercial developments including restaurants, hot food takeaways, night clubs and public houses can have particular impacts, not least because activities are often at their peak in the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the noise that may be made by customers in the vicinity*."

2.2.14 The PPG-N provides a relationship between various perceptions of noise, effect levels and required actions in accordance with the NPPF. This is reproduced in the table below. The wording for each action required is taken directly from the PPG-N.

Table 2.1: Noise Exposure Hierarchy Based on the Likely Average Response

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level (NOEL)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			

Response	Examples of Outcomes	Increasing Effect Level	Action
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.2.15 The PPG-N describes sound that is not noticeable to be at levels below the NOEL. It describes exposures that are noticeable but not to the extent there is a perceived change in quality of life as below the LOAEL and need no mitigation. With reference to the definition of noise in the NPSE, such emissions are ‘sound’ and not ‘noise’. On this basis, the audibility of sound from a development is not, in itself, a criterion to judge noise effects that is commensurate with national planning policy.

2.2.16 The PPG suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPG-N is having to turn up the volume on the television; needing to speak more loudly to be heard; where there is no alternative ventilation, closing windows for some of the time because of the noise; or, a potential for some reported sleep disturbance. In line with the NPPF and NPSE, the PPG states that consideration needs to be given to mitigating and minimising effects above the LOAEL but taking account of the economic and social benefits being derived from the activity causing the noise. This is in line with the "reduce to a minimum” action in Table 2.1.

2.2.17 The PPG-N suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL provided in the PPG-N are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present; and/or there is a potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. In line with the NPPF and NPSE, the PPG-N states that effects above the SOAEL should be avoided and that whilst the economic and social benefits being derived from the activity causing the noise must be taken into account, such exposures are undesirable.

2.2.18 The PPG-N suggests that a noise impact may be partially offset if the residents of affected dwellings have access to a relatively quiet part of their dwelling, private external amenity area and/or external public or private amenity space nearby.

Local Policy

Swindon Borough Local Plan

2.2.19 The principal planning policy document for Swindon is the Swindon Borough Local Plan 2026. This was formally adopted by Swindon Borough Council on 26 March 2015.

2.2.20 Policy ENV7 'Pollution' requires that proposals would not result in a loss of amenity for existing land uses. The policy is written as follows:

"a. Development that is likely to lead to emissions of pollutants such as noise, light, vibration, smell, fumes, smoke, soot, ash, dust, grit or toxic substances that may adversely affect existing development and vulnerable wildlife habitats, shall only be permitted where such emissions are controlled to a point where there is no significant loss of amenity for existing land uses, or habitats.

b. Similarly; where development would be adversely affected by the emission of pollutants from an existing use; the proposal will only be permitted where the users of the future development are protected from loss of amenity from those emissions in accord with Policy DE1."

2.3 Standards

British Standard 5228 'Code of Practice for Noise and Vibration Control on Construction and Open Sites', Parts 1 and 2, 2009+A1:2014

2.3.1 British Standard (BS) 5228 is a two-part standard which was subject to minor amendments (No.1) in 2014 which comprises:

- BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'; and
- BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration';

2.3.2 The Standard provides guidance, information and procedures on the control of noise and vibration from demolition and construction sites. The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015 approved BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 for the purpose of giving guidance on appropriate methods for minimising noise from construction and open sites in exercise of the powers conferred on the Secretary of State by sections 71(1)(b), (2) and (3) of the Control of Pollution Act 1974.

2.3.3 There are no set standards for the definition of the significance of construction noise effects, however, for noise, example criteria are provided in BS 5228-1:2009+A1:2014 Annex E and for vibration, example criteria are provided in BS 5228-2:2009+A1:2014 Annex B. The assessment of whether changes in noise levels due to construction activity constitute significant effects will be dependent on the absolute levels of ambient and construction noise, as well as the magnitude, duration, time of occurrence and frequency of the noise change.

2.3.4 The standard provides basic information and recommendations for methods of noise control relating to construction and open sites where work activities/operations generate significant noise levels. It includes sections on:

- community relations;
- noise and persons on site;

- neighbourhood nuisance;
- project supervision; and
- control of noise.

2.3.5 However, informative annexes to the standard include:

- information on legislative background;
- noise sources, remedies and their effectiveness (mitigation options);
- current and historic sound level data on site equipment and site activities;
- significance of noise effects;
- calculation procedures estimating sound emissions from sites and sound level monitoring;
- types of piling; and
- air overpressure.

2.3.6 The standard covers basic information and recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration levels. It includes sections on: community relations; vibration and persons on site; neighbourhood nuisance; project supervision; control of vibration and measurement.

British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

2.3.7 BS 4142:2014+A1:2019 (BS, 2019) primarily provides a numerical method by which to determine the significance of sound of an industrial nature (i.e. the 'specific sound'[1] from the proposed development) at residential noise sensitive receptors. The specific sound level may then be corrected for the character of the sound (e.g. perceptibility of tones and/or impulses), if appropriate, and it is then termed the 'rating level', whether or not a rating penalty is applied. The 'residual sound' is defined as the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

2.3.8 The specific sound levels should be determined separately in terms of the $L_{Aeq, T}$ index over a period of 1-hour during the daytime and 15-minutes during the night-time. For the purposes of the Standard, daytime is typically between 07:00 and 23:00 hours and night-time is typically between 23:00 and 07:00 hours although these time periods can be varied based on local circumstances.

2.3.9 With regards to the character correction, paragraph 9.2 of BS 4142:2014+A1:2019 states:

"Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a rating penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

[1] equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. … If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

2.3.10 The standard requires that the background sound levels[2] adopted for the assessment be representative for the period being assessed. The Standard recommends that the background sound level should be derived from continuous measurements of normally not less than 15-minute intervals, which can be contiguous or disaggregated. However, the Standard states that there is no 'single' background sound levels that can be derived from such measurements.

2.3.11 It is particularly difficult to determine what is 'representative' of the night-time period is because it can be subject to a wide variation in background sound level between the middle of the night and the shoulder periods. The accompanying note to paragraph 8.1.4 of the standard states that:

"A representative level should account for the range of background sounds levels and should not automatically be assumed to be either the minimum or modal value."

2.3.12 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level of the specific sound. In the context of the Standard, adverse impacts include, but are not limited to, annoyance and sleep disturbance. Typically, the greater this difference, the greater is the magnitude of the impact:

- a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context; and
- a difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

2.3.13 The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. As set out in the standard, where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

[2] A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

2.3.14 The significance of the effect of the noise in should be determined on the basis of the initial estimate of impact significance with reference to the context of the sound.

2.3.15 Whilst there is a relationship between the significance of impacts determined by the method contained within the standard and the significance of effects described in the PPG-N (Ministry of Housing, Communities and Local Government, 2019b), there is not a direct link. It is not appropriate to ascribe numerical rating / background level differences to LOAEL and SOAEL because this fails to consider the context of the sound, which is a key requirement of the Standard.

2.3.16 The significance of the effect of the noise in question (i.e. whether above or below SOAEL and LOAEL) should be determined on the basis of the initial estimate of impact significance from the standard assessment with reference to the examples of outcomes described within the PPG-N, and after having considered the context of the sound. It is necessary to consider all pertinent factors, including:

- the absolute level of sound;
- the character and level of the residual sound compared to the character and level of the specific sound; and
- the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:
  - facade insulation treatment;
  - ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
  - acoustic screening.

2.4 Guidance

Guidelines for Community Noise

2.4.1 The World Health Organisation (WHO) published guidance on the desirable levels of environmental noise in 2000. In this document, Guidelines for Community Noise (GCN) (WHO, 2000), the authors consider that sleep disturbance criteria should be taken as an internal noise level of 30 dB L_{Aeq} or an external level of 45 dB $L_{Aeq,8hr}$, measured at 1 m from the façade (equivalent to a free-field level of 42 dB L_{Aeq}). It is also suggested that internal instantaneous levels of 45 dB L_{Amax} and external instantaneous levels of 60 dB L_{Amax}, should not be exceeded.

2.4.2 The criteria for speech intelligibility and moderate annoyance during the daytime and evening should be taken as an internal noise level of 35 dB L_{Aeq}. For external daytime levels, it is considered that:

"To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB L_{Aeq} on balconies, terraces, and outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB L_{Aeq}. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development."

2.4.3 The major concern in Europe is with respect to noise from transportation systems, and most of the studies on which these guidelines are based relate to this type of noise source. There can be no certainty that the same effects will be observed from noise of an industrial nature, but in the absence of any more detailed information some weight should be attached to the WHO guidance when assessing industrial noise as well.

2.4.4 The WHO published more recent guidance in the Environmental Noise Guidelines for the European Region in 2018 (WHO, 2018). It provides guidance, primarily for policymakers, on protecting human health from harmful exposure to environmental noise and sets health-based recommendations on the average environmental noise exposure of five relevant sources of environmental noise. Industrial noise was not one of the categories included and, therefore, this guidance is not considered to be directly applicable to this assessment notwithstanding the fact that it is primarily for policymakers and does not apply to general assessments.

Night Noise Guidelines for Europe

2.4.5 In 2009 a report was published presenting the conclusions of a World Health Organisation (WHO) working group responsible for preparing guidelines for exposure to noise during sleep entitled "Night Noise Guidelines for Europe" (NNG) (European Centre for Environment and Health, 2009). The document can be seen as an extension to the original WHO GCN. Various effects are described including biological effects, sleep quality, and well-being. The document gives threshold levels for observed effects expressed as L_{max}, inside and L_{night}, outside. The L_{night} is a year-long average night-time noise level, not taking into account the façade effect of a building. In an exposed population a noise exposure of 40 dB $L_{night, outside}$ is stated as equivalent to the "lowest observed adverse effect level" for night noise. Above this level adverse health effects observed are self-reported sleep disturbance, environmental insomnia and increased use of somnifacient drugs and sedatives. Above 55 dB $L_{night, outside}$, cardiovascular effects become the major public health concern. Threshold levels for waking in the night, and/or too early in the morning are given as 42 dB $L_{Amax, inside}$. Lower thresholds are given that may change sleep structure.

Table 2.2: Summary of Observed Health Effects in the Population (WHO NNG)

Noise Level, $L_{night,outside}$	Observed Effect
up to 30 dBA	No substantial biological effects are observed.
30 to 40 dBA	A number of effects are observed to increase: body movements, awakening, self-reported sleep disturbance, arousals. The intensity of the effect depends on the nature of the source and on the number of events, even in the worst cases the effects seem modest.
40 to 55 dBA	Adverse health effects are observed among the exposed population. Many people have to adapt their lives to cope with the noise at night. Vulnerable groups are now severely affected.
Above 55 dBA	The situation is considered increasingly dangerous for public health. Adverse health effects occur frequently, a high percentage of the population is highly annoyed and there is limited evidence that the cardiovascular system is coming under stress.

2.4.6 It is relevant to note that, taking into account the typical night to night variation in noise levels that will often occur due to meteorological effects and the effects of a façade, the night noise guidelines are similar to those previously given in the WHO GCN (an external façade noise level of 45 dB L_{Aeq}), although defined in a different way.

2.4.7 The WHO guidelines have not been formally adopted into UK legislation or guidance, hence it remains a source of information reflecting a high level of health care with respect to noise, rather than a standard to be rigidly applied. The guideline values give the lowest threshold noise levels below which the occurrence rates of particular effects can be assumed to be negligible. Exceedances of the WHO guideline values do not necessarily imply significant noise impact and indeed, it may be that significant impacts do not occur until much higher degrees of noise exposure are reached.

3 ASSESSMENT METHODOLOGY

3.1 Construction Phase

3.1.1 A qualitative assessment of noise and vibration effects has been undertaken based on the typical demolition and construction equipment and plant that would be required for this type of site. Impacts have been evaluated on the basis of professional judgement..

3.2 Operational Phase

3.2.1 Sound immissions[3] from the development have been predicted at the nearest NSRs identified in Section 4 'Baseline'. Predictions have been carried out using SoundPLAN Version 8.1 sound modelling software utilising the propagation method contained in ISO 9613-2:1996 'Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation'. The model predicts sound levels under light down-wind conditions based on hemispherical sound propagation with corrections for atmospheric absorption, ground effects, screening and directivity.

3.2.2 The following plant has been assumed and will be included in the proposed development:

- 43 Air Handling Units (AHUs), including 42 located inside the building and one externally on the roof above the office area.
- 42 Exhaust Units (Exhausts) on the roof of the building.
- 12 Direct Exchange Units (DX Units) located on the roof of the building.
- 11 Generators located adjacent to the southern façade of the building, comprising 10 emergency back-up generators for the data centre and 1 emergency back-up generator for the office.

3.2.3 Acoustic data have been obtained from information provided by the Applicant and RPS' experience of other similar developments.

3.2.4 The AHUs within the buildings are in two banks on each of the long sides of the buildings. The main propagation is through the louvres within the walls on each of the long sides of the building. It has been assumed that there is a loss in the sound power level of the AHUs of 3 dB for transfer to the outside of the building. This is a relatively conservative assumption.

3.2.5 The roof mounted sound sources have been modelled as area sources, with a sound power per source calculated based on the number of units.

3.2.6 Sound power data for the generators has been provided by the potential suppliers who are tendering for the project. The final selection of plant is subject to tender, but it will be ensured that the final selection of plant would not be environmentally worse than the current selection in terms of noise emissions. The generators would be located in enhanced acoustic enclosures (specifically engineered for greater sound attenuation). The generators have been modelled as industrial buildings with the sound power for each section of the enclosure included in the model. The stack has been modelled as a point source at the exhaust outlet.

3.2.7 Sound power levels of individual units and modelled sound power of sources are provided in Annex B.

[3] the act of immitting, or of sending or thrusting in; injection; -- the correlative of emission

3.2.8 The generators would only operate during an emergency situation, i.e. in the event of a major power outage or grid failure. However, the generators would be tested periodically at the following frequency:

- each generator tested separately at 25% load for a maximum of 0.5 hour (it will usually be a less than half of this) every two weeks per year (i.e. a total of 13 hours per generator per year - all during the daytime period);
- depending on maintenance-needs, there will also be approximately 1 hour of testing of generators (at approximately 25% load) per quarter after preventative maintenance and replacement of some critical components (all during the daytime period); and
- each generator tested separately at 100% load for 1.5 hours twice a year all during the daytime period (i.e. three hours per generator).

3.2.9 Testing would be carried out during normal daytime working hours (i.e. Monday to Friday between 07:00 and 19:00 hrs) and excluding Bank Holidays. The Applicant is willing to accept a planning condition to limit generator testing to these times.

3.2.10 To account for the different operating conditions, the following scenarios have been considered:

- Normal worst-case operating conditions: All AHUs, Exhausts and DX Units operating. Note that the sound levels from the cooling equipment will be lower for the majority of the year. The noise levels modelled are for maximum operation during the hottest times of the year when the cooling need is greatest (when the equipment is operating at greatest power).
- Generator testing: one Generator (worst-case for receptor), all AHUs, Exhausts and DX Units operating.
- Emergency operation: all emergency generators, AHUs, Exhausts and DX Units operating.

3.2.11 The following assumptions have been incorporated into the noise model:

- the topography of the site and the surrounding area has been obtained from site surveyed topographical data and Ordnance Survey (OS) open data (Terrain 50);
- the effect of screening from solid structures (buildings) has been incorporated into the modelling process by importing OS Open Data 'Settlement Area' shape file data into the model; and
- the ground type in the model has been set to soft ground G=1 as the area is mainly agricultural and woodland.

3.2.12 Noise effects due to the operation of the proposed development have been assessed according to the guidance in BS 4142:2014+A1:2019.

3.2.13 Background and residual sound levels have been determined through baseline sound monitoring at locations representative of the nearest NSRs to the site, as indicated in Section 4 'Baseline'.

3.2.14 The specific sound levels have been determined separately in terms of the $L_{Aeq, T}$ index for operations during the daytime (07:00 hrs to 23:00 hrs) and the night-time (23:00 hrs to 07:00 hrs) periods.

3.2.15 At each NSR, the rating level has been determined from the predicted specific sound level. Where RPS has considered it to be appropriate, a rating penalty has been applied for tonality, impulsivity and/or intermittent specific sounds as described in the commentary to paragraph 9.2 of BS 4142:2014+A1:2019. This has been applied with consideration for the main sound sources from the development that contribute to the level and character of the specific sound at each NSR location.

3.2.16 As per the requirements of the Standard, an initial estimate of the impact of the specific sound has been obtained by subtracting the measured background sound level from the rating level of the specific sound. Following the initial evaluation of impact, the context of the sound has also been

considered, which is a key requirement of the Standard. In evaluation of the context, the following factors have been considered:

- the absolute level of the sound;
- the character and level of the residual sound compared to the character and level of the specific sound; and
- the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

3.2.17 The evaluation of the magnitude of noise impacts at receptors has been amended following consideration of the above contextual factors. The absolute level of the sound has been compared to guideline levels provided by the WHO for annoyance during the daytime and sleep disturbance during night-time.

3.2.18 The significance of the effect of the noise from the development (i.e. whether above or below SOAEL and LOAEL) has been determined from the BS 4142:2014+A1:2019 assessment with consideration of the context and with reference to the examples of outcomes described within the PPG-N.

4 BASELINE

4.1 Application Site Location and Noise Sensitive Receptors

4.1.1 The Application Site is in a rural location on the Burderop Estate in Wroughton to the south east of Swindon, Wiltshire. The Application Site is located adjacent to the east of the B4005 Brimble Hill and directly to the north of Burderop Park House and grounds. There is an area of woodland adjacent to the north of the site. The other neighbouring uses are agricultural. There are a few individual houses and small clusters of houses in the vicinity. There is also planning permission for a residential development located directly to the south occupying part of Burderop Park. Locations of the NSRs are identified on Figure 1 at the end of this report and listed below:

- Lodge Farm, approximately 240 m to the east of the Application Site;
- Burderop Barns, approximately 280 m to the south of the Application Site;
- Burderop Farm House, approximately 450 m to the south east of the Application Site; and
- consented residential development on Land at Burderop Park; located approximately 10 m to the south of the Application Site.

4.2 Baseline Methodology

4.2.1 Representative baseline sound levels have been determined through a combination of long-term monitoring on the Application Site and short-term monitoring at locations close to the nearest residential properties. The baseline sound monitoring locations have been provided on a plan in Figure 1.

4.2.2 One long term monitor (LT1) was installed on the southern boundary of the Application Site at a location a similar distance from the B4005 Brimble Hill to the consented residential development on Land at Burderop Park. Measurements were recorded between 14:30 hrs on 14 October 2020 and 12:00 hrs on 21 October 2020.

4.2.3 The main sound source at LT1 was road traffic on the B4005 Brimble Hill. There was also some sound from current plant on the Application Site and natural sound such as wind in trees and birdsong.

4.2.4 A second long term monitor (LT2) was installed on the eastern boundary of the Application Site, at the closest part of the site to Lodge Farm. Measurements were recorded between 15:00 hrs on 14 October 2020 and 12:15 hrs on 21 October 2020.

4.2.5 The main sound source at LT2 was road traffic on the surrounding road network. This was mainly a distant broadband hum, but occasionally a vehicle on the Application Site or the local access road to Lodge Farm was audible. There was also sound from natural sources such as wind in the trees and birdsong.

4.2.6 Sound level measurements were carried out using a ‘Class 1’ Rion NL-52 sound level meter (SLM) in accordance with BS 7445-2:1991(BS, 1991), with the microphone mounted on a pole at around 1.5 m above local ground level.

4.2.7 Data were logged of the broadband, A weighted sound pressure level in 100 ms samples. The sound level meter was calibrated before use and the calibration checked after use and it was observed that no significant drift had occurred during the survey period.

4.2.8 Weather data were monitored during the survey using a mast mounted meteorological kit to monitor wind speeds and a rain gauge to monitor rainfall located with the equipment at LT1. Weather conditions were mainly dry with wind speeds below 5 m/s. There were a few periods of rainfall which

were removed from the data set. Winds were variable for the first part of the survey period up to late evening on 17 November 2020 and then mainly northerly until around midday on 19 October 2020, following which the wind direction was mainly south westerly. It is noted that noise levels were higher during the periods of south westerly wind and lower during the periods of northerly wind. However, the northerly wind also correlated to the weekend and a period of low wind speeds, so it may not have been specifically related to the wind direction.

4.2.9 Short-term baseline sound monitoring was carried out at two locations (ST1 and ST2). For both surveys, 15-minute data samples were recorded over four periods during the daytime and evening and two periods during the night-time on 14 and 15 October 2020.

4.2.10 ST1 was located to the north of Burderop Barns on the pavement adjacent to the B4005 at approximately 20 m from the junction. The microphone was mounted on a tripod at a location 1 m from the edge of the carriageway and 1.5 m above local ground level. The main sound source during the survey was road traffic on the B4005. This was dominant when present. When not present, sound from other noise sources including more distant road traffic, and natural sounds such as birdsong and wind in the trees were present. During the late evening and night-time, traffic on the M4 was audible. There was also sound from aircraft during some of the measurements, and some noise from building works during the morning of 15 October.

4.2.11 ST2 was located on the B4005 at the entrance to Burderop Farm. The microphone was mounted on a tripod at a location 1 m from the edge of the carriageway and 1.5 m above local ground level. The main sound source during the survey was road traffic on the B4005. This was dominant when present. When not present, sound from other noise sources including more distant road traffic, and natural sounds such as birdsong and wind in trees were present. During the late evening and night-time traffic on the M4 was audible. There was also sound from farm machinery and aircraft during some of the daytime measurements.

4.2.12 The Application Site is currently occupied by data centre buildings which include emergency generators. Up until July 2020, the emergency generators were tested on a monthly basis and would have been presented a source of sound in the local area. However, noise emission data from the generator testing is not available and has not been used in the assessment.

4.3 Baseline Conditions

Results and Analysis

4.3.1 An analysis has been carried out of the measured baseline sound levels at the long-term sound monitoring locations. The data has been extracted and post-processed in 15-minute periods for the daytime (07:00 to 23:00 hrs) and night-time (23:00 to 07:00 hrs) periods. These analyses are provided in Table 4.1 for LT1 and Table 4.2 for LT2, and in the box and whisker plots in Charts 4.1 and 4.2. Data are rounded to the nearest whole number. Further survey details and graphical plots of the survey data are provided in Appendix A.

Table 4.1: 15-minute Baseline Sound Level Data (whole period) at LT1

Value	Daytime (07:00 to 23:00 hours)		Night-time (23:00 to 07:00 hours)	
	Residual Sound Level $L_{Aeq, T}$ dB	Background Sound Level $L_{A90, T}$ dB	Residual Sound Level $L_{Aeq, T}$ dB	Background Sound Level $L_{A90, T}$ dB
Range	41 - 58	37 - 49	36 - 54	34 - 47
Average (arithmetic mean)	47	43	42	40
St dev	3	2	3	2

Value	Daytime (07:00 to 23:00 hours)		Night-time (23:00 to 07:00 hours)	
	Residual Sound Level $L_{Aeq, T}$ dB	Background Sound Level $L_{A90, T}$ dB	Residual Sound Level $L_{Aeq, T}$ dB	Background Sound Level $L_{A90, T}$ dB
25th percentile	46	41	41	39
50th percentile	48	43	42	40
75th percentile	49	45	43	41
Median	48	43	42	40

Table 4.2: 15-minute Baseline Sound Level Data (whole period) at LT2

Value	Daytime (07:00 to 23:00 hours)		Night-time (23:00 to 07:00 hours)	
	Residual Sound Level $L_{Aeq, T}$ dB	Background Sound Level $L_{A90, T}$ dB	Residual Sound Level $L_{Aeq, T}$ dB	Background Sound Level $L_{A90, T}$ dB
Range	31 - 68	26 - 51	30 - 59	25 - 51
Average (arithmetic mean)	47	43	40	37
St dev	5	5	6	6
25th percentile	45	41	37	33
50th percentile	47	44	40	37
75th percentile	50	46	43	41
Median	47	44	40	37

Chart 4.1: Box and Whisker Plots of Sound Monitoring Data at LT1

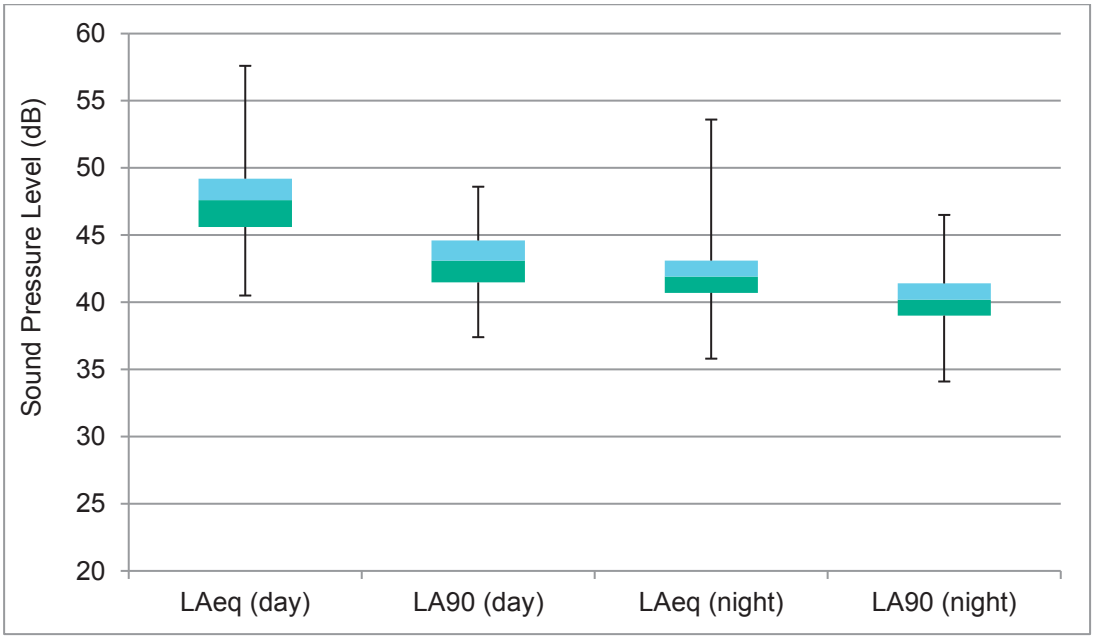
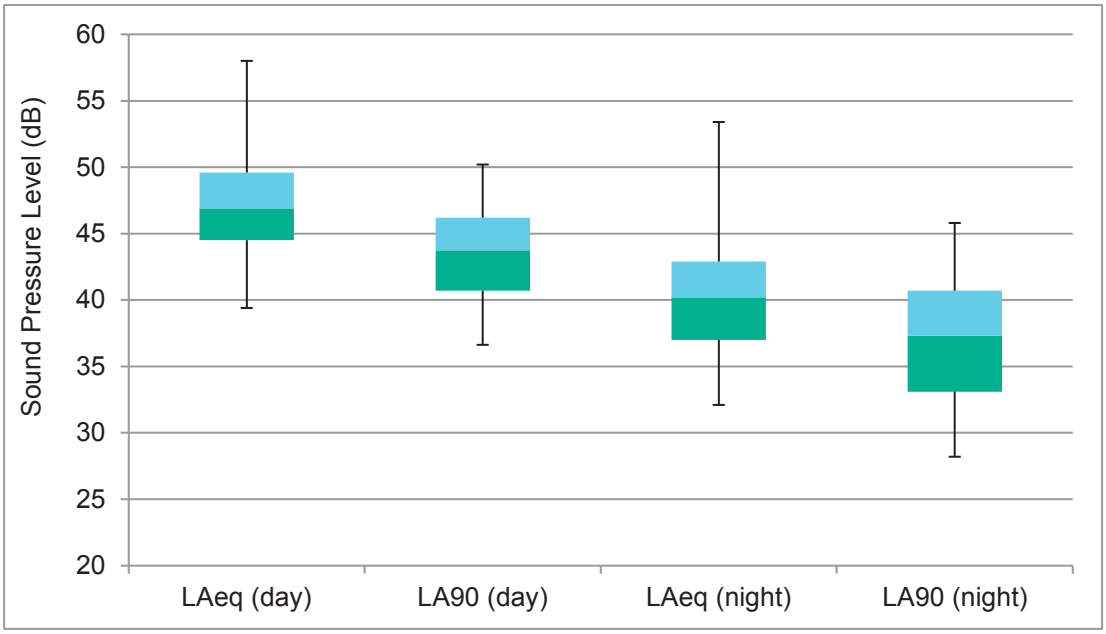


Chart 4.2: Box and Whisker Plots of Sound Monitoring Data at LT2



4.3.2 BS 4142:2014+A1:2019 requires that the background sound levels adopted for the assessment are representative of the period being assessed. The Standard recommends that the background sound level should be derived from continuous measurements of normally not less than 15-minute intervals, which can be contiguous or disaggregated.

4.3.3 However, the Standard states that there is no 'single' background sound level that can be derived from such measurements. It is particularly difficult to determine what is 'representative' of the night-time period because it can be subject to a wide variation in background sound level between the beginning and end of the night period, and the quieter middle part of the night period. The accompanying note states that '*a representative level should account for the range of background sounds levels and should not automatically be assumed to be either the minimum or modal value*'.

4.3.4 In this instance, the 25th percentile from the monitoring has been used to characterise the baseline sound environment. This is not the lowest sound level encountered but is lower than that obtained using the average. It therefore represents somewhere in the range of lower sound levels that are likely to be encountered and provides a conservative assessment. It has been considered appropriate to use this for this case, to account for the uncertainty of using a satellite baseline sound monitoring location to represent the nearest NSRs.

4.3.5 Similarly, representative baseline residual levels have been based on the 25th percentile levels.

4.3.6 The results of the short-term sound monitoring surveys are provided in Annex A.

Representative Baseline Sound Levels at Receptors

4.3.7 The sound levels at individual receptors have been based on professional judgement, based on a review of the sound levels at the closest long term and the closest short-term sound monitoring location, where applicable.

4.3.8 Sound levels measured at LT2 have been considered representative for Lodge Farm.

4.3.9 ST1 has been considered the most representative location for Burderop Barns. The measured data at ST1 have been correlated to the data measured at LT1 in the same periods and an appropriate reduction has been applied to derive the ambient and background sound levels.

4.3.10 Although ST2 was at the access road to Burderop Farm, the sound levels measured at this location were significantly elevated due to noise from road traffic. Therefore, the data measured at LT2 have been taken as representative of noise levels at Burderop Farm. This is a reasonably conservative assumption for the assessment.

4.3.11 Sound levels measured at LT1 have been considered representative for the consented residential development on Land at Burderop Park.

4.3.12 A summary of the representative baseline sound levels at each of the sensitive receptor groups identified is provided in Table 4.3 below.

Table 4.3: Representative Baseline Sound Levels for Assessment

NSRs	Representative Baseline Sound Levels			
	Daytime (07:00 to 23:00 hours)		Night-time (23:00 to 07:00 hours)	
	Background Sound Level, LA90,T dB	Residual Sound Level, LAeq,T dB	Background Sound Level, LA90,T dB	Residual Sound Level, LAeq,T dB
Lodge Farm	41	45	33	37
Burderop Barns	46	62	37	49
Burderop Farm	41	45	33	37
Consented Residential at Land at Burderop Park	41	46	39	41

5 MITIGATION

5.1 Construction Phase

5.1.1 Construction works would follow Best Practicable Means (BPM) outlined in Section 72 of the Control of Pollution Act 1974 (as amended) to minimise noise effects. A Code of Construction Practice CoCP has been prepared, which provides strategies and control measures designed to mitigate the potential environmental impacts and limit the disturbance from the construction activities as far as reasonably practicable (Volume 3, Appendix 2.4). The following mitigation measures for noise and vibration are included in the CoCP, based upon the guidance contained in BS 5228:2009+A1:2014:

- Communication: Occupiers of residential and business properties that are likely to be affected by the works will be notified in advance of the works. Information regarding the nature and duration of the works, and named contact details for key members of staff will be displayed on a noticeboard near to the Site.
- Standard Construction Hours: Normal construction working hours would be. 07:00 to 19:00 hours Monday to Friday, 07:00 to 14:30 hours on Saturday and at no time on Sundays or on public or bank holidays. In the event that external works are required outside of these hours in exceptional circumstances, this would be agreed with SBC prior to commencement of the activity. In such instances, the contractor would apply to SBC for written consent prior to work commencing by submitting either a Section 61 consent application or an agreed method statement in line with the Control of Pollutions Act.
- Access Routes: A Construction Traffic Management Plan is included in the application (document reference 20305S-RPS-XX-XX-RP-P-9731) which sets out the access routes for construction traffic.
- Equipment: Quieter alternative methods, plant and equipment would be used, where reasonably practicable.
- Worksite: Plant, equipment, site offices, storage areas and worksites would be positioned away from existing NSRs, where reasonably practicable.
- Barriers: Site hoardings and portable acoustic enclosures/screens will also be used, as required.
- Maintenance: All vehicles, plant and equipment would be maintained and operated in an appropriate manner, to ensure that extraneous noise from mechanical vibration, creaking and squeaking is kept to a minimum.

5.1.2 The assessment of the construction noise effects takes into consideration the measures proposed above. These include the application of Best Practicable Means to reduce noise emissions.

5.1.3 Noise complaints will be investigated, and, if deemed-necessary, actions will be implemented to ensure repetition of the issues are avoided. In the event of complaints about noise, a noise monitoring programme will be undertaken (if required and justified) by suitably qualified specialists. Logs of all noise monitoring will be kept within the Application Site files and will be made readily available for inspection. The following will be noted at each identified sensitive receptor when noise monitoring is being undertaken:

- time;
- weather conditions and wind direction;
- location of monitoring;
- background noise level; and

- dB L_{Aeq} reading over the relevant time period.

5.2 Operational Phase

Generator Design, Operation and Planning Considerations

5.2.1 The main source of noise at the data centre would be the emergency generators. As discussed in Section 3 'Assessment Methodology', the generators will be within acoustic enclosures. The enclosures have been designed to reduce the noise to the lowest practicable levels. Measures include an enhanced cladding specification above what is normally provided to the roof or the enclosures, and a silencer fitted to the stack of each generator.

5.2.2 It is noted that, without an enclosure, the typical sound level from a generator is 113 dB L_{Aeq} at 1 m. RPS ran an initial model with a generator in an enclosure, which reduced this level to 85 dB L_{Aeq} at 1 m. However, as the predicted noise levels from the generators were high, the specification of the enclosures was upgraded, using an enhanced and bespoke design, to reduce sound pressure levels to between 73 and 75 dB L_{Aeq} at 1 m (giving an overall sound power level of 100 dB L_{WA} based on dimensions of a typical unit in an enclosure). In addition, the exhaust stacks have been fitted with silencers reducing the emission to 75 dB L_{Aeq} at 1 m. Therefore, considerable acoustic mitigation measures have been incorporated into the design of the generators and reducing the acoustic emissions by over 33%. Note this has required the generator enclosures to be larger to accommodate the additional attenuation material but this has avoided the need to change the scale and massing of the main building.

Grid Reliability and In-built Redundancy

5.2.3 By way of context, in the event of a loss of power supply, i.e. temporary grid blackout, the diesel powered emergency (back-up) generators will be utilised to maintain power supply. These generators are designed to automatically activate and provide power to the plant pending restoration of mains power. In addition to applying acoustic measures to the emergency generators, every effort will be made to ensure that the emergency generators would not be required in practice, as described below.

5.2.4 Power for the data centre will be supplied from/by the National Grid which operates its transmission system in accordance with the Security and Quality of Supply Standard which is a requirement of its Transmission Licence. In accordance with this standard, a level of redundancy is also built into the transmission system[4].

5.2.5 The overall reliability of supply for the National Grid Electricity Transmission (NGET) System during 2018 - 2019 was 99.999984%[5]. During 2018-19, there were 347 NGET system events where transmission circuits were disconnected either automatically or by urgent manual switching. Most of these events had no impact on electricity users with only three resulting in loss of supplies to customers.

5.2.6 The power distribution system, on-site, starting from the Medium Voltage intake substation down to the Low Voltage distribution, is designed to be safe, reliable, robust, and efficient and have in-built redundancy. The Operator designs and builds systems with in-built redundancy, based on Medium Voltage power supply connections from an electricity grid, being the primary power source to the

[4] https://www.nationalgridet.com/document/129991/download

[5] https://www.nationalgrideso.com/document/153121/download

site. The dual redundant circuit provides security of supply in the event of a fault or loss of supply from one source, the other circuit is capable of supplying full load to the site. To achieve this redundancy, the operator is proposing for the full supply to be split 50%/50% (dual-feeds) from alternative supply sources, each capable of supplying the 100%, if required. Essentially, the data centre will be supplied from the Grid by a substation with 2 separate cables from 2 separate feeders; therefore, in the event of a loss of supply from a single source, 50% of the development is still on the alternative source, while the remaining 50% is on back-up emergency generators temporarily until the site's own distribution system can be rearranged to resume supply from the available source. This arrangement stays in place until the failed source has restored supply, at which point power returns to the two supply sources. This arrangement is subject to connection agreement and compliance with transmission and distribution regulations (and providers).

5.2.7 The on-site infrastructure is designed on N+1[6] reliability and concurrently maintainable design. This means that there is redundancy built into the system, so that any one component, or any one distribution path can be out of service without affecting operations. Similarly, for the grid connection to the data centre to fail, it would require a number of failures to the upstream distribution network to occur simultaneously. The requirement to run back-up generators is therefore minimised.

5.2.8 The Operator also undertakes a regular and robust infrastructure inspection, preventive maintenance and testing programme and has an integrated Building Management System (BMS) and an Electrical Power Monitoring System (EPMS): these are additional control tools which are used to monitor physical assets and equipment status and performance.

5.2.9 The measures above will minimise the potential for emergency operation of the diesel generators, reducing the overall environmental impact from the installation, in the rare event that they are triggered.

Phasing

5.2.10 The data centre is a phased facility which means that commissioning of the phases will likely to be carried out over time. The operator will not fully deploy all the IT and data storage equipment (or support infrastructure such as the emergency generators) across the entire facility; instead the data servers will be deployed on a phased-basis, determined by customer demand. The time-gaps between the phased deployment can be months. As subsequent data rooms are bought online, the approved backup generator sets in relation to that phase are delivered and installed. As such, when the data centre first becomes operational, the emergency backup generators associated with the latter phases (of which there are 3 after the construction phase of the project) will not be in use in initial operations.

[6] N+1 redundancy is a form of resilience that ensures system availability in the event of component failure. Components (N) have at least one independent backup component (+1). The level of resilience is referred to as active/passive or standby as backup components do not actively participate within the system during normal operation

6 ASSESSMENT OF EFFECTS

6.1 Construction Phase

6.1.1 The construction phase is estimated to take 10 – 12 months to complete and will comprise external construction and civils activities. This is forecast to commence in early Q3 2021 (subject to the progress of the planning process). At the end of that period all external construction activities and civils work will be completed, including:

- hard and soft landscaping;
- security and access areas;
- perimeter fencing;
- internal access roads and car parking areas; and
- drainage and attenuation;
- the shell and core construction of the main data centre building and administration block.

6.1.2 Further information on the construction programme is set out in Chapter 2: Project Description of the Environmental Statement.

6.1.3 In general, noise emissions would be highest at the commencement of works, during site clearance, initial earthworks, and construction of foundations and decrease as the buildings are constructed. Noise emissions during the fit-out as buildings are completed are very low as work is undertaken mostly with hand-tools within the completed superstructures. Consequently, the level of construction noise would vary throughout the construction programme.

6.1.4 For the majority of the construction works, plant on-site would comprise various diesel mechanised plant including excavators (with various tool attachments depending upon the task being undertaken), dump trucks, fork-lift trucks, concrete wagons and pumps, concrete breakers, mobile cranes and delivery lorries. Ancillary plant such as generators and water pumps may also be required) It is anticipated that pad foundations will be used. This method utilises similar plant to other operations including excavators, concrete mixers and pumps, cranes, and poker vibrators. Overall, this method is likely to generate lower levels of noise in comparison to piled methods of foundation construction.

6.1.5 Based on the current construction programme, the consented residential development on Land at Burderop Park will not have been completed prior to construction works taking place on site. Therefore, only existing NSRs have been considered in the assessment of construction noise impacts. Noise from construction activities is likely to be noticeable at some existing NSRs for some periods of the construction programme, including Lodge Farm and Burderop Farm House. It is less likely that construction noise would be noticeable at Burderop Barns as there are high levels of road traffic noise during the daytime at this location, although it may be temporarily noticeable when there are lulls in road traffic.

6.1.6 Construction activities will take place to a predetermined schedule following the BPM measures stated within the above section. There would be very little change to the evening, night-time and weekend baseline noise conditions as most construction activities will be outside of these more sensitive periods. With the BPM measures in place, although noise impacts may occur, these will have been mitigated and minimised to a reasonable level.

6.1.7 Initial estimates of construction vehicle movements have been made using data derived from a similar data centre construction, from which it is expected that an average of approximately 75 HGVs would be on site per day, equating to a total of 150 HGV movements per day. During the peak (during the first three months of construction) this would increase to 110 HGVs on site each (a total

of 220) HGV movements All construction HGVs would route via Junction 15 of the M4 via the A346 and the B4005.

6.2 Operational Phase

6.2.1 Receptors have been included in the model at representative locations for each of the receptors identified in Section 4 of this report. Two receptors have been included for the consented residential development on Land at Burderop Park; Location 1 at the nearest property to the west of the development and Location 2 at the nearest property to the east of the development. Locations of the modelled receptors are provided in Figure 2.

6.2.2 The noise assessment has been carried out for the daytime (07:00 hrs to 23:00 hrs) and night-time (23:00 hrs to 07:00 hrs) periods as identified in BS 4142:2014+A1:2019. Daytime levels have been evaluated at ground floor (living rooms) and night-time levels at first floor (bedrooms).

Normal Worst-case Operating Conditions

6.2.3 Tables 6.1 and 6.2 provide the initial estimate of the noise impact at the nearest NSRs due to the operation of the facility during normal worst-case conditions, with all AHUs, Exhausts and DX Units operating.

6.2.4 In RPS' experience of similar facilities, noise from the development is likely to be of a broadband nature and would not be impulsive or readily distinctive at the nearest NSRs. Therefore, in this instance, as the noise from the proposed development will not have an acoustic character that warrants a correction, the rating level is the same as the specific sound level as referred to in BS 4142:2014+A1:2019.

Table 6.1: Assessment of Impact for Normal Worst-case Operating Conditions – Daytime

Noise Sensitive Receptor	Background Sound Level, dB $L_{A90, T}$	Specific Sound Level, dB $L_{Aeq, T}$	Character Correction	Rating Level, dB $L_{Ar, Tr}$	Rating Level minus Background SoundLevel, dB
Burderop Barns	46	22	0	22	-24
Burderop Farm	41	24	0	24	-17
Land at Burderop Park 1	41	26	0	26	-15
Land at Burderop Park 2	41	30	0	30	-11
Lodge Farm	41	28	0	28	-13

Table 6.2: Assessment of Normal Worst-case Operating Conditions – Night-time

Noise Sensitive Receptor	Background Sound Level, dB $L_{A90, T}$ dB	Specific Sound Level, dB $L_{Aeq, T}$	Character Correction	Rating Level, dB $L_{Ar, Tr}$	Rating Level minus Background Sound Level dB
Burderop Barns	37	25	0	25	-12
Burderop Farm	33	26	0	26	-7

Noise Sensitive Receptor	Background Sound Level, dB $L_{A90, T}$ dB	Specific Sound Level, dB $L_{Aeq, T}$	Character Correction	Rating Level, dB $L_{Ar, Tr}$	Rating Level minus Background Sound Level dB
Land at Burderop Park 1	39	29	0	29	-10
Land at Burderop Park 2	39	30	0	30	-9
Lodge Farm	33	30	0	30	-3

6.2.5 BS 4142:2014+A1:2019 states the following with regards to the difference between the rating and background sound level:

- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

6.2.6 From Tables 6.1 and 6.2, the rating levels are below the background sound levels during both the daytime and the night-time. On this basis, it is likely that the noise impact would be low or even negligible, depending on the context.

6.2.7 Part of the context is to consider the level of the specific sound ($L_{Aeq, T}$ from the development), with respect to the residual sound levels ($L_{Aeq, T}$ without the development), and whether the development would cause any increases in the overall ambient sound level. Tables 6.3 and 6.4 provide an evaluation of the increase in ambient sound levels by combining the residual sound levels and the specific sound level for the normal worst-case operating conditions during the daytime and night-time respectively.

Table 6.3: Change in Ambient Sound Levels for Normal Worst-case Operating Conditions – Daytime

Noise Sensitive Receptor	Residual Sound Level, dB $L_{Aeq, T}$	Specific Sound Level, dB $L_{Aeq, T}$	Total Ambient Sound Level (Specific Plus Residual), dB $L_{Aeq, T}$	Change in Ambient Sound Level dB
Burderop Barns	62	22	62	0
Burderop Farm	45	24	45	0
Land at Burderop Park 1	46	26	46	0
Land at Burderop Park 2	46	30	46	0
Lodge Farm	45	28	45	0

Table 6.4: Change in Ambient Sound Levels for Normal Worst-case Operating Conditions – Night-time

Noise Sensitive Receptor	Residual Sound Level, dB $L_{Aeq, T}$	Specific Sound Level, dB $L_{Aeq, T}$	Total Ambient Sound Level (Specific Plus Residual), dB $L_{Aeq, T}$	Change in Ambient Sound Level dB
Burderop Barns	49	25	49	0
Burderop Farm	37	26	37	0
Land at Burderop Park 1	41	29	41	0
Land at Burderop Park 2	41	30	41	0
Lodge Farm	37	30	38	+1

6.2.8 The specific sound levels range from 22 to 28 dB $L_{Aeq, T}$ during the daytime and 25 to 30 dB $L_{Aeq, T}$ during the night-time. These levels are well below the criteria for speech intelligibility and moderate annoyance during the daytime and sleep disturbance during the night-time provided in the WHO Guidelines for Community Noise. In the majority of locations, the specific sound levels are sufficiently below residual sound levels that they would not cause an increase to the overall ambient sound levels. At Lodge Farm, there is a predicted increase in the ambient sound level of 1 dB during the night-time period. Based on an open window providing a sound reduction of 15 dB, internal ambient sound levels would be below the threshold of 30 dB $L_{Aeq, T}$ which is the onset of sleep disturbance. Therefore, this increase is not significant.

6.2.9 Noise immissions from the proposed development are likely to differ from other sources of sound in the area, which are mainly from road traffic and natural sounds, although the area has been historically exposed to similar noise from the previous data centre so this is not outside of the historic noise climate. Additionally, as the predicted noise levels are low, they are unlikely to be noticeable above existing sources of sound in the area.

6.2.10 Therefore, with consideration of the context, the noise impact of the proposed development is considered to be negligible during normal worst-case operating conditions. With respect to national planning policy, this is at the NOEL.

Generator Testing

6.2.11 Table 6.5 provides the initial estimate of the noise impact at the nearest NSRs due to the operation of the facility during generator testing, which would occur during the daytime only.

6.2.12 In RPS' experience of similar developments, noise from the facility is likely to be of a broadband nature and would not be impulsive or readily distinctive at the nearest NSRs. Therefore, in this instance, it is not considered appropriate to apply any corrections for the acoustic character of the plant to determine the rating level as referred to in BS 4142:2014+A1:2019.

Table 6.5: Assessment of Generator Testing – Daytime

Noise Sensitive Receptor	Background Sound Level, dB $L_{A90,T}$	Specific Sound Level, dB $L_{Aeq,T}$	Character Correction	Rating Level, dB $L_{Ar,Tr}$	Rating Level minus Background Sound Level dB
Burderop Barns	46	29	0	29	-17

Noise Sensitive Receptor	Background Sound Level, dB $L_{A90,T}$	Specific Sound Level, dB $L_{Aeq,T}$	Character Correction	Rating Level, dB $L_{Ar,Tr}$	Rating Level minus Background Sound Level dB
Burderop Farm	41	31	0	31	-10
Land at Burderop Park 1	41	34	0	34	-7
Land at Burderop Park 2	41	35	0	35	-6
Lodge Farm	41	35	0	35	-6

6.2.13 From Table 6.5, during the daytime testing of the generators, the rating levels are well below the background sound levels, with the maximum level for rating minus background being -6 dB at the consented development on Land at Burderop Park. On this basis, it is likely that the noise impact would be low or even negligible, depending on the context.

Part of the context is to consider the level of the specific sound ($L_{Aeq,T}$ from the development), with respect to the residual sound levels ($L_{Aeq,T}$ without the development), and whether the development would cause any increases in the overall ambient sound level. Table 6.6 provides an evaluation of the increase in ambient sound levels by combining the residual sound levels and the specific sound level for the generator testing scenario.

Table 6.6: Change in Ambient Sound Levels for Generator Testing – Daytime

Noise Sensitive Receptor	Residual Sound Level, dB $L_{Aeq,T}$	Specific Sound Level, dB $L_{Aeq,T}$	Total Ambient Sound Level (Specific Plus Residual), dB $L_{Aeq,T}$	Change in Ambient Sound Level, dB
Burderop Barns	62	29	62	0
Burderop Farm	45	31	45	0
Land at Burderop Park 1	46	34	46	0
Land at Burderop Park 2	46	35	46	0
Lodge Farm	45	35	45	0

6.2.14 The specific sound levels range from 29 to 35 dB $L_{Aeq,T}$ during the daytime. These levels are well below the criteria for speech intelligibility and moderate annoyance during the daytime provided in the WHO Guidelines for Community Noise. The specific sound levels are sufficiently below residual sound levels that they would not cause an increase to the overall ambient sound levels.

6.2.15 Noise immissions from the proposed development are likely to differ from other sources of sound in the area, which are mainly from road traffic and natural sounds, although the area has been historically exposed to similar noise from the previous data centre so this is not outside of the historic noise climate. Additionally, as the predicted noise levels are low, they are unlikely to be noticeable above existing sources of sound in the area.

6.2.16 Therefore, with consideration of the context, the noise impact of the proposed development is considered to be negligible during generator testing during the daytime. With respect to national planning policy, this is at the NOEL.

Grid Power Failure (Emergency Scenario)

6.2.17 Tables 6.7 and 6.8 provide the initial estimate of the noise impact at the nearest NSRs due to the operation of the facility during a grid power failure when all, or most, generators would be required to be operational at the same time.

6.2.18 As sound levels from the generators at the NSRs would be sufficiently high during the grid power failure, there is potential for the sound to contain tones that would be perceptible at the NSRs. Therefore, a rating penalty of either +2 dB for a tone that is just perceptible or +4 dB for a tone that is clearly perceptible has been added to the specific sound level to determine the rating level to account for tonality as required by BS 4142:2014+A1:2019. Professional judgement has been applied to determine which locations and periods it is appropriate to provide a rating penalty for.

Table 6.7: Assessment of Power Failure – Daytime

Noise Sensitive Receptor	Background Sound Level, dB $L_{A90,T}$	Specific Sound Level, dB $L_{Aeq,T}$	Character Correction	Rating Level, dB $L_{Ar,Tr}$	Rating Level minus Background Sound Level dB
Burderop Barns	46	37	0	37	-9
Burderop Farm	41	39	0	39	-2
Land at Burderop Park 1	41	42	0	42	1
Land at Burderop Park 2	41	43	0	43	2
Lodge Farm	41	42	0	42	1

Table 6.8: Assessment of Power Failure – Night-time

Noise Sensitive Receptor	Background Sound Level, dB $L_{A90,T}$	Specific Sound Level, dB $L_{Aeq,T}$	Character Correction	Rating Level, dB $L_{Ar,Tr}$	Rating Level minus Background Sound Level dB
Burderop Barns	37	39	2	41	4
Burderop Farm	33	41	2	43	10
Land at Burderop Park 1	39	43	2	45	6
Land at Burderop Park 2	39	45	4	49	10
Lodge Farm	33	43	4	47	14

6.2.19 BS 4142:2014+A1:2019 states the following with regards to the difference between the rating and background sound level:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

6.2.20 From Table 6.7, in the event of a power failure, the rating levels would exceed the background sound levels at some locations during the daytime with the highest exceedance being 2 dB at Land at

Burderop Park. From Table 6.8, in the event of a power failure, the rating levels would exceed the background sound levels at all of the NSRs considered during the night-time, with the highest exceedance being 14 dB at Lodge Farm. On this basis, it is likely that a significant adverse impact would occur, depending on the context.

6.2.21 A major power outage is also an exceptional event and, as discussed in Section 5.2 of this report, every effort has been made in the design of the development to prevent this from occurring in practice. Although not explicitly stated in the standard, BS 4142:2014+A1:2019 is generally used to assess regular noise from industrial and commercial plant. Therefore, an important consideration in this context, as well as the other factors described in the Standard, is the infrequency of the noise impact occurring. Part of the context is to consider the level of the specific sound ($L_{Aeq, T}$ from the development), with respect to the residual sound levels ($L_{Aeq, T}$ without the development), and whether the development would cause any increases in the overall ambient sound level. Tables 6.9 and 6.10 provide an evaluation of the increase in ambient sound levels by combining the residual sound levels and the specific sound level for the normal worst-case operating conditions during the daytime and night-time respectively. An evaluation of internal noise levels with the windows open assuming a partially open window providing a sound attenuation of 15 dB has also been provided.

6.2.22 Another consideration is whether the receptor will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as enhanced façade mitigation. Therefore, a scenario with closed windows has also been considered, taking into account the likely façade attenuation for each of the receptors considered in the assessment. Given the source has a reasonably high low frequency content, it is expected that the façade attenuation would be lower than for more common sources such as road traffic noise. Therefore, a fairly conservative assumption of 25 dB has been made regarding the sound attenuation of the façade with windows closed.

Table 6.9: Change in Ambient Sound Levels for Power Failure – Daytime

Noise Sensitive Receptor	Residual Sound Level, dB $L_{Aeq, T}$	Specific Sound Level, dB $L_{Aeq, T}$	Total Ambient Sound Level (Specific Plus Residual), dB $L_{Aeq, T}$	Change in Ambient Sound Level dB	Estimated Internal Sound Level with Windows Open dB	Estimated Internal Sound Level with Windows Closed dB
Burderop Barns	62	37	62	0	47	37
Burderop Farm	45	39	46	1	31	21
Land at Burderop Park 1	46	42	47	1	32	22
Land at Burderop Park 2	46	43	48	2	33	23
Lodge Farm	45	42	47	2	32	22

Table 6.10: Change in Ambient Sound Levels for Power Failure – Night-time

Noise Sensitive Receptor	Residual Sound Level, dB $L_{Aeq, T}$	Specific Sound Level, dB $L_{Aeq, T}$	Total Ambient Sound Level (Specific Plus Residual), dB $L_{Aeq, T}$	Change in Ambient Sound Level dB	Estimated Internal Sound Level with Windows Open dB	Estimated Internal Sound Level with Windows Closed dB
Burderop Barns	49	39	49	0	34	24
Burderop Farm	37	41	42	5	27	17

Noise Sensitive Receptor	Residual Sound Level, dB $L_{Aeq, T}$	Specific Sound Level, dB $L_{Aeq, T}$	Total Ambient Sound Level (Specific Plus Residual), dB $L_{Aeq, T}$	Change in Ambient Sound Level dB	Estimated Internal Sound Level with Windows Open dB	Estimated Internal Sound Level with Windows Closed dB
Land at Burderop Park 1	41	43	45	4	30	20
Land at Burderop Park 2	41	45	46	5	31	21
Lodge Farm	37	43	44	7	29	19

6.2.23 The specific sound levels range from 37 to 43 dB $L_{Aeq, T}$ during the daytime and 39 to 45 dB $L_{Aeq, T}$ during the night-time. These levels are well below the thresholds for annoyance during the daytime and just below the thresholds for sleep disturbance during the night-time. The specific sound levels would increase the ambient sound levels at receptors by up to 2 dB during the daytime and up to 7 dB during the night-time.

6.2.24 The sound would be out of character of other sound sources in the area which are mainly road traffic and natural sounds. It would also be sufficiently high in some locations that there would be the potential for it to be noticeable above existing sources of sound, especially during the night-time.

6.2.25 During the daytime with the windows open, the internal sound level would be below the internal ambient noise level criteria in the WHO GCN for speech intelligibility and moderate annoyance of 35 dB $L_{Aeq,16hr}$, and would be even lower with the windows closed. During the night-time with the windows open, the internal sound level would be above the internal ambient noise level criteria in the WHO GCN for sleep disturbance of 30 dB $L_{Aeq,8hr}$, at Land at Burderop Park where the noise level is increased from baseline. (We note that noise level would be above 30 dB $L_{Aeq,8hr}$ at Burderop Barns. However, this is due to existing sources of noise and the noise level would not be increased by the proposed development). However, with the windows closed, the internal ambient sound level would be below this criterion at all of the NSRs considered in this assessment. Bearing in mind the infrequency of this event, and that the affected receptors would be able to counter the effects of sleep disturbance by closing windows, this is therefore considered to be not significant.

6.2.26 The noise, when present could cause a change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion and having to keep windows closed because of the noise. There is potential for sleep disturbance, but this reduces significantly if the windows are closed. A major power outage is also an infrequent event, and every effort has been made in the design of the development to prevent this from occurring in practice. If a power outage did occur, the effect would be short-term until the cause of the outage was rectified, and full grid supply restored. Therefore, with consideration of the context, although the noise impact from the development during a major power outage, would be above the LOAEL during the daytime, and above the LOAEL, with some locations at the SOAEL during the night-time, due to the infrequency of the of the event the overall impact would not be significant.

6.2.27 The generator noise has been mitigated by choosing low noise generators and positioning the generators in enclosures. The developer is proposing higher-performing acoustic mitigation for the enclosures; with greater noise reduction than standard enclosures used in their other projects in Europe. However, whilst there is potential for a high noise impact to occur in an emergency scenario at night-time, the predicted noise levels from the emergency generators should be considered acceptable due to the unlikelihood of the scenario occurring.

6.3 Cumulative

6.3.1 There are two developments in the vicinity of the site:

- S/17/0128: demolition of existing pavilions; change of use of offices and ancillary buildings to apartments/dwellings; the erection of 52 dwellings; and the construction of new access and associated works. Granted planning permission, subject to conditions, on 18 December 2019
- S/19/1892: erection of six additional dwellings. Granted planning permission, subject to conditions, on 17 July 2020.

6.3.2 In addition to the above, infrastructure upgrades to the Application Site are proposed and summarised in Appendix 4.3.

6.3.3 During construction there is the potential for cumulative noise impacts to occur with the residential development on Land at Burderop Park (S/17/0128 and S/19/1892), however it has been assumed that Best Practicable Means will be implemented as required by SBC. On this basis, the cumulative impacts are unlikely to be significant.

6.3.4 The main potential noise and vibration impacts associated with infrastructure upgrade works would be related to the construction period for such works; no noise impacts are predicted once the upgraded infrastructure is operational. .

6.3.5 Works to install the upgrades would be undertaken by the utility providers and would follow standard construction methodologies. The works would be undertaken during normal working hours and would incorporate Best Practicable Means. The electrical upgrade is only likely to give rise to noise impacts during the construction works; no noise impacts are expected during operation. Receptors close to the future upgrades would only be affected for a short duration when cable construction activities are being carried out in close proximity. From BS 5228-1:2009+A1:2014 construction works are generally only considered to be potentially significant when they take place for one month or more, or for more than 30 days in a six month period. In this case concurrent noise generating works are unlikely to exceed this threshold. Therefore, cumulative impacts would be low, due to the short-term nature of the works and the effect would not be significant.

7 SUMMARY

7.1.1 This report provides a noise impact assessment for a data centre proposed on land at Burderop Park to the south of Swindon, Wiltshire. The site is located within the administrative area of Swindon Borough Council (SBC).

7.1.2 Noise mitigation measures during the construction stage have been provided, and are incorporated in the Code of Construction Practice (CoCP, Volume 3 Appendix 2.1) for the proposed development. With the BPM measures in place, although noise impacts may occur, these will have been mitigated and minimised to a reasonable level.

7.1.3 An assessment of the noise from the facility has been carried out in accordance with BS 4142:2014+A1:2019 which is the nationally recognised standard and was agreed to be the appropriate methodology with SBC. A baseline acoustic survey was undertaken, and an acoustic model was built of the proposed facility for normal worst-case operations; testing of back-up generators and for the rare case of a major grid power failure with all generators running.

7.1.4 During normal operation and generator testing, predicted operational noise levels at NSRs would be below or just exceed the prevailing background sound levels; would be well below the thresholds at which critical health effects would occur according to guidance published by the World Health Organisation; and would only result in a small increase to existing baseline ambient sound levels. Furthermore, noise from the proposed development would be similar in character to other operational facilities in the vicinity. On this basis, the noise impacts for general operation of the proposed development are anticipated to be negligible.

7.1.5 Noise from the generators has been mitigated and reduced to a minimum by locating the generators in enhanced acoustic enclosures. These enclosures are a higher-performance specification than the Applicant typically uses (reducing the sound emissions by over 33%). Notwithstanding this, in the event of a major grid failure, if all emergency generators are required, the noise impact would be considered as significant during the night-time. However, due to the rare likely occurrence of the emergency scenario, National Grid reliability and the in-built redundancy and infrastructure maintenance systems, this is unlikely to occur in practice and/or for any length of time and should therefore be considered acceptable. The Applicant also has a rigorous internal process for equipment inspection and preventative maintenance with the objective of avoiding the use of the emergency generators.

7.1.6 Furthermore, it is noted that the proposed development is replacing two existing data centre buildings that were constructed in the early 1990s and ceased operation last year (2020). These two existing facilities utilized four 1,500 kVA and two 750kVA emergency generators that were tested on a monthly basis between two and four hours. The data centre in the south of the Application Site has three 3,000 kVA and one 1,000 kVA emergency generators that were tested on a similar schedule. In total, the Data Centre campus that is being redeveloped had a total of 10 emergency generator units. The replacement facility will have 11 total emergency generator units. Therefore, the data centre is not providing a new source, but replacing an existing facility.

7.1.7 On the basis of the above, it is considered that the development complies with national planning policy in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE) and Planning Practice Guidance for Noise (PPG-N); and policy ENV7 of the Swindon Borough Local Plan 2026. Therefore, there is no reason with respect to noise why planning permission should not be granted for the proposed development.

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FIGURES

Notes
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Legend

- Site boundary
- Sound Monitoring Location

Rev	Description	By	CB	Date

MAKING COMPLEX EASY

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Client -

Project Proposed Replacement Data Centre, Old Burderop Hospital Site

Title Noise Sensitive Receptors and Baseline Sound Monitoring Locations

Status	Drawn By	PM/Checked By
FINAL	BG	SH
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:4,500	MAR 2021
Figure Number		**Rev**
1		-

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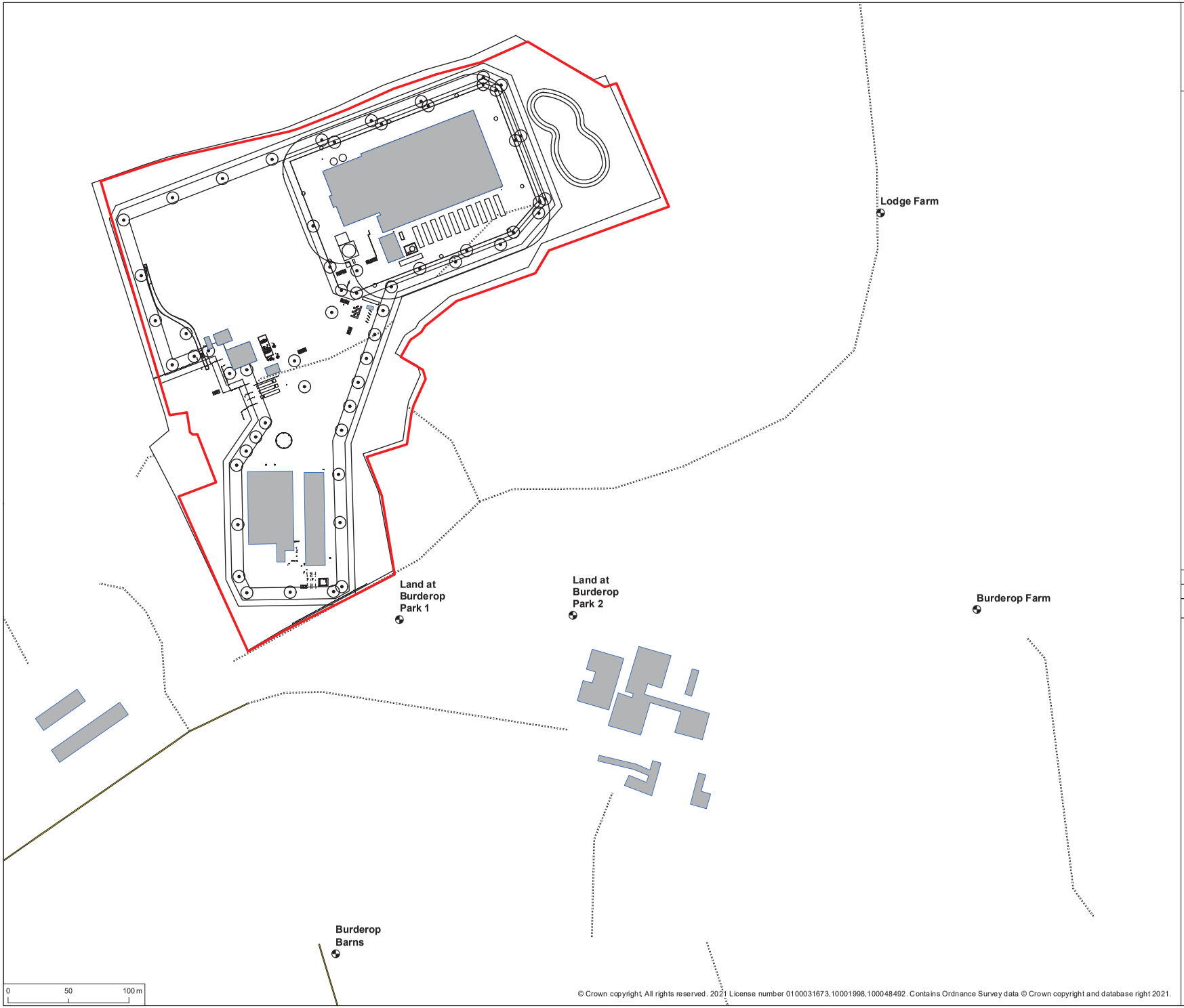

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Legend

- Site boundary
- Main Building
- Receiver

Rev	Description	By	CB	Date

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Client -

Project Proposed Replacement Data Centre, Old Burderop Hospital Site

Title Model Mapping Indicating Locations of Buildings and Modelled Receptors

Status	Drawn By	PM/Checked By
FINAL	BG	SH
Project Number	**Scale @ A3**	**Date Created**
OXF11741	1:3,000	MAR 2021

Figure Number	Rev
2	-

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ANNEXES

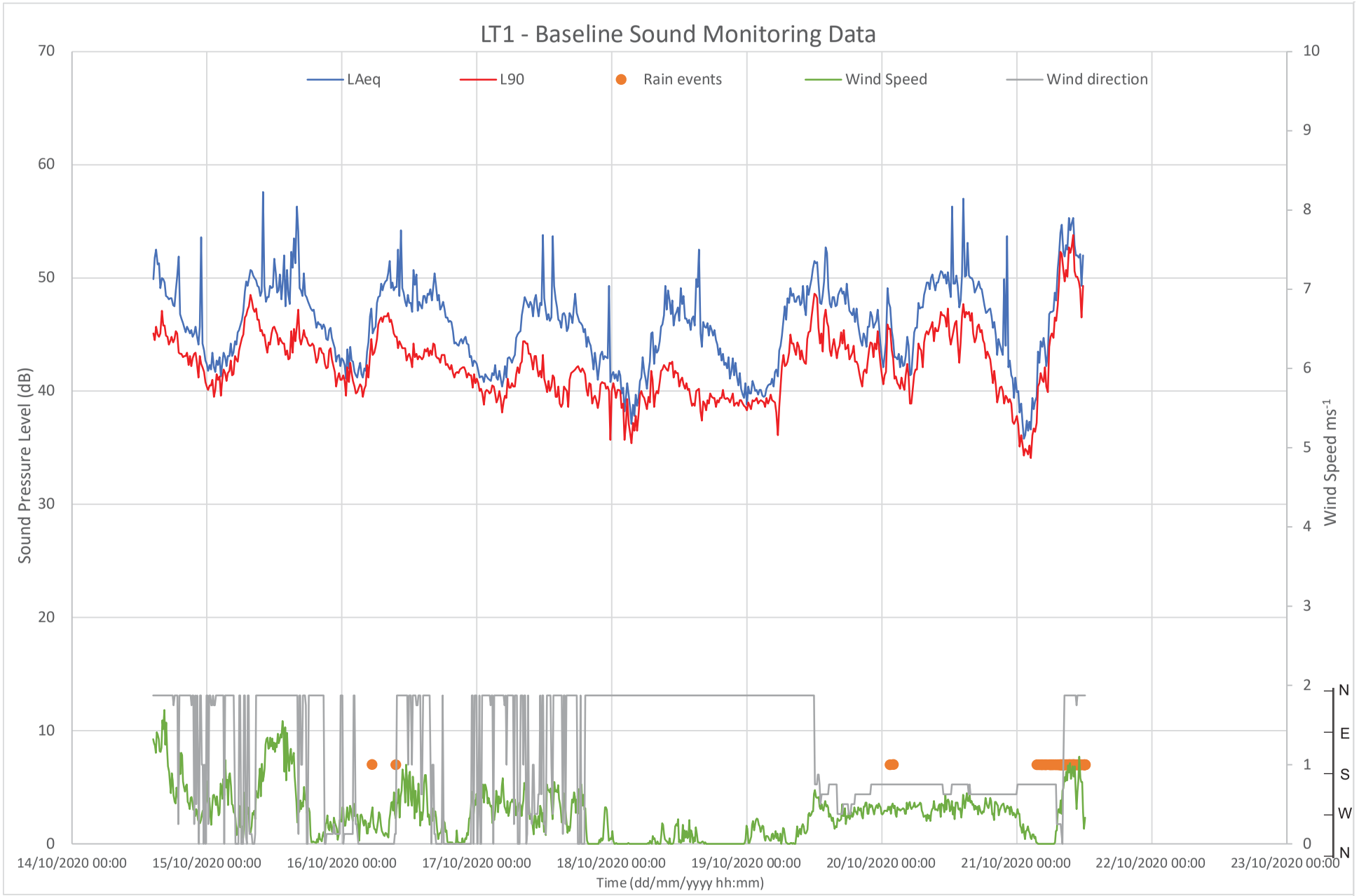
Annex A

Baseline Sound Survey Information and Data

Location			LT1 - On Site			
Sound Measurement System						
RPS ID	Manufacturer / Model		Serial Number		Last Lab Verification	
167	Rion NL-52		tbc		tbc	
Mic Height	Measurement Interval	Dynamic Range (dB)	Time Weighting	Frequency Weighting	Façade / Freefield	Photo?
1.5 m	15 min	20-130	Fast	A	Free field	Yes
			START		**END**	
Personnel			BG		BG	
Date / time			14/10/2020 14:30		21/10/2020 12:00	
Calibrator	RPS ID		162		162	
	Manufacturer / Model		Rion NC-74		Rion NC-74	
	Serial Number		34683836		34683836	
	Date last verification		02/10/2019		02/10/2019	
	Reference level (dB)		94.0		94.0	
	Meter reading (dB)		94.1		93.9	
	Wind speed (m/s) & dir'n Av.		See Met Data	NNW	See Met Data	NNW
	Cloud cover (100%= 8 oktas)		3		8	
	Temperature (degrees Celsius)		14°C		13°C	
	Relative Humidity (%)		67		90	
	Subjective description / additional details		Sunny with some clouds, dry, temperate		Overcast, rainy, temperate	

Location			LT2 - On Site			
Sound Measurement System						
RPS ID	Manufacturer / Model		Serial Number		Last Lab Verification	
147	Rion NL-52		386736		12/11/2012	
Mic Height	Measurement Interval	Dynamic Range (dB)	Time Weighting	Frequency Weighting	Façade / Freefield	Photo?
1.5 m	15 min	20-130	Fast	A	Free field	Yes
			START		**END**	
Personnel			BG		BG	
Date / time			14/10/2020 15:00		21/10/2020 12:15	
Calibrator	RPS ID		162		162	
	Manufacturer / Model		Rion NC-74		Rion NC-74	
	Serial Number		34683836		34683836	
	Date last verification		02/10/2019		02/10/2019	
	Reference level (dB)		94.0		94.0	
	Meter reading (dB)		94.0		93.9	
	Wind speed (m/s) & dir'n Av.		See Met Data	NNW	See Met Data	NNW
	Cloud cover (100%= 8 oktas)		3		8	
	Temperature (degrees Celsius)		14°C		13°C	
	Relative Humidity (%)		67		90	
	Subjective description / additional details		Sunny with some clouds, dry, temperate		Overcast, rainy, temperate	

Location			ST1 and ST2			
Sound Measurement System						
RPS ID	Manufacturer / Model		Serial Number		Last Lab Verification	
147	Rion NL-52		386736		12/11/2012	
Mic Height	Measurement Interval	Dynamic Range (dB)	Time Weighting	Frequency Weighting	Façade / Freefield	Photo?
1.5 m	15 min	20-130	Fast	A	Free field	Yes
			START		**END**	
Personnel			BG		BG	
Date / time			14/10/2020 14:30		15/10/2020 10:30	
Calibrator	RPS ID		162		162	
	Manufacturer / Model		Rion NC-74		Rion NC-74	
	Serial Number		34683836		34683836	
	Date last verification		02/10/2019		02/10/2019	
	Reference level (dB)		94.0		94.0	
	Meter reading (dB)		94.0		94.1	
	Wind speed (m/s) & dir'n Av.		See Met Data	NNW	See Met Data	NNW
	Cloud cover (100%= 8 oktas)		3		1	
	Temperature (degrees Celsius)		14°C		10°C	
	Relative Humidity (%)		67		77	
	Subjective description / additional details		Sunny with some clouds, dry, temperate		Cloudy, slightly colder, dry	
Calibrator	RPS ID		162		162	
	Manufacturer / Model		Rion NC-74		Rion NC-74	
	Serial Number		34683836		34683836	
	Date last verification		02/10/2019		02/10/2019	
	Reference level (dB)		94.0		94.0	
	Meter reading (dB)		94.0		94.1	
	Wind speed (m/s) & dir'n Av.		See Met Data	NNW	See Met Data	NNW
	Cloud cover (100%= 8 oktas)		3		5	
	Temperature (degrees Celsius)		14°C		10°C	
	Relative Humidity (%)		67		84	
	Subjective description / additional details		Sunny with some clouds, dry, temperate		Cloudy, slightly colder, dry	


LT1 - Baseline Sound Monitoring Data
LAeq
L90
Rain events
Wind Speed
Wind direction
Sound Pressure Level (dB)
Wind Speed ms-1
Time (dd/mm/yyyy hh:mm)
14/10/2020 00:00
15/10/2020 00:00
16/10/2020 00:00
17/10/2020 00:00
18/10/2020 00:00
19/10/2020 00:00
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21/10/2020 00:00
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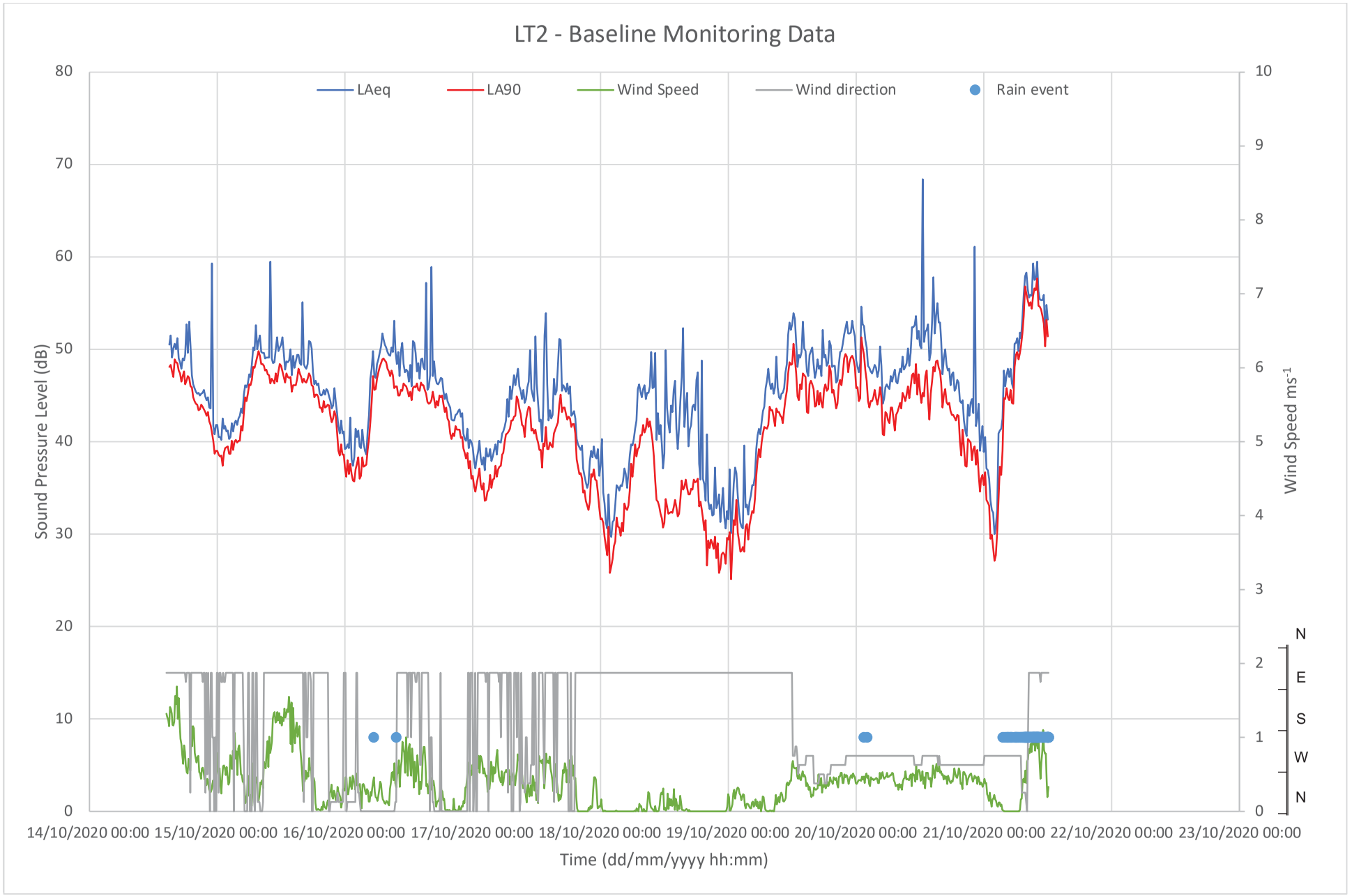
23/10/2020 00:00
N
E
S
W
N


LT2 - Baseline Monitoring Data
LAeq
LA90
Wind Speed
Wind direction
Rain event
Sound Pressure Level (dB)
Wind Speed ms-1
Time (dd/mm/yyyy hh:mm)
14/10/2020 00:00
15/10/2020 00:00
16/10/2020 00:00
17/10/2020 00:00
18/10/2020 00:00
19/10/2020 00:00
20/10/2020 00:00
21/10/2020 00:00
22/10/2020 00:00
23/10/2020 00:00
N
E
S
W
N

Location	Measurement	Time	Period	Sound Survey Metric (dB)	
				Laeq, 15min	LA90, 15min
1	11	2020/10/14 15:24:00	Day	68.1	51
	2	2020/10/14 18:02:00	Day	65.6	48.3
	5	2020/10/14 21:02:00	Day	59.6	43.2
	7	2020/10/14 23:01:00	Night	56.3	40.9
	10	2020/10/15 00:14:00	Night	51.7	37.7
	12	2020/10/15 09:57:00	Day	68.2	51.5
2	1	2020/10/14 16:32:00	Day	73.3	53.8
	4	2020/10/14 20:41:00	Day	69	44
	6	2020/10/14 21:40:00	Day	63.7	42.6
	8	2020/10/14 23:21:00	Night	60.6	41.2
	11	2020/10/15 00:34:00	Night	57.8	39.2
	13	2020/10/15 10:16:00	Day	72.4	47.6

Annex B

Calculations and Noise Model Input Data

Roof Mounted Plant

Included in the following Model runs:

Normal Worst Case Operating Conditions
Generator Testing
Grid Power Failure

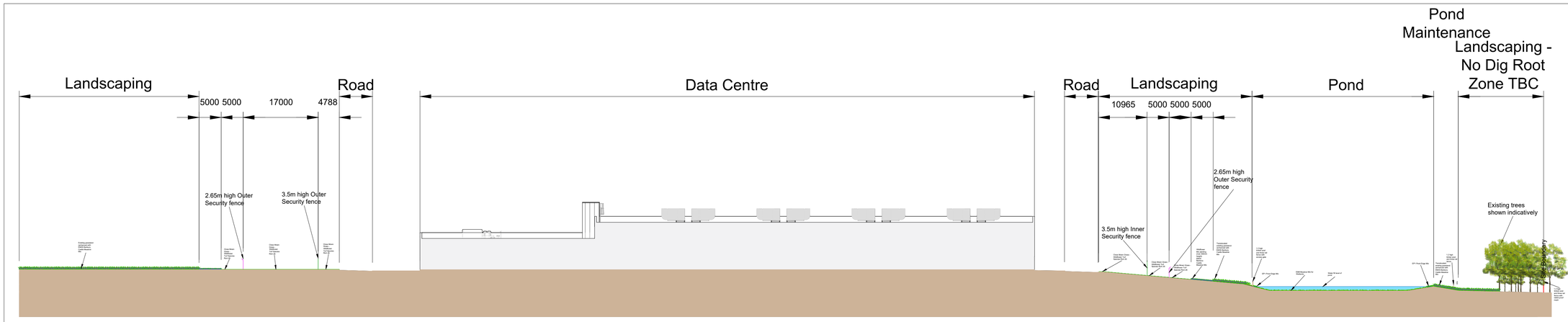
Unit	Location in Model	Sound Power Level LWA dB	Number of Sources	Number of Units per Source	Combined Sound Power Level per Modelled	Spectral Levels dB(A) / Hz							
						63	125	250.0	500.0	1000	2000	4000	8000
AHUs	1 m above roo	80	1	42	96.2324929	67	81	89.3	90.7	92	86	80	70
AHU	1 m above roo	80	1	1	80	50	65	73.0	74.4	76	70	64	54
Exhaust	1 m above roo	76	1	42	92.2324929	73	84	88.6	86.6	74	80	80	77
Dx Unit	1 m above roo	72.9897	1	12	83.7815125	64	62	73.0	73.4	83	69	65	56

Generators

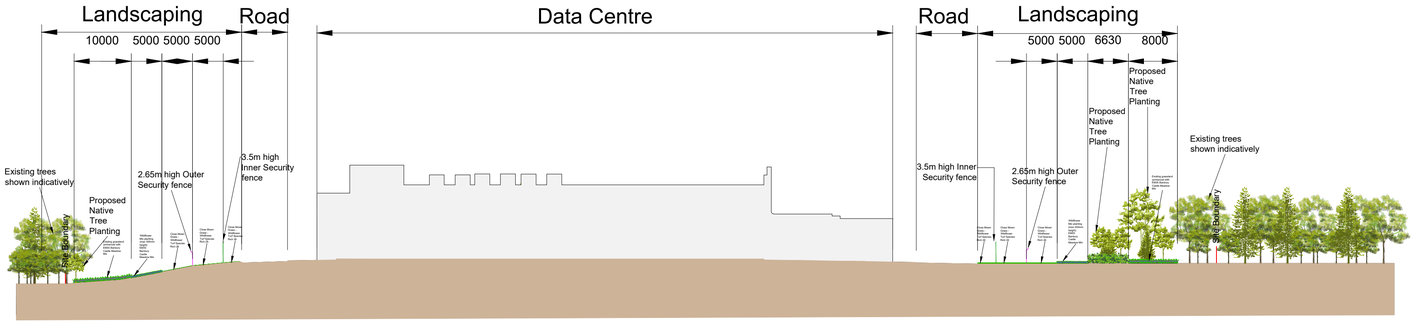
Included in the following Model Runs:

Generator Testing (1 generator)
Grid Power Failure (11 generators)

Surface	Sound Power	Spectral Levels dB(A) / Hz							
		63	125	250	500	1000	2000	4000	8000
LHS	97.2	74.3	88.8	89.1	91.8	88.8	89.7	84.7	82.8
RHS	97.2	74.3	88.8	89.1	91.8	88.8	89.7	84.7	82.8
Front	88.8	68.1	79.8	81.3	85.0	80.5	78.3	73.7	67.4
Rear	89.8	73.1	88.1	84.5	63.0	58.3	56.0	55.0	68.0
Roof - Solid	95.3	71.8	87.9	88.4	89.0	87.4	87.4	80.8	79.3
Roof - Discharge	87.9	73.7	86.7	77.0	64.6	63.7	61.1	65.6	78.4
Exhaust Outlet	80.0	-13.0	80.0	4.0	10.0	13.0	14.0	14.0	12.0

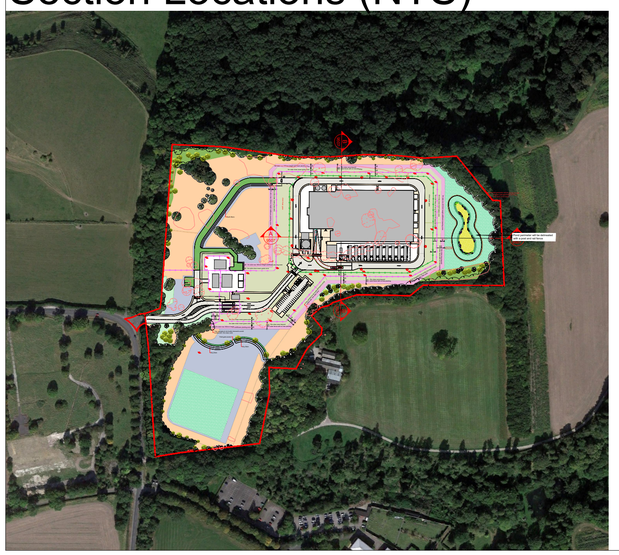


Section A (Scale 1:500)



Section B (Scale 1:500)

Section Locations (NTS)



Rev	Description	By	Ckd	Date
P05	Berm/Ditches & Translocated Grassland updated. Six tree's added to Northern Woodland Boundary.	AH	DB	16:03:21
P04	Updated to latest layout. Tree's updated to ecologists comments.	AH	DB	05.03.21
P03	Updated to suit latest comments - scrub area added.	AGH	DMB	28:01:21
P02	Updated to suit latest comments.	AGH	DMB	12:01:21
P01	First Issue.	AH	DB	11:12:20

Notes

1. This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided.
2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

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Client

Project: Proposed Replacement Data Centre

Title: Proposed Site Landscape Sections

Status	Scale	Date Created
For Planning	1000 @A1	November 2020

Task Team Manager	Information Author	Task Information Manager
DB	DB	DB

Document Number
20305S-RPS-SI-XX-DR-A-9534
Project Code - Originator - Zone - Level - Type - Role - Drawing Number

RPS Project Number	Revision
NK020305	P05

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Notes

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2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

Landscape Key

- Development Boundary *Site perimeter will be delineated with a timber post and three rail fence and rabbit proof mesh.
- Outer Security Fence
- Inner Security Fence
- Existing Grassland to be Retained and Enhanced
- Existing Grassland to be Translocated and Enhanced (taken from area beneath proposed building)
- Wildflower Mix (max 300mm height zone)
- Wildflower Mix (wider site)
- Pond Edge Wildflower Mix
- Close Mown Grass
- Wetland Seed Mix
- Suregreen PP40 Universal Permeable Paver - Green (or similar approved). Sown with a wildflower mix.
- Suregreen PP40 Universal Permeable Paver - Green (or similar approved). Sown with a wildflower mix, cut to a 300mm height.
- Native understory/woodland edge Tree and Shrub Mix
- Timber post and three rail fence with access gate to attenuation pond
- Existing scrub to be retained
- Native Hedge planting

EP1 Pond Edge Mixture (Sow at 40Kg/hectare or 4g/m2)

Composition:
Emorsgate EP1 (or similar approved) contains wild flowers and grasses suitable for sowing at the wet margins of ponds, streams and ditches.

Wild Flowers (20%)

%	Latin name	Common name
0.4	*Achillea ptarmica*	Sneezewort
2	*Angelica sylvestris*	Wild Angelica
0.2	*Caltha palustris*	Marsh Marigold
0.5	*Eupatorium cannabinum*	Hemp Agrimony
2.4	*Filipendula ulmaria*	Meadowsweet
0.5	*Hypericum tetrapterum*	Square-stalked St John's Wort
4	*Iris pseudacorus*	Yellow Iris
0.5	*Lotus pedunculatus*	Greater Birdsfoot Trefoil
1	*Lycopus europaeus*	Gypsywort
1.5	*Lythrum salicaria*	Purple Loosestrife
3	*Ranunculus acris*	Meadow Buttercup
0.3	*Scrophularia auriculata*	Water Figwort
0.5	*Silene flos-cuculi - (Lychnis flos-cuculi)*	Ragged Robin
0.2	*Succisa pratensis*	Devil's-bit Scabious
1	*Thalictrum flavum*	Common Meadow-rue
2	*Vicia cracca*	Tufted Vetch

Grasses (80%)

%	Latin name	Common name
12	*Agrostis capillaris*	Common Bent
5	*Alopecurus pratensis*	Meadow Foxtail (w)
1	*Anthoxanthum odoratum*	Sweet Vernal-grass (w)
36	*Cynosurus cristatus*	Crested Dogstail
1	*Deschampsia cespitosa*	Tufted Hair-grass (w)
25	*Festuca rubra*	Slender-creeping Red-fescue

EM8 Meadow Mixture for Wetlands (Sow at 50Kg/hectare or 5g/m2)

Composition:
Emorsgate EM8 (or similar approved) contains species suitable for seasonally wet soils and is based on the vegetation of traditional water meadows. Soils in wet meadows may flood for short periods in winter, but are usually well drained in summer.

Wild Flowers (20%)

%	Latin name	Common name
0.5	*Achillea millefolium*	Yarrow
0.5	*Betonica officinalis* - (Stachys officinalis)	Betony
1	*Centaurea nigra*	Common Knapweed
1	*Filipendula ulmaria*	Meadowsweet
1.6	*Galium verum*	Lady's Bedstraw
1.5	*Leucanthemum vulgare*	Oxeye Daisy
0.3	*Lotus pedunculatus*	Greater Birdsfoot Trefoil
1	*Plantago lanceolata*	Ribwort Plantain
1	*Primula veris*	Cowslip
2	*Prunella vulgaris*	Selfheal
3	*Ranunculus acris*	Meadow Buttercup
1.6	*Rhinanthus minor*	Yellow Rattle
1.2	*Rumex acetosa*	Common Sorrel
1.5	*Silaum silaus*	Pepper Saxifrage
0.3	*Silene flos-cuculi* - (Lychnis flos-cuculi)	Ragged Robin
0.2	*Succisa pratensis*	Devil's-bit Scabious
1.8	*Vicia cracca*	Tufted Vetch

Grasses (80%)

%	Latin name	Common name
12	*Agrostis capillaris*	Common Bent
5	*Alopecurus pratensis*	Meadow Foxtail (w)
1	*Anthoxanthum odoratum*	Sweet Vernal-grass (w)
36	*Cynosurus cristatus*	Crested Dogstail
1	*Deschampsia cespitosa*	Tufted Hair-grass (w)
25	*Festuca rubra*	Slender-creeping Red-fescue

EM35 Barbury Castle Meadow Mixture (Sow at 40Kg/hectare or 4g/m2)

Composition:
Emorsgate EM35 is brush harvested from some old arable reversion grassland on the Wessex Downs previously restored using locally sourced green hay. The soils near Barbury Castle are thin, overlying chalk and the flora is species rich and typical of chalk grassland.

Wild Flowers (78%)

%	Latin name	Common name
4.4	*Galium verum*	Lady's Bedstraw
2.1	*Leontodon hispidus*	Rough Hawkbit
3.7	*Leucanthemum vugare*	Oxeye Daisy
0.5	*Linum catharticum*	Fairy Flax
12	*Lotus corniculatus*	Birdsfoot Trefoil
0.6	*Pimpinella saxifraga*	Burnet-saxifrage
16	*Plantago lanceolata*	Ribwort Plantain
21	*Prunella vulgaris*	Selfheal
6	*Ranunculus acris*	Meadow Buttercup
4.8	*Rhinanthus minor*	Yellow Rattle
6.9	*Trifolium pratense*	Wild Red Clover

Grasses (22%)

%	Latin name	Common name
2.5	*Arrhenathrum elatius*	False Oat-grass
1.5	*Bromus hordeaceus*	Soft Brome
3	*Cynosurus cristatus*	Crested Dogstail
1	*Dactylis glomerata*	Cocksfoot
12	*Festuca rubra*	Red Fescue
1	*Lolium perenne*	Perennial Ryegrass

WFT - Species Rich 26
(Roll Size: 1x0.64m=0.64m2/2x20m=40m2)

Composition:
Wildflower Turf WFT Species Rich 26 is a soil-free turf system that is species rich, has a high grass inclusion rate and is treated as a traditional lawn as opposed to a wildflower meadow.

Wild Flowers (10%)

Latin name	Common name
Achillea millefolium	Yarrow
Bellis perennis	Daisy
Centaurea nigra	Common Knapweed
Conopodium majus	Pignut
Galium mollugo	Smooth Bedstraw
Galium verum	Lady's Bedstraw
Hypochoeris radicata	Cat's Ear
Lathyrus pratensis	Meadow Vetchling
Lotus corniculatus	Bird's Foot Trefoil
Medicago lupulina	Black Medic
Origanum vulgare	Wild Marjoram
Primula veris	Cowslip
Prunella vulgaris	Selfheal
Ranunculus acris	Meadow Buttercup
Rumex acetosa	Common Sorrel
Sanguisorba minor	Salad Burnet
Stachys officinalis	Betony
Trifolium dubium	Suckling Clover
Trifolium pratense	Wild Red Clover
Trifolium repens	White Clover

Grasses (90%)

Latin name	Common name
Festuca ovina	Sheep's Fescue
Festuca rubra subsp. commutate	Chewing's Fescue
Festuca rubra trichophylla	Slender Creeping Red Fescue
Lolium perenne	Dwarf cultivar
Phleum bertolonii	Smaller Cat's Tail
Poa pratensis	Common Meadow Grass

Grassland Management Schedule:

Mixture Key	Mixture Image	Mixture	Supplier (or similar approved)	Cutting Regime: Year One	Cutting Regime: Year Two Onwards
Wetland Seed Mix		**EM8 Meadow Mixture for Wetlands**	Emorsgate Seeds	Winter/early Spring: Mow to a height of 30mm. April to July/August: Stop mowing to promote flower growth.	Spring to July/August: No mowing to promote flower growth. August/Sept after flowering: cut back with a scythe, petrol strimmer or tractor mower to 50mm. Leave to dry and shed seed for 1-7 days then remove cuttings from site. Late Autumn/Winter: Mowto a height of 50mm and again in Spring.
Pond Edge Wildflower Mix		**EP1 Pond Edge Mixture**	Emorsgate Seeds	Cut back annual weeds to allow good perennial ground cover.	Cut back and remove short sections of vegetation every 2-3 years in rotation. Cut out sections and/or work from one bank each year between Sept and Nov.
Existing Grassland to be translocated and enhanced with additional wildflower mix.		**EM35 Barbury Castle Meadow Mixture**	Emorsgate Seeds	Mow regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings if dense. Carefully dig out or spot treat any residual perennial weeds such as docks.	Cut annually in Sept to a height of 50mm. Leave the cuttings to dry and shed seed for 1-7 days then remove from site. Mow the re growth through late Autumn/Winter to 50mm and again in Spring if needed.
Wildflower Mix		**EM35 Barbury Castle Meadow Mixture**	Emorsgate Seeds	Mow regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings if dense. Carefully dig out or spot treat any residual perennial weeds such as docks.	Cut regularly to maintain a maximum height of 300mm. Cut annually in Sept to a height of 50mm. Leave the cuttings to dry and shed seed for 1-7 days then remove from site. Mow the re growth through late Autumn/Winter to 50mm and again in Spring if needed.
Wildflower Mix (Wider Site)		**EM35 Barbury Castle Meadow Mixture**	Emorsgate Seeds	Mow regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings if dense. Carefully dig out or spot treat any residual perennial weeds such as docks.	Cut regularly to maintain a maximum height of 300mm. Cut annually in Sept to a height of 50mm. Leave the cuttings to dry and shed seed for 1-7 days then remove from site. Mow the re growth through late Autumn/Winter to 50mm and again in Spring if needed.
Existing Grassland to be retained and enhanced with additional wildflower mix.		**EM35 Barbury Castle Meadow Mixture**	Emorsgate Seeds	Mow regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings if dense. Carefully dig out or spot treat any residual perennial weeds such as docks.	Cut regularly to maintain a maximum height of 300mm. Cut annually in Sept to a height of 50mm. Leave the cuttings to dry and shed seed for 1-7 days then remove from site. Mow the re growth through late Autumn/Winter to 50mm and again in Spring if needed.
Suregreen PP40 Universal Permeable Paver - Green, sown with a Wildflower Mix		**EM35 Barbury Castle Meadow Mixture**	Emorsgate Seeds	Mow regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings if dense. Carefully dig out or spot treat any residual perennial weeds such as docks.	On poor, shallow soils, one or two cuts at the end of Summer are required. On deeper soils, best results are obtained by traditional meadow management - a Summer 'hay' cut in combination with Autumn and Spring mowing. After late July/August, cut back to 50mm, leave the 'hay' to dry and shed seed for 1 -7 days them remove from site. Mow the re growth through to late Autumn/Winter to 50mm and again in Spring if needed.
Suregreen PP40 Universal Permeable Paver - Green, sown with a Wildflower Mix, cut to a 300mm height.		**EM35 Barbury Castle Meadow Mixture**	Emorsgate Seeds	Mow regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings if dense. Carefully dig out or spot treat any residual perennial weeds such as docks.	Cut regularly to maintain a maximum height of 300mm. Cut annually in Sept to a height of 50mm. Leave the cuttings to dry and shed seed for 1-7 days then remove from site. Mow the re growth through late Autumn/Winter to 50mm and again in Spring if needed.
Close Mown Grass		**WFT - Species Rich 26**	Wildflower Turf Ltd	To be close mown regularly to maintain a maximum height of 50-75mm.	To be close mown regularly to maintain a maximum height of 50-75mm.

Rev	Description	By	Ckd	Date
P03	Berm/Ditches & Translocated Grassland updated. Six tree's added to Northern Woodland Boundary.	AH	DB	16:03:21
P02	Berm/ditches added. Tree's removed - ecology comment.	AH	DB	04.03.21
P01	First Issue.	AH	DB	22:02:21

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Client

Project: Proposed Replacement Data Centre

Title: Grassland Management Plan Sheet 1 of 1

Status	Scale	Date Created
For Planning	1000 @A1	February 2021

Task Team Manager	Information Author	Task Information Manager
DB	AH	DB

Document Number
20305S-RPS-SI-XX-DR-A-9535
Project Code - Originator - Zone - Level - Type - Role - Drawing Number

RPS Project Number: NK020305
Revision: P03

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PROPOSED REPLACEMENT DATA CENTRE

TREE SURVEY & ARBORICULTURAL IMPACT ASSESSMENT

National Data Centre, Old Burderop Hospital site, Brimble Hill, Wroughton, Swindon.

20305S-RPS-XX-XX-RP-P-9733

Tree Survey and Arboricultural Impact Assessment
Final
17 March 2021

PROPOSED REPLACEMENT DATA CENTRE, OLD BURDEROP HOSPITAL SITE – ENVIRONMENTAL STATEMENT VOLUME 3: APPENDICES – APPENDIX 5.3 TREE SURVEY AND ARBORICULTURAL IMPACT ASSESSMENT

Prepared by:

RPS

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Prepared for:

Mullhaven Properties LLC

Contents

Annexes

1 INTRODUCTION

1.1 This Tree Survey and Arboricultural Impact Assessment (AIA) has been prepared by RPS on behalf of Mullhaven Properties LLC to support the planning application for proposed development on land north of Burderop Park, Brimble Hill Road, Burderop Park, Chiseldon, Swindon SN4 0QD.

1.2 A tree survey of the application area was carried out by RPS on the 17th August 2020 in accordance with the requirements of BS5837:2012. Refer to Tree Constraints Plan 20305S-RPS-00-XX-DR-A-9561 – 63 (Annex B). The weather was calm with some cloud.

1.3 This report has been prepared in broad accordance with the requirements set out in BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations.'[1]

1.4 The purpose of this report is to:

- Provide an assessment of the quality of the surveyed trees with reference to the categories and sub-categories listed within Table 1 - BS5837:2012.
- Assess and quantify the arboricultural impact of the proposed development within the survey area, based on the proposed development layout.
- Provide additional arboricultural information and advice in relation to the protection of trees throughout the development of the site.
- Provide a Tree Protection and Removal Plan to detail the proposed protective measures to be taken in respect of the trees during development of the site.

1.5 The Tree Protection and Removal Plan 20305S-RPS-00-XX-DR-A-9564 – 66 included at Annex C identify the following:

- Trees to be retained;
- Alignment and design of protective fence;
- Root Protection Area (RPA) of trees;

1.6 The Tree Protection and Removal Plan shall be made available to all relevant site operatives prior to and throughout the construction process, so they understand the scope and importance of the tree protection measures.

1.7 To minimise the potential for harm to occur to retained trees all works shall be carried out with regard to the Tree Protection Measures and construction techniques detailed within this report.

1.8 In particular the establishment of a Construction Exclusion Zone (CEZ) by erection of Tree Protection Fencing would minimise the potential for harm to occur to retained trees.

[1] British Standards Institute. British Standard (BS5837) Trees in Relation to Design, Demolition and Construction - Recommendations. 2012.

2 SITE LOCATION

2.1 The survey covered an area of land located at National Data Centre, Old Burderop Hospital site, Brimble Hill, Wroughton, Swindon. Swindon is a town located in south-west England close to the M4, between Bristol and Reading. The land is roughly centred at Grid reference 416360 180509

2.2 The Application Site currently compromises an open field with a couple of buildings and vegetation throughout. The site was previously a hospital. The area is located approximately five miles south of Swindon Train Station and approximately two miles east of Wiltshire Wildlife Trust Markham Banks. The wider environs consist of open fields, village settlements, airfield hangers and solar farm.

2.3 The soilscape of the area typically consists of 'Shallow, lime-rich soils over chalk or limestone.''[2]

[2] *Magic.gov.uk – 22.07.2020*

3 SURVEY METHOLDOLOGY

3.1 This report has been authored by Alice Brown, Junior Arboricultural Consultant of RPS and authorised by David Cox, a professional member of the Arboricultural Association and Chartered Landscape Architect of RPS.

3.2 The tree survey was undertaken by Alice Brown, Junior Arboricultural Consultant of RPS.

3.3 The report and survey were carried out in general accordance with the requirements set out in BS 5837:2012 'Trees in relation to design, demolition and construction – Recommendations'.

3.4 The tree survey involved a visual inspection from the ground of individual specimens and groups of trees to record their amenity value, management recommendation and dimensions. Where observed, the general condition of all the trees has been noted. The survey does not constitute a full arboricultural condition assessment involving the detailed inspection of tree in relation to their structural condition, decay, and any other physical and pathogenic defects. A full post development tree inspection is recommended to establish that the trees retained during construction pose acceptable levels of risk once the development has been completed.

3.5 The location of the trees is based on a topographic survey (Drawing No. 989/4414/1) produced by Clifton Surveys in June 2020.

3.6 The survey assesses individual trees and groups of trees for quality, structural integrity, and visual amenity within the context of proposed development. The quality of each tree or group of trees has been recorded by allocating it to one of four categories as described in table 3.1. These categories have been differentiated on the Tree Constraints Plan 20305S-RPS-00-XX-DR-A-9561 – 63 (Annex B) by colours.

3.7 The survey information was recorded on the attached Tree Survey Schedule (Annex A) in general accordance with the guidance contained within Section 4 of BS 5837:2012 "Trees in relation to design, demolition and construction – Recommendations".

3.8 The information recorded is detailed in Table 3.1.

Table 3.1 Tree characteristics recorded during survey

Tree Ref No:	Sequential reference number of trees or groups of trees. Avenues, woodlands and hedgerows were also recorded on the tree survey plan. # - denotes inaccessible trees (best estimates are made about the location, physical dimensions and characteristics.)				
Species	Species listed by common name, with scientific names (italic lettering).				
Height (m)	Estimated height of canopy to nearest metre.				
Branch Spread	Branch spread, taken as a minimum at the four cardinal points, to derive an accurate representation of the crown				
Stem diameter @ 1.5 m (m)	Estimated diameter of trunk at 1.5 m above ground level in metres unless otherwise indicated, multi-stemmed trees being measured in accordance with Annex C: BS5837				
Existing height above ground level	To inform on ground clearance, crown/stem ratio and shading the estimated height of the first significant branch and direction of growth and canopy above ground level.				
Stem No.	Number of stems (if necessary) of individual tree.				
Life Stage	Expressed as:-	Y SM EM M	(Young) (Semi-mature) (Early-mature) (Mature)	OM V D	(Over-mature) (Veteran) (Dead)
Physical Condition	Apparent condition expressed as the following categories, based upon a brief visual inspection from the ground only:-	Good Fair Poor Dead			
Comments / Management Recommendations	General observations, particularly of structural and/or physiological condition (e.g. the presence of any decay and physical defect), and/or preliminary management recommendations and potential for wildlife habitats (not exhaustive).				
Estimated remaining contribution (years)	Estimated remaining contribution, in years (<10, 10+,20+,40+)				
Tree Quality Assessment Value: **<u>Category</u>**	Criteria grading with regards to Table 1: BS 5837:2012, expressed as:-	**A** (Trees/Vegetation of high quality and value) **B** (Vegetation of moderate quality and value) **C** (Trees/Vegetation of low quality and value) **U*** (Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years)			
	* Category U trees can have existing or potential conservation value which might be desirable to preserve.				
Tree Quality Assessment Value: <u>Sub - Category</u>	Criteria grading with regards to Table 1: BS 5837:2012, expressed as:-	**1** (Trees with mainly *arboricultural* value) **2** (Trees with mainly *landscape* value) **3** (Trees with mainly *cultural / conservation* value)			

Limitations

3.9 The findings of this survey are not valid following adverse or unpredictable weather conditions or for any failure due to 'force majeure' or unpredictable events.

3.10 The survey does not constitute a full arboricultural condition assessment involving the detailed inspection of trees in relation to their structural condition, decay, and any other physical and pathogenic defects. It is recommended that further arboricultural assessments be undertaken in order to assess the full health and safety of all trees which may possess structural or pathogenic conditions.

3.11 Trees were not climbed or inspected below ground level and inaccessible trees have estimates made about the location, physical dimensions and characteristics.

3.12 Where the locations of trees were not highlighted in the provided topographical survey – 989/4414/1 by Clifton Surveys in June 2020, they were estimated on site and highlighted within the supporting plan/s with a hash '#'.

3.13 Trees and woody vegetation were not assessed for their potential impact upon future construction issues such as foundation designs (re: NHBC chapter 4.2)[3]. Whilst this report may assist in assessing likely future impacts, it should not be classed as a comprehensive vegetation survey in relation to impact upon future designs.

3.14 Trees are dynamic, living organisms and respond rapidly to changes in their environment. The tree conditions cannot be assumed to remain unchanged.

3.15 Newly planted crops in the fields limited access to public rights of way only. Trees along the East and Western boundaries were viewed from site side only or were assessed from distance where they are located on private property.

[3] NHBC. 'Chapter 4.2- Building Near Trees'. NHBC Standards 2016.

4 APPRAISAL AND RECOMMENDATIONS

Generally

4.1 There were variations in the structural condition of the surveyed trees, however, in the main, their condition was generally good and largely consistent with expectations for the age, management and species.

4.2 The surveyed trees contained much diversity. However, Oak, Sycamore and Cherry were among the most abundant. The trees provide amenity, soften the lines of the built environment and provide wildlife habitats.

Surveyed Trees

4.3 The site was bordered by three significant woodlands[2]. These were all considered to be of high retention value (Category A). These woodlands were all species rich and provide much amenity value to the area. The woodland adjacent to the north of the site, forms part of an ancient woodland.

4.4 A row of trees which are located through the middle of the site, were awarded a Category B status. These were attractive trees and provided much amenity to the area.

4.5 The north-west corner had a number of mature trees primarily consisting of Sycamore. Collectively, these provided landscape value to the site.

4.6 The most Impressive tree onsite was T76, a mature Oak on the northern boundary. This tree was awarded a Category A status and provided much landscape value to the site.

Planning considerations

4.7 Trees covered by a Tree Preservation Order are protected under the Town and Country Planning Act 1990 (Trees Regulation 2012) and the local authority must be consulted, and permission sought for any works that may affect them.

4.8 TPOs: An email response from Swindon Borough Council confirmed that there are no trees onsite covered by a TPO. However, it was highlighted that there are trees in the surrounding area covered by a TPO. (Refer to Annex D).

4.9 Conservation Areas: An email response from Swindon Borough Council confirmed that the area surveyed is not part of a conservation area (Refer to Annex D).

4.10 Ancient woodlands: A desktop investigation using the Magic Maps application[2] confirmed that there is ancient woodland across the northern boundary of the site. In order to protect this woodland, a 15m buffer has been added to the Tree Constraints Plan and Tree Protection and Removal Plan. This is in accordance with government guidance to protect the roots[4].

4.11 The Hedgerows Regulations 1997 were made under Section 97 of the Environmental Act 1995 and came into operation in England and Wales on 1 June 1997. The regulations provide important protection by prohibiting the removal of most countryside hedgerows (or parts of

[4] https://www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences

them) without first notifying the local planning authority (LPA). Removal includes acts which could result in the destruction of a hedgerow.

4.12 Care is needed regarding the retention of large, mature trees which become enclosed within the new development. Where such trees are retained, adequate space should be allowed for their long-term physical retention and future maintenance.

4.13 Under the UK planning system, local authorities have a statutory duty to consider the protection and planting of trees when granting planning permission for proposed development. The potential effect of development on trees, whether statutorily protected (e.g. by a tree preservation order or by their inclusion within a conservation area) or not, is a material consideration that is taken into account in dealing with planning applications.

4.14 Regarding a particularly valuable tree with serious structural faults it may be decided it be retained and the proximity of the target to the tree be reduced. This could be achieved by retaining or encouraging the formation of physical barriers (e.g. dense bramble or Holly understory) to deter direct access.

4.15 Trees can offer many benefits, including the provision of visual amenity, softening or complementing the effect of the built environment, and adding maturity to new developments by making places more comfortable in tangible ways e.g. contributing screening and shade, reducing wind speed and turbulence, intercepting snow and rainfall, and reducing glare.

4.16 Existing trees on development sites, if included into plan, can offer many benefits, including the provision of visual amenity, softening or complementing the effect of the built environment, and adding maturity and value to new developments.

4.17 New tree planting opportunities should be considered as part of any potential redevelopment, this would help to broaden the age diversity of the tree cover within the area. Enough space should be provided for species with significant stature to grow out into maturity.

4.18 Trees may have the potential to provide valuable habitat for significant and/or/ protected species. It is therefore recommended that this report is read in conjunction with the ecology surveys for the site.

Design and Site Layout Considerations

4.19 A tree constraints plan defines the Root Protection Area (RPA) for each tree shown as a circle. This area may be adjusted should physical constraints or topographical features limit root activity in a particular area, however the total area should remain the same. Prior to any adjustment of the trees RPA zones the changes should be assessed by an arboriculturalist. During any site planning exercises the current and future growth potential of the trees should be considered.

4.20 The RPA for single stem trees broadly equates to a radius 12 times the stem diameter of the tree at 1.5m above ground level. For multi-stemmed, low branching trees or those with trunks with an irregular girth the point of stem diameter measurement is adjusted in consideration of these factors and in accordance with the illustrations in BS5837:2012 (Annex C).

4.21 The RPA should become an exclusion zone during construction works and for any development. It should be fenced-off and protected in accordance with BS5837:2012. The canopy is likewise susceptible to damage during construction work and requires similar protection.

4.22 No activities that result in excavations, changes in level or soil compaction should take place within the RPA of any retained trees, especially older mature trees. This would include the storage of materials, any construction work, trafficking by vehicles or even excessive trafficking by pedestrians.

4.23 If some form of construction has to take place within the RPA, then certain measures need to be adopted to avoid disturbance or damage to the roots and to maintain moisture infiltration and gaseous diffusion into the soil.

Services

4.1 Services likewise should be routed outside the existing or potential root zone of trees. Where it is unavoidable, then certain measures should be employed to avoid damage to the tree's larger roots.

4.2 The location and siting of new facilities near trees should consider the potential impact on and conflict with both tree roots and canopy. This should take into account the ultimate size of existing young and middle-aged trees at maturity. Conversely the impact of the tree on the activities should also be considered with regard to obstruction, shading, leaf fall and root action. These are problems that can be managed provided sufficient space is allowed for.

4.3 Any new services should avoid the RPAs of any retained tree. Where it is unavoidable, then the route of the services must be designed by an Engineer in consultation with an Arboriculturalist.

4.4 For further advice, read in full - NJUG Volume 4- "Guidance for the planning, installation and maintenance of utility services in proximity of trees". (The National Joint Utilities Group. *NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*. 2007).

Trees and Management of Health and Safety

4.5 It is recommended that a programme of periodic arboricultural assessments be undertaken in order to regularly assess the full health and safety of all trees both in full leaf and bare stemmed. The assessments should prioritise areas based on levels of access and presence of target (i.e. exposure of people to hazard) and accord with arboricultural advice, taking account of relevant factors (where known) that affect safety such as the age class, condition, size and species of the trees.

5 ARBORICULTURAL IMPACT ASSESSMENT

Introduction

5.1 Trees have finite energy reserves, developed each year throughout the growing season, which are utilised for biological processes such as growth and defence against pests or diseases throughout the following year.

5.2 Any development in proximity to trees has the potential to cause harm to those trees unless control measures are identified and acted upon; as such it is essential to consider the relationship between the proposed development and the retained trees to identify what precautions are necessary, proportionate and appropriate.

5.3 Damage that is not immediately evident, but which can cause long term harm to retained trees includes things such as damage to the soil structure by compaction causing root damage and levels changes altering the water table and affecting moisture availability.

5.4 To minimise the potential for harm to occur to retained trees all works must be carried out with regard to the Tree Protection measures detailed within this report.

5.5 In general, by adopting appropriate methods of working, precautionary and protective measures, significant harm to retained trees can be avoided.

5.6 In particular the establishment of a Construction Exclusion Zone (CEZ) by erection of Tree Protection Fencing would minimise the potential for harm to occur to retained trees.

5.7 The retention and protection of significant trees and vegetation would assist in assimilating the proposed development into the wider landscape and offer long term tree cover.

5.8 Furthermore, redevelopment of the site may offer an excellent opportunity to actively manage any retained vegetation and accordingly we recommend restorative tree works be undertaken as appropriate. This would further improve the amenity value and landscape setting of the site and increase the useful life of any retained trees.

Brief Description of Proposed Development

5.9 This report relates to the following:

- New data centre; and,
- Associated works.

Retained Trees

5.10 This development would necessitate the removal of T1, T2, T3, T4, T6, T7, T8, T9, T12, T13, T14, T15, T16, T17, T26, T39, T40, T41, T42, T43, T44, T45, T46, T47, T48, T49(*2), T50, T51#, T52#, T53#, T54, T55,T56, T57, T58, T59, T60, T61, T62, T63, T64, T72, T73, T74, T75, G1, G2, G3, G4, G7, G8, G9, G10, G11, G12 and sections of G6 and H1.

5.11 In order to facilitate the construction of the security fence, 10m buffer zone and incoming utilities, W1, W2, W3 and G14 will require selective removal/crown lifting or reduction in crown extent by selective faceback.

5.12 T24 and T67 are considered unsuitable for retention (Category U) and therefore require removal.

5.13 The replacement data centre will create some shade on the woodland, which will vary throughout the day and year. This has been considered and it was concluded that the woodland ecology will only be impacted mildly.

Proposed works within the Root Protection Area (RPA)

5.14 Root Protection Areas for each tree, group of trees and hedgerows surveyed have been determined in accordance with BS5837:2012[5].

5.15 It can be noted that the development does not interact with any of the RPAs. Therefore, no additional measures would need to be put in place.

Outline methodology within Root Protection Areas

5.16 Details of Tree Protection Fencing and ground protection are detailed in the following section of this document.

5.17 The RPA should become an exclusion zone during construction works and for any development. It should be fenced-off and protected in accordance with BS5837:2012. The canopy is likewise susceptible to damage during construction work and requires similar protection.

5.18 No activities that result in excavations, changes in level or soil compaction should take place within the RPA of any retained trees, especially older mature trees. This would include the storage of materials, any construction work, trafficking by vehicles or even excessive trafficking by pedestrians.

5.19 All new (and existing re-routed) services shall be routed outside the existing or potential RPA retained trees. Where it is unavoidable, then hand excavation shall be employed to avoid damage to the larger roots and the services slid through or below the root system. Ducting shall be used to carry cables. Reference shall be made to the recommendations included within Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (NJUG 4)[6].

5.20 The location and siting of new facilities near trees should consider the potential impact on and conflict with both tree roots and canopy. This should take into account the ultimate size of existing young and middle-aged trees at maturity. Conversely the impact of the tree/s on end user activities should also be considered with regard to obstruction, shading, leaf fall and root action. These are problems that can be managed provided sufficient space is allowed for.

5.21 Where works within the RPA are unavoidable works must be undertaken by hand and the soil levels should be carefully reduced by hand to avoid damage to the bark of larger roots directly beneath and adjacent to the excavation. Where these become exposed, they should be further protected from drying out. Where root pruning is unavoidable it should be made at a suitable place within the root system, avoiding damage to surrounding tissue in accordance

[5] BS5837: 2012 'Trees in relation to design, demolition and construction – Recommendations'.

[6] *http://streetworks.org.uk/wp-content/uploads/V4-Trees-Issue-2-16-11-2007.pdf*

with BS 3998:2010. Final pruning cuts shall be made at right angles to the axis of the root and the final cut wound should be smooth and as small as possible, free from ragged torn ends.

6 TREE WORKS

Standard of Work

6.1 All tree works shall be carried out in accordance with BS3998:2010 and latest arboricultural best practice.

6.2 All tree work shall be carried out by suitably qualified, competent and insured arboricultural contractors in accordance with Arboricultural Association Standard Conditions of Contract and Specifications for Tree Works (2008) Edition and BS 3998:2010 Tree Work.

6.3 All green and woody waste generated by the tree works shall be removed from site and disposed of in an environmentally sustainable manner.

6.4 When a branch is removed at its point of attachment, injury of the wood and bark of the parent stem or branch above the cut shall be avoided. If a branch collar is visible, the final cut shall be just outside it and care shall be taken to avoid tearing retained wood and bark when the cut is made. Preliminary cuts shall be made, if necessary, so as to remove weight, before a final cut is made. Care shall be taken to prevent falling branches from harming other parts of the tree (including its roots), its surroundings, people or property. Heavy branches shall be removed in sections and, where necessary, shall be lowered with ropes.

6.5 Prior to the commencement of any tree works an appropriate risk assessment shall be produced to describe the measures required to fulfil the statutory safety obligations. It shall aim to identify and prioritise the necessary control measures and precautions.

6.6 Following the works, it is recommended that the trees are monitored on a regular basis to ensure their ongoing vitality and health. These inspections shall be completed by a suitably qualified and experienced person.

Timing of Works

6.7 All tree works, and tree protection measures shall be completed prior to commencement of any construction and enabling works on the site.

6.8 All works shall be timed to have regard to the phenological cycles of protected species that are associated with trees, notably birds and bats.

6.9 Selective pruning shall be undertaken with regard to the phenological cycle of trees, i.e. when energy reserves are highest; generally observed to be late winter before budburst (optimal), or mid-summer before leaf drop, dependent on species.

6.10 Nesting birds are protected by law and any removal / tree works should not be carried out during the bird nesting season (March-August inclusive). Should any vegetation be outlined for removal during this period, then an ecological inspection would be required to check that no nesting birds are present. Should checks reveal nesting birds the vegetation must remain until September or until an ecologist has certified that the fledglings have left the nest.

6.11 Similarly bats and bat roots are also protected by law and the advice of an ecologist should be sought prior to removing any trees.

7 TREE PROTECTION MEASURES

Construction Exclusion Zone

7.1 The Construction Exclusion Zone (CEZ) shall be defined by the protection fence line as shown on the Tree Protection and Removal Plan JSL3708_700-703.

7.2 The tree protection fence shall be erected prior to any works commencing on site (including site clearance an enabling works) and shall remain in place until after all construction activities have been completed and then only with the prior approval of the arboricultural consultant.

7.3 This CEZ shall not be disturbed, and the protective fencing shall not be moved or taken down at any time.

7.4 Within the Construction Exclusion Zone there must be no mechanical digging or scraping, no alteration to existing ground levels including soil stripping, no earthworks, no handling or discharge of any chemical substance, concrete washings or of any fuels.

7.5 Vehicular or pedestrian access and the storage of any materials is prohibited within the CEZ.

7.6 No materials that may contaminate the soil such as concrete mixings, diesel oil and vehicle washings shall be discharged within 10m of the stem of any tree and no fires shall be lit within 10m of the maximum extent of a trees crown.

Tree Protection Fencing

7.7 The tree protection fence shall be erected as shown on the Tree Protection and Removal Plan (JSL3708_703-705) included with is report.

7.8 The fence line shown is the minimum required and the length of the fence shall be extended or adjusted on site as agreed with the Arboricultural Consultant to ensure satisfactory protection of all retained trees and RPAs.

7.9 Where proposed (permanent) construction site-hoarding provides the same level of protection to the retained trees and RPAs as the proposed tree protection fence, subject to agreement with the Arboricultural Consultant, the hoarding may serve as the tree protection fence. Notwithstanding, depending on the form and alignment of the construction site-hoarding it may be necessary to provide additional tree protection fence to ensure adequate protection of retained trees and RPAs as shown on the Tree Protection Plan.

7.10 Unless otherwise agreed in writing with the Arboricultural Consultant and/or LPA Tree Officer, the fencing system to be utilised shall be in accordance with Annex C and compliant with BS5837:2012.

7.11 Once the protective barrier is in place it must remain in situ throughout the course of the development until the completion of development, other than to facilitate agreed tree removal; see below.

7.12 Where necessary, tree protection fencing may be temporarily re-aligned in order to facilitate tree removal. Fencing is to be re-instated immediately following removal in a manner that encompasses the remaining trees and their respective RPAs. During tree removal, no wheeled or tracked machinery is to enter the area previously encompassed by tree protective fencing as shown in the Tree Protection Plan.

7.13 Copies of the Tree Protection Plan shall be placed in the site office for reference by all site staff.

7.14 Signs detailing the purpose of the protective barrier shall be attached to the barriers at 10m intervals. Such signs should be weatherproof and shall be substantially in the form of the specimen provided at Annex F. Signs must be replaced as necessary should they be removed or become illegible.

7.15 Following erection of the protective barriers and prior to commencement of the development it is recommended that an inspection of the site, by either the Council's Tree Officer or the Arboricultural Consultant, is arranged to confirm fencing has been installed in accordance with the Tree Protection Plan and that any relevant arboreal conditions attached to the planning consent have been met.

Site Compounds and Materials Stores

7.16 Activities related to the establishment of a temporary site compound have the potential to impact upon retained trees by various means. In particular the storage and mixing of chemicals and materials such as concrete can have a damaging effect on tree health if precautions are not taken.

7.17 To prevent harm occurring to trees, provision for materials storage, deliveries and other related activities shall be made available in areas away from retained trees.

7.18 Under no circumstances shall materials or plant be stored beneath the canopy or within or abutting the Root Protection Zone of any retained trees/hedges, whether fenced or not.

Reporting

7.19 Should any arboricultural issues become apparent during the works the site manager should immediately contact the Arboricultural Consultant or the Council's Tree Officer for advice upon how to proceed.

8 CONCLUSIONS

8.1 A comprehensive tree survey has been completed on the site and its immediate surroundings. The survey was completed in accordance with BS5837:2012.

8.2 This development would necessitate the removal of T1, T2, T3, T4, T6, T7, T8, T9, T12, T13, T14, T15, T16, T17, T26, T39, T40, T41, T42, T43, T44, T45, T46, T47, T48, T49(*2), T50, T51#, T52#, T53#, T54, T55,T56, T57, T58, T59, T60, T61, T62, T63, T64, T72, T73, T74, T75, G1, G2, G3, G4, G7, G8, G9, G10, G11, G12 and sections of G6 and H1.

8.3 In order to facilitate the construction of the security fence, 10m buffer zone and incoming utilities, W1, W2, W3 and G14 will require selective removal/crown lifting or reduction in crown extent by selective faceback.

8.4 T24 and T67 are considered unsuitable for retention (Category U) and therefore require removal.

8.5 Tree protection fencing would be installed to protect the Construction Exclusion Zone.

8.6 From an arboreal perspective, subject to the satisfactory implementation of the recommendations contained within report, it is considered that the proposed scheme has minimal impacts.

ANNEXES

Annex A

Tree Survey Schedule JSL3708_750

Tree Survey Schedule

Site Swindon Data Centre
Project schedule ref: JSL3708_750
Drawing reference: JSL3708_700-702
Survey date: 17/08/2020

Surveyor: A Brown
Status: For Information
Revision: .A
Notes:

Ref. no.	Species	Height (m)	Crown spread (m) N	E	S	W	Stem dia. (m)	Stem no. at 1.5m	Height of crown clearance (m)	Dir/ height	Age class	Structural condition	Physiological condition	General observations Management recommendations	Estimated remaining contribution (years)	Tree Quality Category (BS5837)
T1	Quercus robur Pedunculate Oak	11.0	10.0	7.0	7.0	9.0	0.60	1.00	2.00	W	EM	G	G	Attractive oak with wide crown.	20-40	B2
T2	Acer pseudoplatanus Sycamore	7.0	5.0	4.0	1.0	2.0	0.20	1.00	2.00	W	SM	G	G	Small tree with north-east bias. Some epicormic growth.	20-40	C2
T3	Betula pendula Silver Birch	9.0	7.0	5.0	2.0	3.0	0.70	1.00	0.50	E	M	G	G	Mature Birch within group.	40+	B2
T4	Prunus avium Wild Cherry	8.0	7.0	6.0	6.0	6.0	0.77	3.00	0.50	N	M	G	G	Cherry within group. Trifurcates at 0.5m. Northerly bias.	40+	B2
T5	Liriodendron tulipifera Tulip tree	12.0	7.0	8.0	7.0	7.0	0.77	1.00	2.00	N	M	F	F	Tall Tulip tree. Fungi and deadwood present.	40+	B2
T6	Crataegus monogyna Common Hawthorn	6.0	6.0	6.0	5.0	4.0	0.34	1.00	2.00	E	SM	G	G	Hawthorn with easterly bias.	20-40	C2
T7	Sorbus aria Whitebeam	7.0	6.0	6.0	7.0	6.0	0.34	1.00	3.50	S	SM	G	G	Tree with southerly bias. Previous pruning. Some fungi present.	20-40	B2
T8	Sorbus aria Whitebeam	5.0	2.0	2.0	5.0	2.0	0.15	1.00	3.00	W	Y	G	G	Tree with some epicromic growth.	10+	C2
T9	Sorbus aria Whitebeam	8.0	7.0	7.0	7.0	5.0	0.38	1.00	3.50	N	SM	G	G	Attractive tree with northerly bias. Some fungi present.	20-40	B2
T10	Fagus sylvatica Common Beech	6.5	4.0	8.0	9.0	4.0	0.32	1.00	2.50	S	SM	G	G	Beech with wide crown.	20-40	B2
T11	Fagus sylvatica Common Beech	7.0	7.0	8.0	4.0	6.0	0.37	1.00	2.00	W	SM	G	G	Attractive Beech.	20-40	B2
T12	Acer pseudoplatanus Sycamore	9.0	4.0	4.0	4.0	4.0	0.49	3.00	0.50	N	EM	G	G	Sycamore which trifurcates at 0.5m Ivy present.	20-40	B2

Note: This survey is based on a brief visual inspection from the ground.
It is not intended as a full arboricultural inspection.
- Indicates estimated tree. * - Indicates off site tree.

Tree Survey Schedule

Site Swindon Data Centre
Project schedule ref: JSL3708_750
Drawing reference: JSL3708_700-702
Survey date: 17/08/2020

Surveyor: A Brown
Status: For Information
Revision: .A
Notes:

Ref. no.	Species	Height (m)	Crown spread (m) N	E	S	W	Stem dia. (m)	Stem no. at 1.5m	Height of crown clearance (m)	Dir/ height	Age class	Structural condition	Physiological condition	General observations Management recommendations	Estimated remaining contribution (years)	Tree Quality Category (BS5837)
T13	Prunus avium Wild Cherry	7.5	6.0	2.0	6.0	7.0	0.50	2.00	2.00	N	SM	G	G	Cherry with westerley bias. Bifurcates at 0.5m.	20-40	C2
T14	Fagus sylvatica Common Beech	11.0	10.0	10.0	10.0	11.0	0.80	1.00	1.00	S	M	G	G	Tree which stands out in the landscape. Wide canopy.	40+	C2
T15	Sorbus aucuparia Rowan	6.0	3.0	3.0	4.0	3.0	0.20	1.00	3.00	S	M	G	G	Small Rowan with southerly bias.	40+	C2
T16	Aesculus hippocastanum Horse Chestnut	5.0	3.0	3.0	2.0	3.0	0.42	1.00	2.50	S	EM	F	F	Tree which bifurcates at 2m. Stem occlusions and deadwood present.	40+	B2
T17	Aesculus hippocastanum Horse Chestnut	9.0	6.0	6.0	6.0	6.0	0.70	1.00	2.00	E	SM	G	G	Tree which bifurcates at 3m. Wide crown.	20-40	B2
T18	Liriodendron tulipifera Tulip tree	12.0	8.0	8.0	8.0	8.0	0.80	1.00	1.00	W	M	G	G	Impressive Tulip tree. High landscape value.	40+	B2
T19	Aesculus hippocastanum Horse Chestnut	8.0	7.0	7.0	7.0	7.0	0.57	2.00	0.50	W	EM	G	G	Attractive tree which bifurcates at 0.5m. Wide canopy.	20-40	B2
T20	Sorbus aucuparia Rowan	7.0	7.0	7.0	4.0	6.0	0.30	1.00	0.50	W	EM	G	G	Rowan with stem occlusions.	20-40	C2
T21	Salix babylonica Weeping Willow	11.0	8.0	10.0	9.0	10.0	0.50	1.00	0.00	E	M	G	G	Impressive willow. Prominent.	40+	B2
T22	Sorbus aucuparia Rowan	5.5	2.0	2.0	2.0	2.0	0.30	1.00	0.50	N	SM	G	G	Small Rowan.	20-40	C2
T23	Fraxinus excelsior Common Ash	6.0	3.0	2.0	3.0	4.0	0.16	2.00	0.50	N	Y	G	G	Young Ash.	10+	C2
T24	Prunus avium Wild Cherry	7.0	3.0	4.0	3.0	4.0	0.35	1.00	1.00	W	SM	P	P	Dead.	<10	B2

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Tree Survey Schedule

Site Swindon Data Centre
Project schedule ref: JSL3708_750
Drawing reference: JSL3708_700-702
Survey date: 17/08/2020

Surveyor: A Brown
Status: For Information
Revision: .A
Notes:

Ref. no.	Species	Height (m)	Crown spread (m) N	E	S	W	Stem dia. (m)	Stem no. at 1.5m	Height of crown clearance (m)	Dir/ height	Age class	Structural condition	Physiological condition	General observations Management recommendations	Estimated remaining contribution (years)	Tree Quality Category (BS5837)
T25	Acer platanoides Norway Maple	10.0	7.0	8.0	7.0	8.0	0.50	1.00	0.50	E	EM	G	G	Norway maple which stands out in the landscape.	20-40	B2
T26	Acer platanoides (Purple var.) Norway Maple (purple)	7.0	2.0	2.0	2.0	2.0	0.40	1.00	0.50	W	EM	G	G	Attractive tree which stands out in the landscape.	20-40	B2
T27	Fraxinus excelsior Common Ash	11.0	7.0	7.0	9.0	7.0	0.45	1.00	0.50	S	M	G	G	Mature Ash with south-east bias.	40+	B2
T28	Fraxinus excelsior Common Ash	12.0	5.0	9.0	10.0	7.0	0.80	1.00	0.50	S	EM	G	G	Attractive Ash with south-east bias.	20-40	B2
T29	4 Acer pseudoplatanus Sycamore	13.0	8.0	8.0	8.0	8.0	0.80	1.00	6.00	S	M	G	G	Four mature Sycamore.	40+	B2
T30	5 Fraxinus excelsior Common Ash	10.0	4.0	4.0	4.0	4.0	0.35	1.00	1.00	W	SM	G	G	Semi-mature Ash.	20-40	C2
T31	Acer pseudoplatanus Sycamore	13.0	10.0	10.0	5.0	5.0	1.00	1.00	1.00	N	M	F	F	Sycamore with some stem damage.	20-40	B2
T32	Acer pseudoplatanus Sycamore	13.0	2.0	2.0	2.0	2.0	0.35	1.00	1.00	W	SM	G	G	Attractive Sycamore.	20-40	C2
T33	Acer pseudoplatanus Sycamore	13.0	14.0	2.0	2.0	8.0	1.00	1.00	1.00	N	M	G	G	Tree with northerly bias.	40+	B2
T34	Acer pseudoplatanus Sycamore	11.0	6.0	6.0	6.0	8.0	0.75	1.00	1.00	W	M	G	G	Sycamore which bifurcates at 4m.	40+	B2
T35	Acer pseudoplatanus Sycamore	12.0	4.0	4.0	4.0	4.0	0.90	1.00	1.00	N	M	G	G	Mature Sycamore.	40+	A2
T36	Acer pseudoplatanus Sycamore	13.0	6.0	4.0	4.0	4.0	1.00	1.00	1.00	N	M	G	G	Mature Sycamore.	40+	A2

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Revision: .A
Notes:

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T37#	Acer pseudoplatanus Sycamore	7.0	0.0	0.0	0.0	0.0	1.00	1.00	1.00	-	M	P	P	Declining.	<10	U
T38	Prunus avium Wild Cherry	9.0	8.0	8.0	8.0	8.0	0.80	1.00	0.00	W	M	G	G	Impressive Cherry.	40+	A2
T39	Fraxinus excelsior Common Ash	12.0	6.0	6.0	6.0	9.0	0.60	1.00	1.00	E	M	G	G	Tall Ash.	40+	B2
T40	Fraxinus excelsior Common Ash	7.0	8.0	8.0	8.0	8.0	0.60	4.00	0.00	S	SM	G	G	Tree with four stems. Wide, even crown.	20-40	C2
T41	Tilia platyphyllos Broad-leaved Lime	9.0	6.0	3.0	6.0	3.0	0.65	1.00	0.00	W	SM	G	G	Attractive lime.	20-40	B2
T42	Tilia platyphyllos Broad-leaved Lime	9.0	6.0	3.0	6.0	8.0	0.50	1.00	0.00	E	SM	G	G	Attractive lime.	20-40	C2
T43	Malus sp. Apple	8.0	6.0	6.0	7.0	7.0	0.25	1.00	0.50	W	SM	G	G	Attractive Apple tree.	20-40	C2
T44	Quercus frainetto Hungarian oak	8.0	9.0	9.0	9.0	9.0	0.40	1.00	0.00	N	SM	G	G	Tree with wide canopy.	20-40	C2
T45	Betula pendula Silver Birch	11.0	7.0	6.0	6.0	6.0	0.35	1.00	0.50	W	EM	G	G	Attractrive Birch.	20-40	B2
T46	Acer pseudoplatanus Sycamore	11.0	4.0	7.0	9.0	7.0	0.80	1.00	0.50	S	M	G	G	Tall Sycamore.	40+	B2
T47	Acer pseudoplatanus Sycamore	11.0	9.0	5.0	5.0	5.0	0.70	1.00	0.50	N	M	G	G	Tall Sycamore.	40+	B2
T48#	Acer pseudoplatanus Sycamore	11.0	5.0	5.0	8.0	8.0	0.60	1.00	0.50	S	M	G	G	Tall Sycamore.	40+	B2

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Drawing reference: JSL3708_700-702
Survey date: 17/08/2020

Surveyor: A Brown
Status: For Information
Revision: .A
Notes:

Ref. no.	Species	Height (m)	Crown spread (m) N	E	S	W	Stem dia. (m)	Stem no. at 1.5m	Height of crown clearance (m)	Dir/ height	Age class	Structural condition	Physiological condition	General observations Management recommendations	Estimated remaining contribution (years)	Tree Quality Category (BS5837)
T49	Prunus laurocerasus Cherry Laurel	6.0	7.0	7.0	7.0	7.0	0.57	10.00	0.00	W	EM	G	G	Wide spread Cherry laurel.	20-40	C2
T50	Sorbus aria Whitebeam	6.0	6.0	4.0	4.0	4.0	0.25	1.00	0.50	N	SM	G	G	Tree which slight lean northwards.	20-40	B2
T51#	Quercus robur Pedunculate Oak	9.0	8.0	6.0	6.0	6.0	0.40	1.00	0.00	N	SM	G	G	Attractive oak.	20-40	B2
T52#	Prunus avium Wild Cherry	8.0	6.0	7.0	6.0	6.0	0.45	3.00	0.50	N	EM	G	G	Cherry which trifurcates at 1m.	20-40	B2
T53#	Sambucus nigra Elder	5.0	3.0	3.0	4.0	3.0	0.34	5.00	0.50	S	Y	G	G	Small, muliti-stemmed tree.	10+	C2
T54	Fraxinus excelsior Common Ash	11.0	4.0	8.0	4.0	4.0	0.32	2.00	0.50	E	SM	G	G	Ash which trifurcates at 1m.	20-40	C2
T55	Fraxinus excelsior Common Ash	12.0	7.0	8.0	7.0	8.0	0.50	1.00	0.50	W	EM	G	G	Ash with wide crown.	20-40	B2
T56	Prunus avium Wild Cherry	10.0	6.0	7.0	6.0	6.0	0.50	1.00	0.50	W	M	G	G	Cherry with previous pruning wounds.	40+	B2
T57	Fraxinus excelsior Common Ash	11.0	7.0	6.0	6.0	6.0	0.35	1.00	0.50	S	SM	G	G	Ash with southerly lean.	20-40	C2
T58	Chamaecyparis lawsoniana Lawson Cypress	12.0	3.0	3.0	3.0	3.0	0.50	1.00	0.00	S	M	G	G	Conifer on edge of row.	40+	B2
T59	Chamaecyparis lawsoniana Lawson Cypress	11.0	4.0	4.0	4.0	4.0	0.50	1.00	0.00	S	M	G	G	Attractive, tall tree.	40+	B2
T60	Acer pseudoplatanus Sycamore	7.0	6.0	6.0	6.0	6.0	0.20	1.00	0.50	E	SM	G	F	Sycamore with Tar spot present.	20-40	C2

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Surveyor: A Brown
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Revision: .A
Notes:

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T61	Fraxinus excelsior Common Ash	11.0	5.0	4.0	4.0	5.0	0.40	2.00	2.00	N	EM	G	G	Ash which bifurcates at 0.5m.	20-40	C2
T62	Betula pendula Silver Birch	12.0	5.0	5.0	5.0	4.0	0.50	1.00	0.50	S	M	G	G	Tall Birch.	40+	B2
T63#	Betula pubescens Downy Birch	12.0	6.0	6.0	7.0	6.0	0.50	1.00	0.50	S	M	G	G	Very impressive tree. Biifurcates at 2m.	40+	B2
T64#	Acer pseudoplatanus Sycamore	12.0	6.0	6.0	7.0	8.0	0.45	1.00	3.00	S	EM	G	G	Attractive tree in front of fence.	20-40	B2
T65	Quercus robur Pedunculate Oak	11.0	8.0	8.0	8.0	8.0	1.00	1.00	2.00	S	M	G	G	Mature Oak.	40+	A2
T66	Acer pseudoplatanus Sycamore	12.0	6.0	6.0	7.0	7.0	0.70	1.00	4.00	N	EM	G	G	Tall Sycamore. Crown overhangs fence.	20-40	B2
T67#	Fraxinus excelsior Common Ash	8.0	4.0	4.0	5.0	4.0	0.70	1.00	2.00		M	P	P	Dead.	<10	U
T68	Prunus avium Wild Cherry	9.0	7.0	6.0	5.0	5.0	0.55	3.00	4.00	N	M	G	G	Cherry with four stems.	40+	B2
T69	Prunus avium Wild Cherry	7.0	8.0	7.0	3.0	4.0	0.50	2.00	3.00	N	M	G	G	Cherry which triifurcates at 0.5m. Ivy present.	40+	B2
T70	Prunus avium Wild Cherry	7.0	7.0	7.0	4.0	6.0	0.25	1.00	2.00	N	SM	G	G	Cherry with some fungi present.	20-40	C2
T71	Prunus avium Wild Cherry	9.0	5.0	7.0	7.0	8.0	0.57	2.00	2.00	W	M	G	G	Cherry which bifurcates at 0.5m.	40+	B2
T72#	Acer platanoides Norway Maple	9.0	6.0	7.0	7.0	6.0	0.48	1.00	4.00	S	SM	G	G	Norway Maple near road.	20-40	B2

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Drawing reference: JSL3708_700-702
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Revision: .A
Notes:

Ref. no.	Species	Height (m)	Crown spread (m) N	E	S	W	Stem dia. (m)	Stem no. at 1.5m	Height of crown clearance (m)	Dir/ height	Age class	Structural condition	Physiological condition	General observations Management recommendations	Estimated remaining contribution (years)	Tree Quality Category (BS5837)
T73#	Acer platanoides Norway Maple	8.0	6.0	5.0	5.0	5.0	0.32	1.00	4.00	S	SM	G	G	Norway Maple near road.	20-40	B2
T74	Acer platanoides Norway Maple	9.0	5.0	5.0	5.0	0.4	0.40	1.00	4.50	E	SM	G	G	Norway Maple near road.	20-40	B2
T75	Prunus avium Wild Cherry	9.0	7.0	7.0	7.0	7.0	0.60	4.00	0.50	E	SM	G	G	Cherry with four stems.	20-40	C2
T76	Quercus robur Pedunculate Oak	14.0	12.0	12.0	12.0	12.0	1.20	1.00	2.00	-	M	G	G	Huge Oak on the edge of the site with some big cavities in the stem.	40+	A1/3
W1	Betula pendula Silver Birch, Quercus robur Pedunculate Oak, Fagus sylvatica Common Beech, Acer campestre Field Maple, Prunus laurocerasus Cherry Laurel, Tilia platyphyllos Broad-leaved Lime, Crataegus monogyna Common Hawthorn	10.0	See Plan				-	-	0.00	-	Y-M	G	G	Impressive woodland bordering fence. Species rich.	40+	A2
W2	Fraxinus excelsior Common Ash, Acer pseudoplatanus Sycamore, Liriodendron tulipifera Tulip Tree	12.0	See Plan				-	-	0.00	-	Y-M	G	G	Attractive woodland across western boundary.	40+	B2
W3	Fraxinus excelsior Common Ash, Acer pseudoplatanus Sycamore, Quercus robur Pedunculate Oak, Prunus avium Cherry, Tilia platyphyllos Broad-leaved Lime, Crataegus monogyna Common Hawthorn, Prunus laurocerasus Cherry Laurel, Populus sp. Poplar	12.0	See Plan				-	-	0.00	-	Y-OM	G	G	Impressive, dense woodlandwith much species diversity.	40+	A2

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G1	Betula pendula Silver Birch, Tilia platyphyllos Broad-leaved Lime, Quercus robur Pedunculate Oak, Prunus avium Cherry	9.0	See Plan				-	-	0.50	-	Y-M	G	G	Mixed group. High amenity.	40+	B2
G2	Fraxinus excelsior Common Ash, Prunus avium, Cherry, Acer pseudoplatanus Sycamore, Buxus sempervirens Common Box	9.0	See Plan				-	-	0.00	-	Y-M	Varies	Varies	Mixed group. Some dead and fallen trees.	40+	C2
G3	Fraxinus excelsior Common Ash	5.0	See Plan				-	-	0.50	-	Y	G	G	Group of young Ash trees and shrubs.	10+	C2
G4	Fraxinus excelsior Common Ash, Sambucus nigra Elder	9.0	See Plan				-	-	0.00	-	Y	G	G	Scrub.	10+	C2
G5	Fraxinus excelsior Common Ash, Acer pseudoplatanus Sycamore, Sambucus nigra Elder	12.0	See Plan				-	-	0.50	-	Y-M	G	G	Group of young trees adjacent to larger trees.	40+	B2
G6	Fraxinus excelsior Common Ash, Prunus avium Cherry	6.0	See Plan				-	-	0.50	-	Y	G	G	Selection of young Ash and Cherry trees.	10+	C2
G7	Sambucus nigra Elder, Rubus Bramble	5.0	See Plan				-	-	0.00	-	Y	G	G	Small trees and shrubs.	10+	C2
G8	Fraxinus excelsior Common Ash, Acer pseudoplatanus Sycamore	5.0	See Plan				-	-	0.00	-	Y	G	G	Young Ash and Sycamore.	10+	C2
G9	Sorbus aria Whitebeam	7.0	See Plan				-	-	0.00	-	SM	G	G	Attractive group.	20-40	B2
G10	Fraxinus excelsior Common Ash, Prunus avium Cherry	7.0	See Plan				-	-	0.00	-	Y	G	G	A number of young Ash trees.	10+	C2

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G11	Betula pendula Silver Birch, Fraxinus excelsior Common Ash, Prunus avium Cherry, Acer campestre Field Maple, Prunus laurocerasus Cherry Laurel	12.0	See Plan				-	-	0.00	-	Y-EM	G	G	Attractive row of plantings, primarily consisting of Cherry. Stands out in landscape and provides much amenity to the area.	40+	B2
G12#	Crataegus monogyna Common Hawthorn	7.0	See Plan				-	-	0.50	-	Y	G	G	Young Hawthorn trees.	10+	C2
G13	Betula pendula Silver Birch,Quercus robur Pedunculate Oak, Sambucus nigra Elder, runus avium Cherry, Tilia platyphyllos Broad-leaved Lime, Crataegus monogyna Common Hawthorn	12.0	See Plan				-	-	0.00	-	Y-M	G	G	Row of plantings. Very impressive, species rich group providing high land value.	40+	B2
G14	Fagus sylvatica Common Beech	7.0	See Plan				-	-	0.10	-	SM	G	G	Group of Beech with wide crowns.	20-40	B2
G15#	Chamaecyparis lawsoniana Lawson Cypress	12.0	See Plan				-	-	0.00	-	EM	G	G	Row of conifers at top of slope.	40+	B2
H1	Fagus sylvatica Common Beech	5.0	See Plan				-	-	0.00	-	Y	G	G	Young hedge bordering car park.	20+	C2

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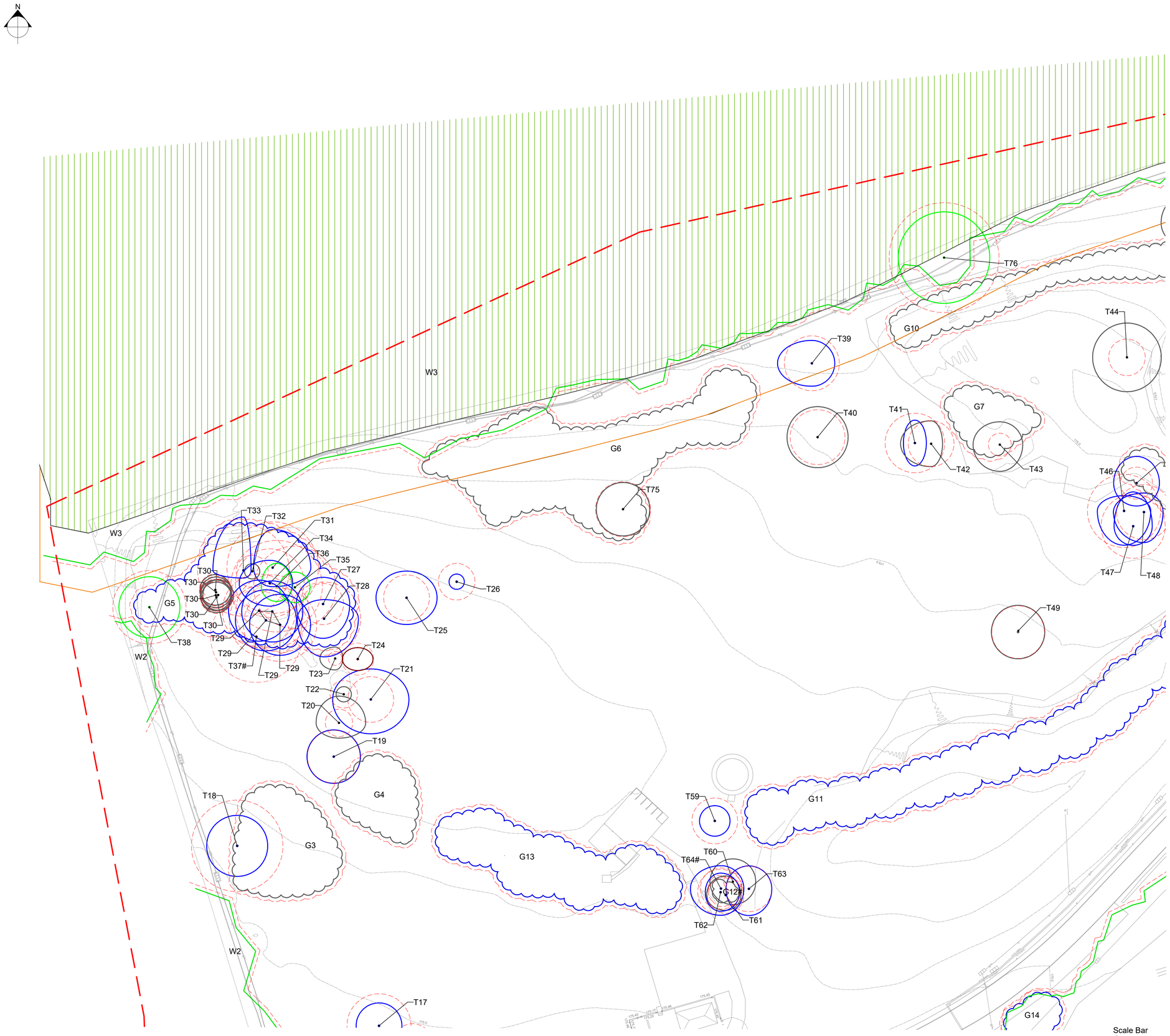
Annex B

Tree Constraints Plan 20305S-RPS-00-XX-DR-A-9561 - 63



Notes

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Key

- Survey boundary.
- T1 — Tree with numbered reference. Canopy spread and BS5837:2012 tree quality category as shown below.
- T1# — Tree (location estimated) with numbered reference. Canopy spread and BS5837:2012 tree quality category.
- T1* — Tree off-site with numbered reference. Canopy spread and BS5837:2012 tree quality category.
- G1 — Vegetation group with numbered reference. Canopy extents and BS5837:2012 tree quality category as shown below.
- Woodland with numbered reference. Canopy extents and BS5837:2012 tree quality category as shown below.
- H1 — Hedge with numbered reference. Width and BS5837:2012 tree quality category as shown below.

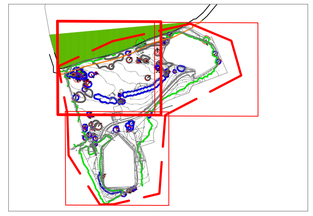
BS 5837:2012 Tree Quality Categories - Table 1

- Category A - High quality
- Category B - Moderate quality
- Category C - Low quality
- Category U - Unsuitable for retention

- Ancient Woodland
- Ancient Woodland Buffer-15m
- Root protection area (RPA) Calculated in accordance with Section 4.6 - BS5837:2012

NOTES:

- Refer to RPS Tree Survey Report & Schedule for further details.
- Survey based on a visual inspection from the ground and is not intended as a full arboricultural inspection.
- Plan produced in accordance with recommendations set out in BS 5837:2012 - 'Trees in Relation to design, demolition and construction'.
- Due to the legal protection afforded to breeding birds vegetation removal should not take place during the bird nesting period; generally, although not restricted to, March - August inclusive.
- Survey based upon topographic survey produced by Clifton Surveys in June 2020.



Rev	Description	By	CB	Date
A	Minor Amends	AB	DC	Jan 2021

MAKING COMPLEX EASY

Lakesbury House, Hiltingbury Road, Chandlers Ford, Hampshire SO53 5SS

T: 02380 810 440 **E:** rpsso@rpsgroup.com

Client: Mullhaven Properties LLC

Project: Proposed Replacement Data Centre

Title: Tree Constraints Plan

Status	Drawn By	PM/Checked by
For Information	AB	DC

Job Ref	Scale @ A1	Date Created
JSL3708	1:500	August 2020

RPS Drawing / Figure Number: 20305S-RPS-00-XX-DR-A-9561 Rev: A

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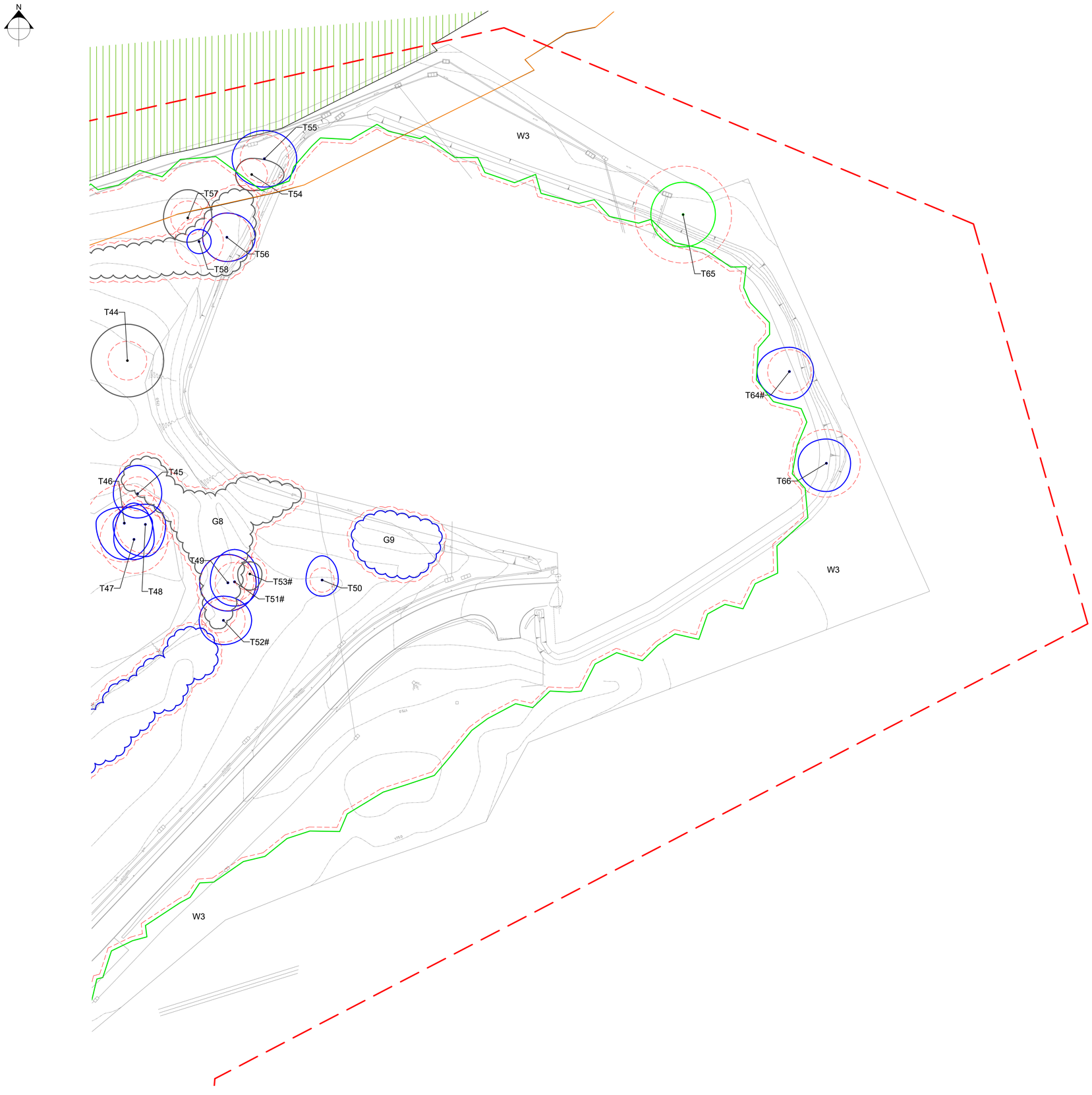

Scale Bar

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- Category A - High quality
- Category B - Moderate quality
- Category C - Low quality
- Category U - Unsuitable for retention

Ancient Woodland

Ancient Woodland Buffer-15m

Root protection area (RPA) Calculated in accordance with Section 4.6 - BS5837:2012

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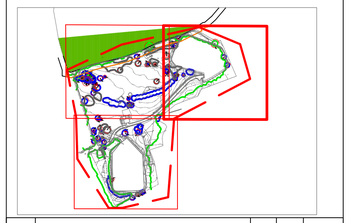

Rev	Description	By	CB	Date
A	Minor Amends	AB	DC	Jan 2021

MAKING COMPLEX EASY

Lakesbury House, Hiltingbury Road, Chandlers Ford, Hampshire SO53 5SS

T: 02380 810 440 **E:** rpsso@rpsgroup.com

Client: Mullhaven Properties LLC

Project: Proposed Replacement Data Centre

Title: Tree Constraints Plan

Status	Drawn By	PM/Checked by
For Information	AB	DC

Job Ref	Scale @ A1	Date Created
JSL3708	1:500	August 2020

RPS Drawing / Figure Number: 20305S-RPS-00-XX-DR-A-9562 Rev: A

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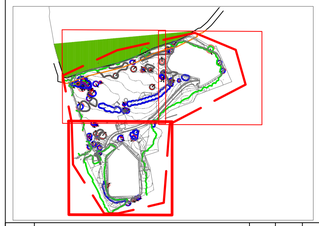

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A	Minor Amends	AB	DC	Jan 2021

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Project: Proposed Replacement Data Centre

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Status	Drawn By	PM/Checked by
For Information	AB	DC

Job Ref	Scale @ A1	Date Created
JSL3708	1:500	August 2020

RPS Drawing / Figure Number: 20305S-RPS-00-XX-DR-A-9563

Rev: A

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Annex C

Tree Protection/Removal Plan 20305S-RPS-00-XX-DR-A-9564 - 66

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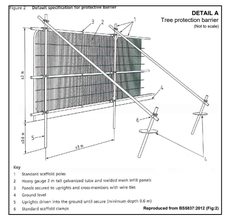

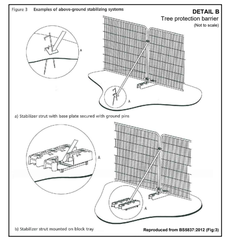

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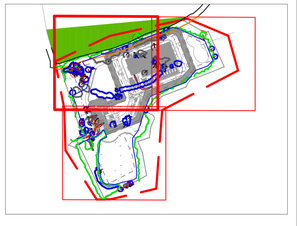

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Rev	Description	By	CB	Date
B	Updated layout	AB	BW	March 2021
A	Updated layout	AB	DC	Dec 2020

MAKING COMPLEX EASY

Lakesbury House, Hiltingbury Road, Chandlers Ford, Hampshire SO53 5SS

T: 02380 810 440 **E:** rpsso@rpsgroup.com

Client: Mullhaven Properties LLC

Project: Proposed Replacement Data Centre

Title: Tree Protection and Removal Plan

Status	Drawn By	PM/Checked by
For Planning	AB	DC

Job Ref	Scale @ A1	Date Created
JSL3708	1:500	October 2020

RPS Drawing / Figure Number: 20305S-RPS-00-XX-DR-A-9564 Rev: B

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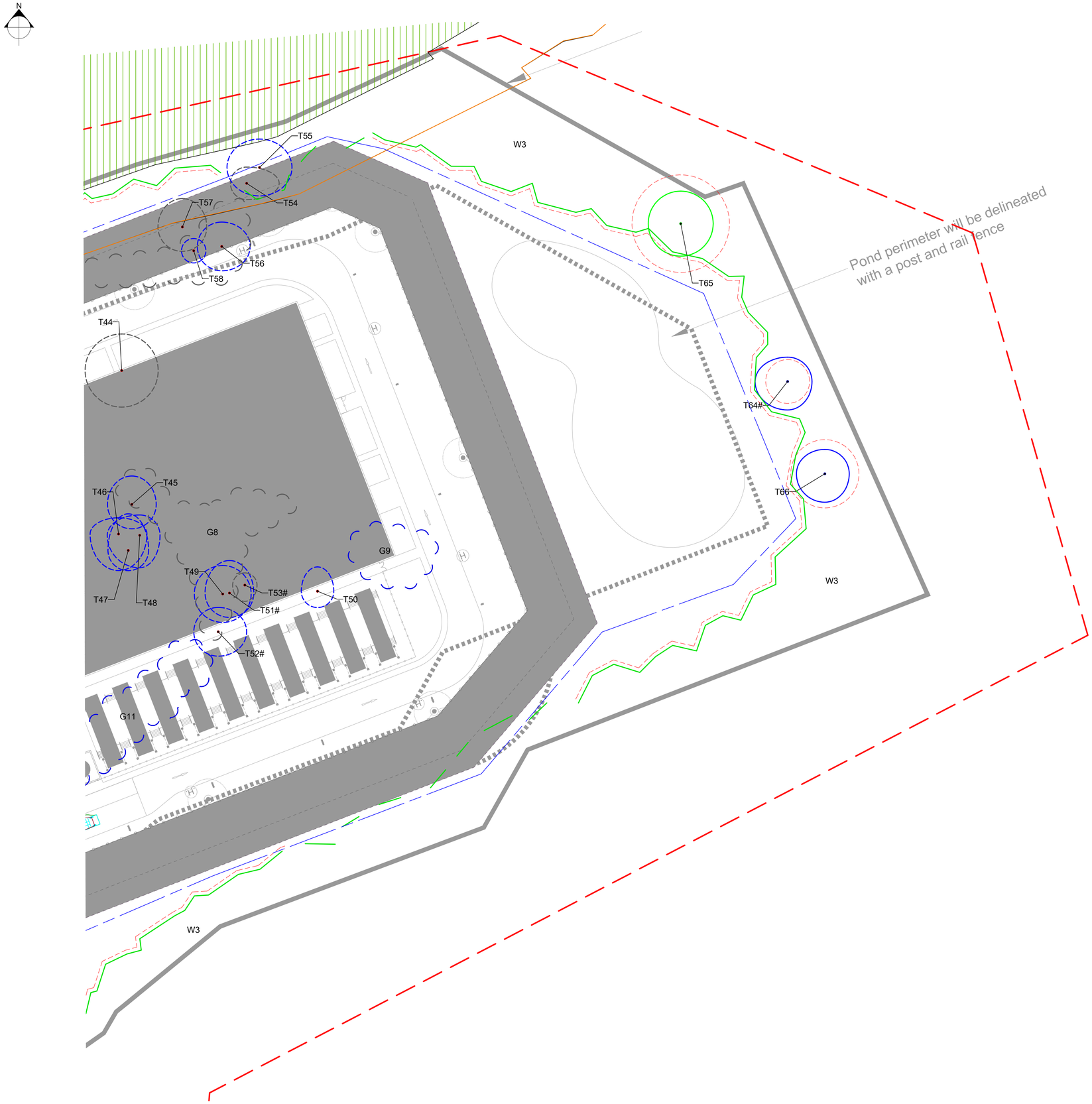

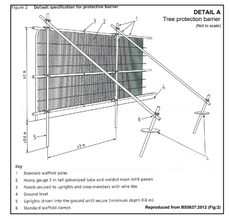

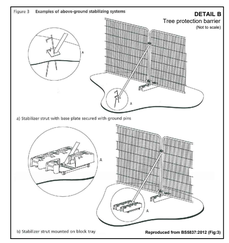

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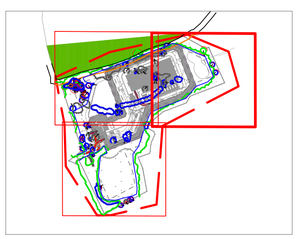

Scale Bar

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MAKING COMPLEX EASY

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For Planning	AB	DC

Job Ref	Scale @ A1	Date Created
JSL3708	1:500	October 2020

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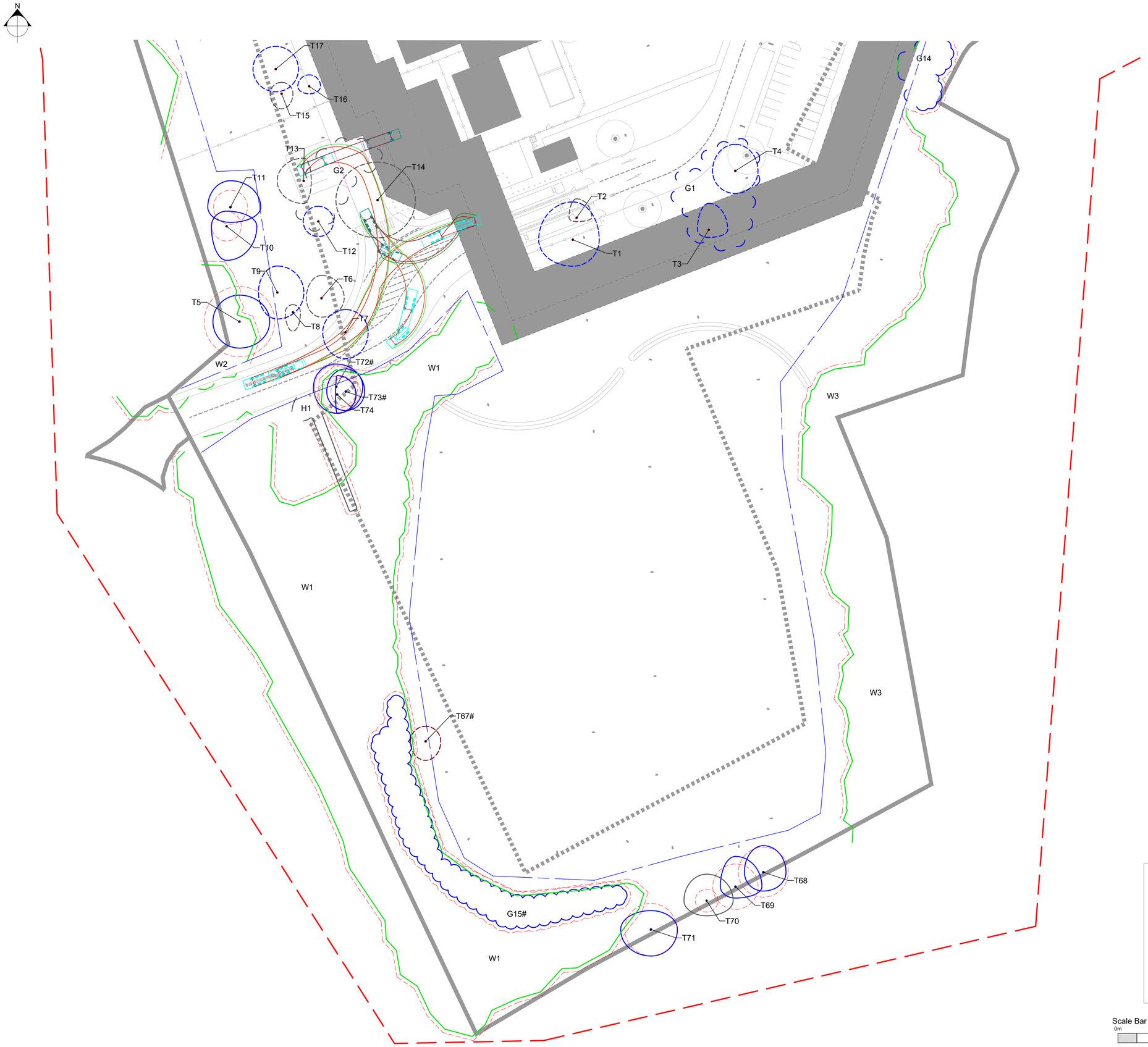

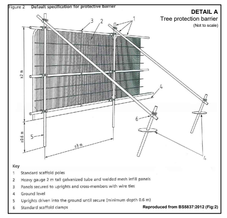

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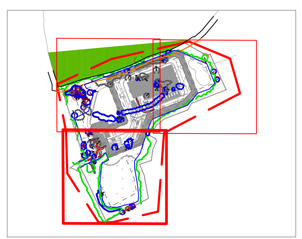

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Annex D

Email Response from Swindon Borough Council

Hello Alice,

Thank you for your contact regarding the above matter. I have checked the files and can confirm that there are currently **no tree preservation orders** within, or immediately adjacent to, the subject property. The area edged red on your location plan is **not within a conservation area**, but the site adjoining to the south (Burderop Park) has a number of TPOs within it and the trees immediately adjacent to its north-western boundary are included within an extant planning condition controlling their management.

Kind regards,

Tim

Tim Stringer

Arboricultural Officer

Masterplanning, Design and Conservation

Swindon Borough Council

Annex E

Example Tree Protection Barriers (BS5837:2012 Fig 2 & 3)

Figure 2 **Default specification for protective barrier**

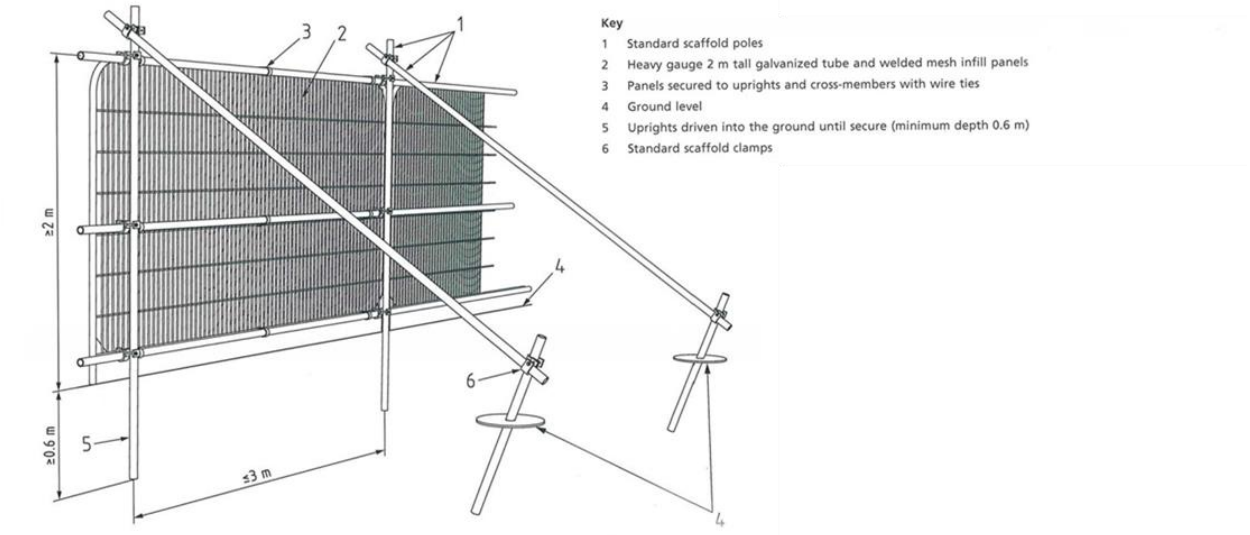
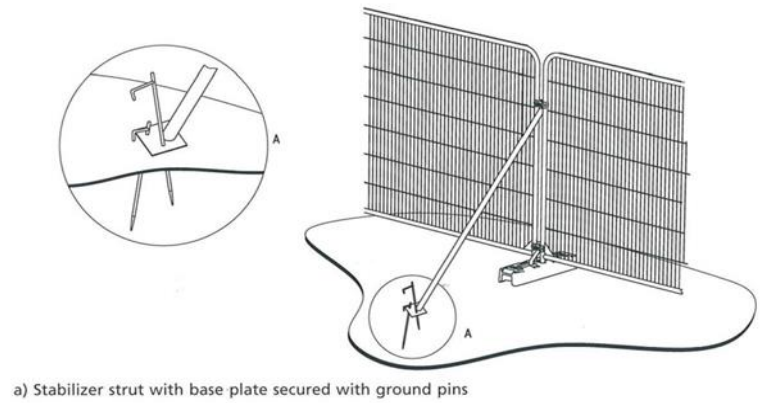
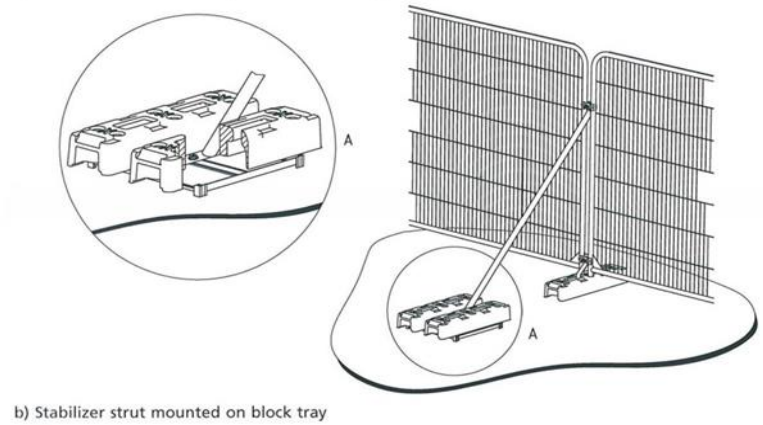


Figure 3 **Examples of above-ground stabilizing systems**



a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

Annex F

Construction Exclusion Zone (CEZ) Signage

Annex G

Arboricultural Glossary

Age-class - A general classification of the tree into either - young, semi-mature, early mature, mature, over-mature, or veteran.

Apical Bud/Shoot – The apical bud, also known as the leading shoot, is responsible for shoot extension and is dominant.

Apical Dominance – A singular, leading shoot remains dominant.

Arboreal - In connection with, or in relation to, trees.

Arboriculturalist – Person who has, through relevant education, training and experience, gained recognised qualifications and expertise in the field of trees in relation to construction.

Arboricultural Implications Assessment (AIA) – Study, undertaken by an arboriculturalist, to identify, evaluate and possibly mitigate the extent of direct and indirect impacts on existing trees that may arise as a result of the implementation of any site layout proposal.

Arboricultural Method Statement (AMS) – Methodology for the implementation of any aspect of development that has the potential to result in the loss of or damage to a tree. Note The AMS is likely to include details of an on-site tree protection monitoring regime.

Asymmetric crown- Crowns that have a morphological bias in a particular direction. This can give the tree an aesthetically unfavourable appearance, but can also subject the tree to uneven wind- loading forces and potentially result in failure.

Basal – Referring to the bottom part of a tree's stem.

Basifugal mortality – A natural process seen in trees in an advanced life stage whereby the trees extremities die back and the inner crown expresses new growth, in order to conserve energy reserves.

Bifurcated - A growth characteristic, where two stems of similar size grow from the same point. Can create an inherent weakness.

Branch union/junction - The point at which a branch joins a larger stem. Can be a point of weakness, especially in certain species.

Brown Rot- Decay caused by certain species of fungus which results in the affected wood becoming brittle and liable to suddenly 'break out', especially if in key structural areas.

Buttress flares – Extensions of the basal stem of a tree that provide additional structural support. See reaction wood.

Bifurcated- A growth characteristic, where two or more stems of similar size grow from the same point. Can create an inherent weakness.

Cable braces – Cable braces used to support the crown of a tree, reduce impacts caused by wind- throw oscillation.

Canker – A clearly defined area of dead and sunken or malformed bark, caused by bacteria or fungi. Can have a bearing on structural integrity of infected limb(s) depending on size and location.

Central leader- See apical dominance.

Chalara ash dieback- A disease affecting ash trees caused by the fungus *Hymenoscyphus fraxineus*. Usually fatal, the disease causes leaf loss and crown dieback in infected trees. It was first confirmed in Britain in 2012.

Chlorosis- yellowing of leaves which can be caused by a range of factors, often an indicator of nutrient deficiency.

Compaction - The compressing & hardening of soil around tree root systems, due to vehicular/pedestrian use etc. Loss of pore space between soil granules limits water movement and gaseous exchange, and inhibits root growth.

Companion shelter- Shelter provided by neighbouring trees in groups to one another, factors such as wind throw are reduced due to supporting branches and interlocking root systems. Removing individual trees on the peripheries of such groups can expose neighbouring trees to environmental factors they have not previously been subjected to and can lead to individual failure.

Competent person – Person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached

Note 1 A competent person understands the hazards and the methods to be implemented to eliminate or reduce the risks that can arise. For example, when on site, a competent person is able to recognise at all times whether it is safe to proceed.

Note 2 A competent person is able to advise on the best means by which the recommendations of this British Standard may be implemented.

Condition – Assessment based on a visual and professional view giving consideration to many factors such as tree health, structural integrity and suitability of its position.

Conservation dead- wooding- Removal of deadwood using 'coronet cuts' that mimic the way a branch would naturally break off, maximising deadwood habitat availability for invertebrates.

Coppice - The method of managing trees by cutting the stems at between 1.0 inch and 1.0 foot from the ground level on a regular cycle, the cut stumps of the trees or shrubs are allowed to re-grow many new stems.

Crown spread - Gives distances between extreme limits of the crown and the stem, usually along the four compass points. Helps to show crown symmetry.

Crown Reduction – The removal of branch ends to reduce the extreme limits of a trees branch spread and height.

Crown Thin – The removal of selected branches within the crown to thin the internal branch structure.

D.B.H. - 'Diameter at Breast Height', an industry standard to gauge tree stem size and development. Within arboriculture, breast height is taken to be 1.5m above ground level.

Dieback - The reduction in crown vigour and extension growth progressing to death of distal parts; often associated with decline.

Epicormic growth - New growth from dormant buds that can often form tenuous attachments. Although some species readily form such shoots, it can be an indication of stress.

Form - A general assessment of the shape and position of the tree within its environment.

Hanger – Term used to describe a branch that has become detached and is being supported by other branches. Can be a hazard to persons and property below.

Hazard Beam – After the loss of a distal part, a limb concentrates growth upwards creating adverse end weights that can render the limb susceptible to failure. .

Included bark – Growth characteristic usually caused when two or more stems/branches growing in close proximity 'fuse' together entrapping the bark from when the parts were separate in the middle, creating a structural weakness.

Invertebrate tower – Pollarding of a (usually dead) tree to a safe height that leaves part of the main stem as a deadwood habitat for invertebrate species.

Occlusion/Occluded – Normally used to describe the overgrowth of a wound. Also, immoveable foreign objects in contact with a tree part can become encased or 'occluded' by the tree as it grows incrementally.

Pathogen - An agent that causes disease, especially a living microorganism such as a bacterium or fungus.

Phototropic growth – Growth responding to a light stimulus i.e. the sun. This can influence the form of a tree, particularly where other factors e.g. buildings or other trees, affect the amount/ direction light is received.

Pollard – The removal and subsequent regular re-removal of the crown of a tree above animal browsing height. Can be an effective method of controlling the size of trees in urban areas. This is ideally begun in the trees early stages and maintained throughout its life.

Reaction wood - Essentially additional wood laid down by the tree to compensate for structural defects such as cavities.

Rhizosphere - The rhizosphere is the narrow region of soil that is directly influenced by root secretions and associated soil microorganisms. In particular, mycorrhizal fungi form a symbiotic relationship with trees and assist in the assimilation of phosphates essential to the trees health.

Ring barking/Girdling – the removal of bark around the entire circumference of a stem or branch, causing the death of all distal parts.

Root Protection Area (RPA) – Layout design tool indicating the area surrounding a tree that contains sufficient rooting volume to ensure the survival of the tree, shown in plan form in m^2.

Scaffold limbs - The main structural branches within the crown.

Tree protection plan – scale drawing prepared by an arboriculturalist showing the finalised layout proposals, tree retention and tree and landscape protection measures detailed within the arboricultural method statement (AMS), which can be shown graphically.

U.L.E – 'Useful Life Expectancy' is an estimate based on currently known factors of the possible remaining life of the tree as an asset. AKA 'Estimated remaining contribution'.

Veteran tree – Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.

Vigour - A general classification, as to the present and future potential growth and development of a tree. A comment regarding the health status of the tree specific to its species.

White Rot - A type of decay caused by certain species of fungi which results in the affected wood becoming flexible with little compressive strength.