ARUP

Amazon Data Services UK Ltd

Hemel Hempstead Data Centre – Emergency Back-up Generation Facility

Site Condition Report - Environmental Permit Application

Reference: 284474-EP-SCR

Issue | 6 May 2022

Job number 284474-00

Ove Arup & Partners Limited
8 Fitzroy Street
London
W1T 4BJ
United Kingdom
arup.com

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Introduction

Ove Arup & Partners Ltd (Arup) has been commissioned by Amazon Data Services UK Limited (henceforth referred to as 'the Operator') (henceforth known to prepare a Site Condition Report (SCR) to accompany a bespoke application for an Environmental Permit (EP) for the Hemel Hempstead Data Centre – Emergency Back-up Generation Facility only (not including the whole data centre).

The application is made by Amazon Data Services UK Limited, which is the legal entity that will be responsible for operating the generating installation.

The data centre is located at 3A Blossom Way, Hemel Hempstead. in the Borough of Dacorum, Hertfordshire.

The site comprises 33 containerised generators for emergency back-up purposes with a combined thermal input capacity of 222 MWth. 30 of the main back-up generators are double stacked, with two being included as secondary back-ups (redundancy). There is also a smaller ('house') generator to cover non-critical loads (e.g., office lights, office fire system) during an emergency.

The permitting activities on-site fall under The Environmental Permitting (England and Wales) Regulations 2016 (EPR) - Section 1.1 Part A(1)(a) burning any fuel in an appliance with a rated thermal input of 50 or more megawatts). Directly associated activities also considered on-site comprise the storage of diesel fuel for use in the emergency back-up generators.

This SCR aims to record and describe the condition of the land at the site prior to the commencement of any permitted operations with particular attention paid to contamination levels in the underlying and surrounding soil and groundwater.

The location of the site is illustrated in the Site Location Plan[1] and the EP boundary and site layout are illustrated in the Site Layout and Emissions Point Plan[2]. These are included with the EP application as Documents 284474-EP-DR001 and 284484-EP-DR002 respectively.

This SCR follows the Environment Agency's (EA) H5 template[3], with Section 1 to 3 populated in this report.

Sections 4 to 7 of the SCR template will be maintained during the life of the EP and Sections 8 to 10 will be completed and submitted in support of the application to surrender the EP.

The H5 template is considered by the EA to satisfy[4] the 'baseline report' requirements of the European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions (IED)[5].

[1] Site Location Plan (Document reference 284474-EP-DR001)

[2] Site Layout and Emissions Point Plan (Document reference 284474-EP-DR002)

[3] EA, 2013. Environmental permitting: H5 Site condition report. Available at https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report Accessed April 2022

[4] EA, 2013. Site Condition report - guidance and templates - Environmental Permitting Regulations. Available at <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/298106/LIT_8001_38258e.pdf> Accessed April 2022

[5] EU, 2014. Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0506(01)&from=EN> Accessed April 2022.

1. Site Details

1.1 Name of the applicant

Amazon Data Services UK Ltd

1.2 Activity address

3A Blossom Way, Hemel Hempstead. in the Borough of Dacorum, Hertfordshire.

1.3 National grid reference

TL 08125 07513

1.4 Document reference and dates for SCR at permit application and surrender

Document reference: 284474-EP-SCR

1.5 Document reference for site plans

- Site Location Plan[1] (Document reference 284474-EP-DR001)
- Site Layout and Emission Point Plan[2] (Document reference 284474-EP-DR002)
- Environmental Site Settings[6] (Document reference 284474-EP-DR003)
- Cultural and Natural Heritage[7] (Document reference 284474-EP-DR004)
- Site Drainage Plans[8], Flood Risk Assessment and Drainage Strategy[9] (See Appendix 03-03)
- EA Pre-Application Screening[10]

1.6 Key Objectives

The key objectives of this report are to:

- Establish the environmental setting of the site and determine its environmental sensitivity;
- Identify activities that are currently undertaken at the site;
- Establish the extent of historical contamination in the soil and groundwater in areas where current and/or future processes may include similar potentially contaminating substances;
- To identify the Site Conditions at the site at the point of varying the permit for the facility (baseline condition) such that they may be used as a point of reference to determine whether the site has been contaminated during the site's permitted operation in line with the IED and EPR requirements; and
- To provide conclusions on whether land quality has been impacted from historical activities.

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[6] Environmental Site Settings (Document reference 284474-EP-DR003).

[7] Cultural and Natural Heritage (Document reference 284474-EP-DR004).

[8] Site Drainage Plans (drawing ref LHR095-ARP-00-XX-DR-C1200 to C1204 and LHR095-ARP-00-XX-DR-C1100 to C1102).

[9] Arup, 2022. Flood Risk Assessment and Drainage Strategy Report (2022) (Document ref ARP-005).

[10] EA, 2022. Nature and heritage Conservation Screening Report - Preapplication Screening - EPR/BP3546QP/A001, 1st April 2022

2. Condition of land at permit issue

2.1 Environmental Setting

2.1.1 Geology

The British Geological Survey (BGS) mapping the geological succession at the site is as indicated in the table below, with mapped extents of outcrop as shown on the figures below. However, ground investigations at the site have shown that the Lambeth Group appears to be generally absent on this site, but the Clay with Flints encountered as the uppermost layer of bedrock geology across the whole of the site. Made Ground was also encountered across the whole site during the ground investigations.

Table 1 Summary of geology from BGS and previous GI

Strata	Location shown on BGS maps	Short description (based on BGS map)	Remarks based on data from GIs	Recorded thickness (m)
Made Ground	Not shown	N/A	Made Ground recorded to generally comprise gravelly clay to sandy gravel.	0.1 to 1.0
Clay-with-flints Formation	Southern and central portion of the site.	Mainly orange-brown and red-brown sandy clay with abundant nodules and rounded pebbles of flint.	Present across entire site	1.0 to 4.7
Lambeth Group (formerly known as Woolwich and Reading Beds)	Northern and central portion of the site.	Vertically and laterally variable sequences mainly of clay, some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate.	Generally absent in GIs (identified in two holes, but probably in error). Outcrop boundary probably lies to north of site.	0.6 to 10.6
Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated) *For brevity, referred to in this report as simply "Chalk"*	Underlying the Lambeth Group in the northern and central portion of the site and the Clay-with-flints Formation in southern portion of the site.	Chalk with flints.	Present, to depth. Significant dissolution features present on site.	Not proven

Figure 1 Geology – Bedrock

Figure 2 Superficial Deposits

2.1.2 Hydrogeology

The Environment Agency aquifer designations for the site are:

- Clay with flints Formation is considered to be unproductive strata
- Chalk is a Principal Aquifer

Ground investigations at the site, have shown that there appears to be no water table as such in the Clay with Flints. Localised pockets of perched groundwater have occasionally been encountered however, the water levels are not considered to be representative of the underlying aquifer but localised seepages from surface water infiltration.

The ground investigations have also shown that the water table in the Chalk is at considerable depth, probably 40-50m depth, and certainly below the base of the ground investigations carried out to date. This is plausible as the site is located on relatively high lying ground.

In this context, the site setting can be considered of low to moderate sensitivity, due to the presence of low permeability superficial deposits, deep groundwater, the absence of either groundwater or surface water abstractions within 500m of the site, and the predominantly industrial/ commercial land use within the surrounding area. The EA website identified the nearest groundwater abstraction as being located 613m to the north-east of the site.

The site is also located with a Source Protection Zones (SPZ) - Zone 3 or Total Catchment (area around a supply source within which all the groundwater ends up at the abstraction point).

2.1.3 Surface water / hydrology

The (EA) Flood Map indicates that the site is located within Flood Zone 1. This means that the annual probability of flooding from a river or the sea is less than 1 in 1000, i.e. there is less than 0.1% annual probability that the site will suffer from river or sea flooding in a given year.

Regarding groundwater flooding risk, the DBC Strategic Flood Risk Assessment (SFRA) did not identify the site as being at risk from groundwater flooding.

The SFRA does not note any historical flooding occurring within the site. Taking account of all sources, the site is concluded to be at low risk of flooding.

2.2 Pollution History

Historical maps were sourced from the Groundsure report to examine the previous uses of the site. A summary of the key site developments is detailed below. Aerial imagery from between 1999 and 2018 from Google Earth Pro was also reviewed.

The first available mapping in 1878 shows the site as open fields, likely used for agriculture. An old chalk pit is shown to the northwest of the site, and an old clay pit is shown to the southeast as shown in Figure 3.

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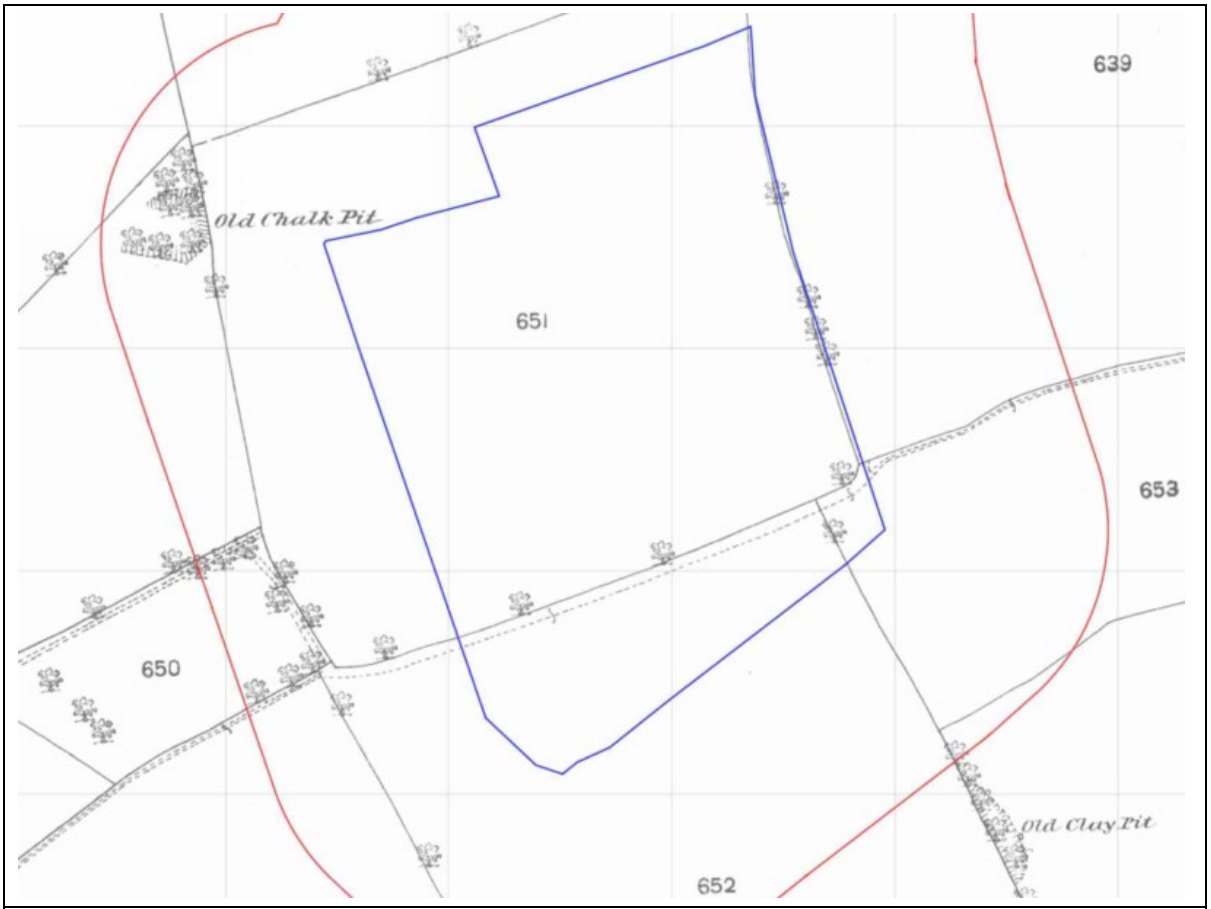


Extract from Groundsure. 1873-1878 Country Series 1:2,500 map. © Crown copyright and database rights 2018 Ordnance Survey 100035207

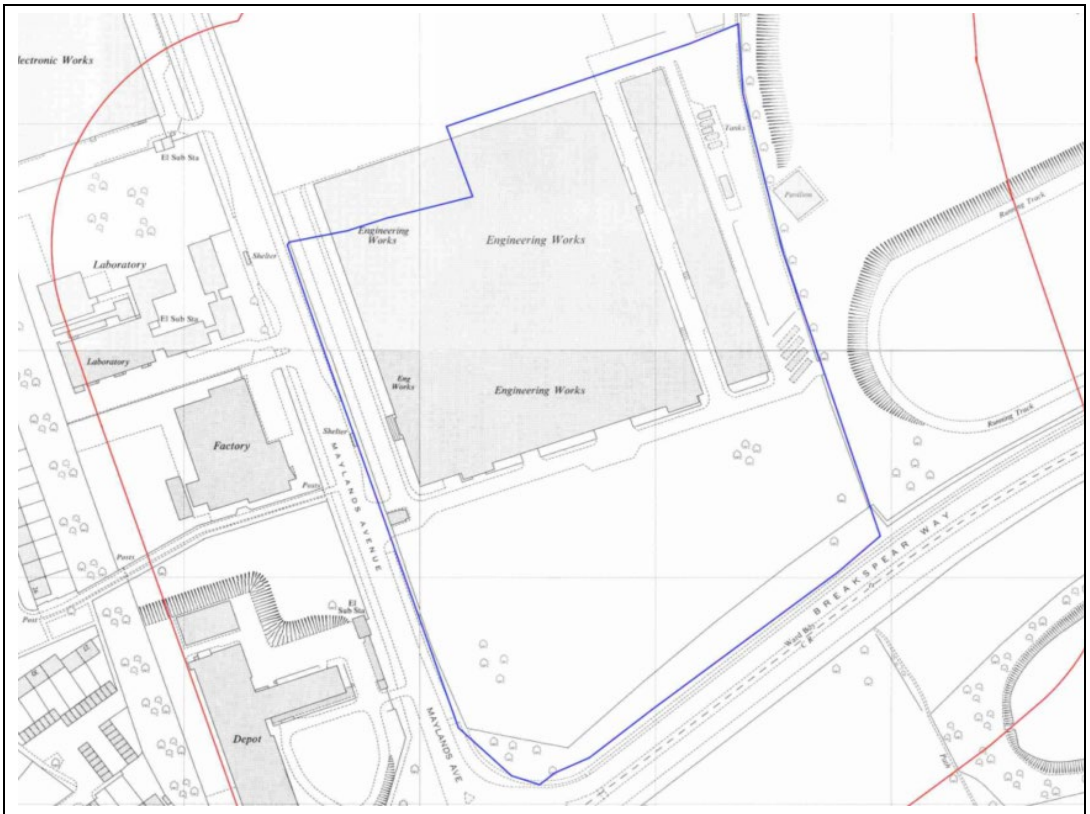
Figure 3 Extract from Groundsure. 1873-1878 Country Series 1:2,500 map

The site remains open fields until 1955 when a factory is shown in the north of the site, previous research indicates the factory opened in 1956. A second narrow building is shown parallel as shown in Figure 4. A pond feature later labelled as a balancing pond, is located approximately 100m southwest of the site.

1969-1970 mapping shows the factory building labelled as an Engineering works (known as TRW Lucas factory). The TRW Lucas factory previously manufactured power systems for aircraft and military vehicles. Processes operating at the site included a metal plating shop, a spray-painting shop, solvent degreasing and heat treatment furnaces. Tanks are shown in the historical mapping located north east of the building.

A factory, laboratory, electricity substation, depot and electronic works are shown offsite to the west. A running track, sports ground and pavilion are shown to the east of the site boundary. These were developed for use by the company's employees between 1964 and 1970. Breakspear Way runs around the southern boundary of the site. The north of the site is shown as open land.

The 1999 Google Earth imagery shows a car park in the south of the site (Figure 5) and an extension to the main building in the north.



Extract from Groundsure. 1969-1970 National Grid 1:1,250 map. © Crown copyright and database rights 2018 Ordnance Survey 100035207

Figure 4 Extract from Groundsure. 1969-1970 National Grid 1:1,250 map

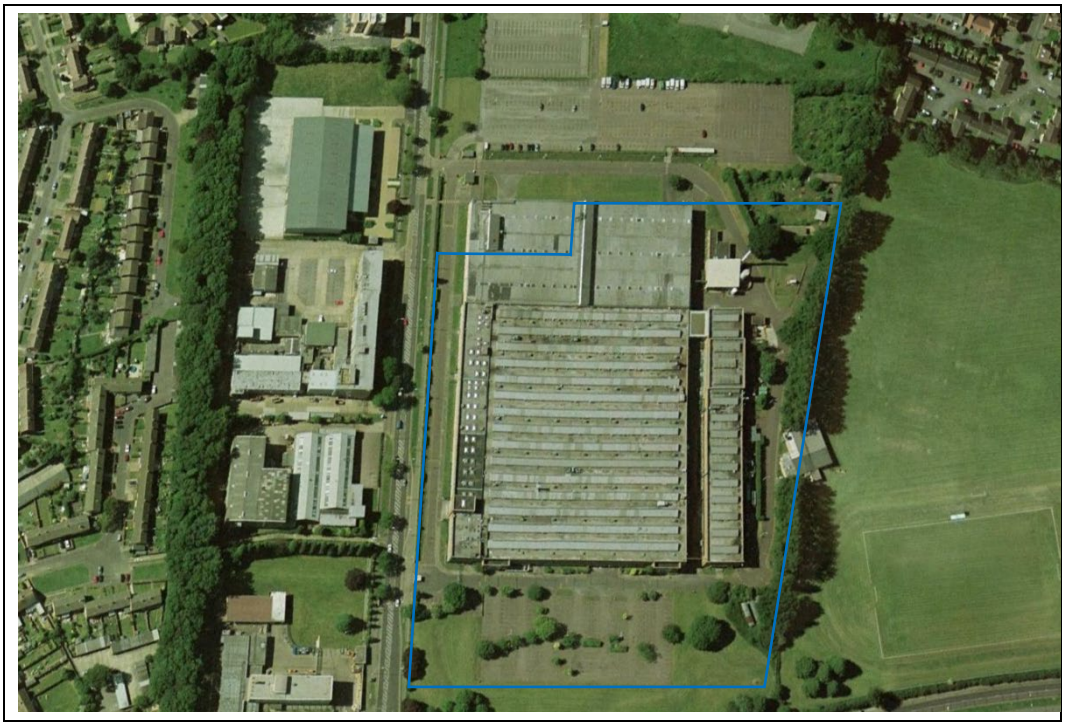


Figure 5 1999 Google Earth Pro Imagery

The operation of the factory ceased in around 2000 when the company relocated to a new site in Tring, Hertfordshire. The factory was demolished around the year 2002 and the land remained vacant until 2018 when works were initiated to prepare the land for future development (removal of slabs and creation of stockpiles) (Figure 6).

Figure 6 2018 Google Earth Pro imagery

In December 2019, Prologis UK Ltd received consent in December 2019 for the following (Dacorum Borough Council reference 4/01922/19/MFA):

"Comprehensive redevelopment of the site to provide 21,726 sqm of flexible floorspace within use classes B1c/B2/B8 & ancillary offices, with car & cycling parking, access & landscaping"

Construction of the consented scheme commenced in January 2021 and is at an advanced stage of construction. Figure 7 shows a recent aerial photograph. This shows the progress made in construction from January 2021, with site development works and the building on the site substantially complete.

A minor material amendment planning application under Section 73 of the Town and Country Planning Act, 1990, was submitted in March 2022, for proposed alterations to be progressed to enable the site to be occupied as a data centre.

Figure 7 Aerial view from above Maylands Avenue; Source: Prologis

2.3 Evidence of Historic Contamination

A number of phases of investigation have been undertaken at the site between 2000 and 2016.

Three separate phases were undertaken in 2000. The first was a preliminary phase targeting specific areas as a result of current and historic site operations. The second and third phases involved further delineation of both known and potentially contaminated areas. Overall, the investigations provided adequate coverage over the site, but were more focused on higher risk areas. No significant widespread contamination was identified, but three distinct areas of contamination were delineated.

Remedial works were subsequently undertaken by ERM in three separate areas of identified contamination in the north-east of the site and supervised by Arup in 2003.

- An area in the vicinity of an underground pit where elevated concentrations of total petroleum hydrocarbons (TPH) were recorded and two underground storage tanks (USTs) found during the remediation process. All liquid was removed from the pits before the surrounding material was excavated and removed offsite. The concrete filled UST were removed along with the surrounding soil in July 2003.
- The site of the former metal plating workshop. Contamination with heavy metals was anticipated but not found after intrusive investigation.
- An area of a former kerosene spill. During removal of a concrete pad located close to the proposed excavation, a significant volume of free phase light fraction TPH was observed on the ground immediately below the pad. Further inspection uncovered a large brick pit infilled with debris water and TPH. The liquid was observed to be leaching through the pit walls and into the surrounding soils. The pit and surrounding soils were excavated and backfilled with inert crushed concrete and rubble.

ERM produced a report detailing the remediation, which was submitted to and accepted by the Environmental Health Department of Dacorum Borough Council and Environment Agency. This provides reassurance that remediation objectives were achieved.

More recent ground investigation was undertaken in 2016 and 2018. This provided additional coverage in previously investigated areas of the site and was used to inform the current development of the site.

The planning permission granted for the site in August 2019. Includes two planning conditions relating to contaminated land. These are Condition 13 and Condition 14 as outlined below

> *Condition 13: No development approved by this permission (other than that necessary for the discharge of this condition) shall be commenced until a Remediation Method Statement report has been submitted to and approved by the Local Planning Authority. This site shall not be occupied, or brought into use, until: All works which form part of the Remediation Method Statement report pursuant to the above have been fully completed and if required a formal agreement is submitted that commits to ongoing monitoring and/or maintenance of the remediation scheme. A Remediation Verification Report confirming that the site is suitable for use has been submitted to, and agreed by, the Local Planning Authority.*
>
> *Condition 14: Any contamination, other than that reported by virtue of Condition 13 encountered during the development of this site shall be brought to the attention of the Local Planning Authority as soon as practically possible; a scheme to render this contamination harmless shall be submitted to and agreed by the Local Planning Authority and subsequently fully implemented prior to the occupation of this site. Works shall be temporarily suspended, unless otherwise agreed in writing during this process because the safe development and secure occupancy of the site lies with the developer.*

WSP submitted a Remediation Method Statement (RMS)[11] and Materials Management Plan (MMP) in April 2020 for approval by Dacorum Borough Council and Condition 13 was discharged in August 2020 (decision notice ref 20/01581/DRC). This document is provided with the EP Application as Appendix 04-01. The contamination assessment within the RMS concluded that no substantial residual contamination was present beyond the limited occasional presence of asbestos and localised elevated concentrations of PAHs associated with tarmac fragments in the Made Ground. No formal remedial works or intervention were considered required for the proposed redevelopment of the site.

Therefore, the remedial risk management measures put forward for the development were to comprise the following standard brownfield measures:

- removal of deleterious materials remaining on site at the time (the asbestos contaminated stockpiles);
- removal of remnant below ground obstructions and removal or stopping up of redundant drainage and services;
- sustainable reuse of stockpiled materials in accordance with an MMP;
- implementation of a watching brief and unexpected finds protocol;
- management of dust and environmental risks during the works; and
- management of future exposure risks through managed soft landscaping (comprising a validated clean soil cover system).

A Contamination Verification Report was submitted by Prologis to Dacorum Borough Council on 30 November 2021 (reference 21/04489/DRC) and Condition 14 was subsequently discharged in Jan 2022 (decision notice ref 20/01581/DRC).

[11] WSP, Prologis UK Limited Maylands Avenue, Hemel Hempstead: Remediation Method Statement (2020) (Document ref 70053735-RMS)

The Verification Report concluded that '*the Site had been suitably remediated, and no further works were considered necessary for the betterment of ground and groundwater conditions.'* However, the report did note that the areas of soft landscaping were incomplete at the time, stating *verification sampling and analysis was required within the import and use of topsoil to confirm that these areas do not pose a risk to human health and are suitable for use*.'The landscaped areas are not considered to have a material impact to ascertaining the baseline conditions of the site and are due to be completed as part of the current development works.

The Verification report is provided with the EP Application as Appendix 04-02.

2.4 Relevant Baseline Soil and Groundwater Data

The site was historically open fields before being developed on by TRW Lucas factory. The site was decommissioned and relocated in 2002. There were a number of potential contamination sources at the former factory site and remedial works were undertaken in for three areas of localized contamination in 2003 including source removal and verification testing.

Subsequent ground investigation has been undertaken between 2016 and 2018 in support of the current development. The previous remedial works were considered to be successfully implemented with no substantial residual contamination identified, though asbestos was recorded in the soils it was not considered to require mitigation measures beyond standard capping layers. The WSP assessment for the current development did not include any formal remedial requirements such as source removal or treatment. Existing soil stockpiles on site contaminated with asbestos were to be assessed and removed and a clean cover layer installed in areas of soft landscaping to mitigate risk from the remaining Made Ground. No unexpected contamination was recorded during the development works as set out in the WSP verification report. The DBC Planning Conditions 13 and 14 associated with contamination have now been discharged for the consented scheme based on the WSP reporting to date.

The potential contaminants of interest in relation to the data centre permitted Installation are limited to hydrocarbons associated with the use and storage of diesel for the diesel-fired generators, and any associated lubrication oil used to top-up the generators during periods of maintenance.

In relation to soil samples, WSP's July 2020 Remediation report[11] states that PAHs (benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, dibenzofuran and carbazole) were recoded within some of the Made Ground samples taken during a previous phase of investigation by DTS Raeburn, which they attributed to tarmac fragments present within this sample.

In relation to ground water, WSP's July 2020 report[11] also states that minor exceedances of arsenic and benzo (a) pyrene were recorded above drinking water standards within two leachate samples across varying strata. Arsenic was detected in one sample within the Made Ground and benzo (a) pyrene was detected in one sample within the Clay-with-flints Formation.

Minor exceedances of Copper, Anthracene, Benzo (a) pyrene, Fluoranthene and Phenols above the assessment criteria for surface water standards were also identified within leachate samples within the Clay-with-flints Formation and the Lewes Nodular Chalk Formation and the Seaford Chalk Formation.

The WSP Remediation Report[11] and the WSP Verification Report[12] provides further details of the baseline soil and groundwater data.

[12] WSP, Prologis UK Limited Hemel Hempstead Maylands DC31: Verification report (2021) (Document ref 70076442-VER)

3. Permitting Activities

3.1 Permitting activities

A summary is provided in the report Introduction section.

3.2 Non-permitted activities undertaken

All areas other than the diesel fired generators and the associated diesel storage.

3.3 Document references

- Site Layout and Emission Points[2] (Document reference 284474-EP-DR002)
- Environmental Risk Assessment[13] (Document reference 284474-EP-ERA)

[13] Environmental Risk Assessment – Environmental Permit Application (2022) (Document ref 28447-EP-ERA) Hemel Hempstead Data Centre – Emergency Back-up Generation Facility