JOMAS ENGINEERING ENVIRONMENTAL LAND REMEDIATION

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DESK STUDY / PRELIMINARY RISK ASSESSMENT REPORT

ISLAND SITE
ESKDALE ROAD
UXBRIDGE
UB8 2RT

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Report Title: **Desk Study/Preliminary Risk Assessment Report for Island Site, Eskdale Road, Uxbridge, UB8 2RT**

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EXECUTIVE SUMMARY

Global Exhibitions Limited ('The client') commissioned Jomas Associates Ltd to undertake a desk study and preliminary risk assessment at Island Site, Eskdale Road, Uxbridge, UB8 2RT. The principal objectives of the study were as follows:

- To determine the nature and where possible the extent of contaminants potentially present at the site;
- To establish the presence of significant contaminant linkages, in accordance with the procedures set out within the Environment Agency (EA) land contamination risk management (LCRM) guidance and relevant guidance within the National Planning Policy Framework (NPPF);
- To assess whether the site is safe and suitable for the purpose for which it is intended, or can be made so by remedial action.

It should be noted that the table below is an executive summary of the findings of this report and is for briefing purposes only. Reference should be made to the main report for detailed information and analysis.

Desk Study	
Current Site Use	Commercial units with office present towards the east.
Proposed Site Use	Demolition of the existing building and the construction of a new warehouse with two units and offices. New parking spaces (including EV charging bays) with some areas of soft landscaping are anticipated.
Site History	A review of earliest available (1866) historical maps indicates that the site was undeveloped agricultural land at that time. By the map dated 1963, a portion of the site is shown to be occupied by a depot. The historical maps from 1971 show that this building has expanded and is relabelled as "Engineering Works". Few changes then occur to the site until the present day. Before 1963, the surrounding areas is shown to comprise primarily undeveloped land with residential and industrial uses present from approximately 190m northeast and 130m southeast. From 1963, the surrounding area is shown to be dominated by industrial uses including paint works, cabinet works, and engineering works. The historical maps also show evidence of extensive ground workings to the south-west, consistent with reported historic landfills.
Site Setting	The British Geological Survey indicates that the site is directly underlain by superficial deposits of Alluvium, likely to be underlain by further superficial deposits of the Shepperton Gravel Member. These superficial deposits are underlain by solid deposits of the London Clay Formation. No artificial deposits are reported within the site. The superficial deposits underlying the site are identified as a Secondary A Aquifer with the underlying solid deposits identified as Unproductive.

Desk Study	
	A review of the Enviro+Geoinsight Report indicates that there are no source protection zones within 500m of the site. There are 23No groundwater abstractions reported within 2km of the site; nearest entry as "Process water" with status as historical 437m south. There are 3No. reported surface water abstractions reported within 2km of the site; nearest entry as "Spray Irrigation- Direct" with status as historical 565m northwest. There are no or potable water abstractions reported within 2km of the site. 10No water networks reported within 250m. Nearest entry noted as "Inland river not influenced by normal tidal action", 70m north. There are no Environment Agency Zone 2 or 3 floodplains reported within 50m of the site.

Potential Sources	• Potential for Made Ground associated with previous development operations – on site (S1)
	• Current and previous industrial use – on site (S2)
	  ○ Depot
	  ○ Engineering Works
	• Potential for PCB contaminated ground associated with an electrical substation – on site (S3)
	• Current and previous industrial use – off site (S4)
	  ○ Numerous works in the immediate vicinity.
	  ○ Uxbridge Sewage Works, approximately 130m southeast.
	  ○ Gas works 400m east.
	• Potential ground gas generation from infilled gravel pits/reported landfill – off site (S5)
	  ○ Historical landfills 86m west/330m south.
	  ○ Infilled gravel pit approx. 150m west.
	  ○ Infilled gravel pit approx. 160m north.

Potential Receptors	• Construction and maintenance workers,
	• Neighbouring and future site users,
	• Buried foundations and services,
	• Controlled waters – on site(R6)
	  ○ Secondary A Aquifer, on site.
	  ○ River 70m north

Preliminary Risk Assessment	The risk estimation matrix indicates a "moderate" risk. It is recommended that an intrusive investigation is undertaken to clarify potential risks to the identified receptors and assess the extent of Made Ground soils present at the site. Soil gas monitoring should be undertaken due to the presence of extensive historic landfills in the site vicinity and the probable presence of a potential migration pathway in the superficial deposits. This should be undertaken in accordance with CIRIA C665.

Desk Study	
	The above conclusions are made subject to approval by the statutory regulatory bodies.
Potential Geological Hazards	The Groundsure data identifies a "moderate" risk from compressible deposits. Other geological hazards are rated "low" to "negligible" risk – for full details see Section 4. Existing hardstanding and foundations will need to be removed and grubbed out ahead of the development. This may require the use of hydraulic breaking. The clearance of the site, including removal of foundations and services is likely to increase the depth of Made Ground on the site. Foundations should not be formed within Made Ground or organic rich material (e.g. topsoil or alluvial deposits due to the unacceptable risk of total and differential settlement. Foundations must be designed so as not to load nor undermine adjacent boundary walls and buildings. The presence of Made Ground derived from demolition material may be a source of elevated sulphate, associated with plaster from the previous structures. If such levels are noted, sulphate resistant concrete may be required. The BGS notes disseminated pyrite within the London Clay Formation and as such may be a source of elevated sulphate results. If such levels are noted, sulphate resistant concrete may be required. The resultant thickness of Made Ground and the potential for clays beneath the proposed footprint means that a suspended floor slab may be required. A geotechnical investigation is recommended to inform foundation design.
Recommended Further Work	An intrusive investigation is recommended to confirm the preliminary geo-environmental risks identified and to provide geotechnical information for use in design. The investigation should assess the thickness of any Made Ground and allow samples of Made Ground and natural soils to be taken for laboratory analysis. A programme of soil gas monitoring should be undertaken due to the proximity of historic landfill sites.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Global Exhibitions Limited ("The Client") has commissioned Jomas Associates Ltd, to assess the risk of contamination posed by the ground conditions at a site referred to as Island Site, Eskdale Road, Uxbridge, UB8 2RT, prior to redevelopment of the site.

1.1.2 To this end a desk based assessment has been undertaken in accordance with Jomas Associates Limited's email proposal dated 31st July 2024.

1.2 Proposed Development

1.2.1 The proposed development is to comprise the demolition of the existing building and the construction of a new warehouse with two units and offices. New parking spaces (including EV charging bays) with some areas of soft landscaping are anticipated.

1.2.2 Plans of the proposed development are included in Figures 4a-e.

1.2.3 For the purposes of the contamination risk assessment, the proposed development is classified as 'commercial'.

1.2.4 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997 Part 1. GC 2 projects are defined as involving:

- Conventional structures.
- Quantitative investigation and analysis.
- Normal risk.
- No difficult soil and site conditions.
- No difficult loading conditions.
- Routine design and construction methods.

1.2.5 This will be reviewed at each stage of the project.

1.3 Objectives

1.3.1 The objectives of Jomas Associates Limited's investigation were as follows:

- To present a description of the present site status, based upon the published geology, hydrogeology and hydrology of the site and surrounding area;
- To review readily available historical information (i.e., Ordnance Survey maps and database search information) for the site and surrounding areas, with respect to potentially contaminative land uses.

- To provide an assessment of the environmental sensitivity at the site and the surrounding area, in relation to any suspected or known contamination which may significantly affect the site and the proposed development.

- To assess the potential presence of significant pollutant linkages, in accordance with the procedures set out within Part IIA of the Environmental Protection Act 1990, associated statutory guidance and current best practice including the EA land contamination risk management (LCRM) guidance.

- To identify and assess geotechnical issues that may affect the site.

1.4 Scope of Works

1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- A walkover survey of the site.
- A desk study, which included the review of third party historical Ordnance Survey maps and an environmental database report (attached in Appendix 2 and Appendix 3).
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Supplied Documentation

1.5.1 Jomas Associates have not been supplied with any previously produced reports at the time of writing this report.

1.6 Limitations

1.6.1 Jomas Associates Ltd has prepared this report for the sole use of Global Exhibitions Limited in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas Associates Limited. No other third-party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

1.6.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas Associates Limited has actual knowledge to the contrary, information obtained from public sources or provided to Jomas Associates Limited by site personnel and other information sources, have been assumed to be correct. Jomas Associates Limited does not assume any liability for the misinterpretation of information or for items not visible, accessible, or present on the subject property at the time of this study.

1.6.3 Whilst effort has been made to ensure the accuracy of the data supplied, and analysis derived from it, there may be conditions at the site that have not been disclosed by

the investigation and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.

1.6.4 Any reports provided to Jomas Associates Limited have been reviewed in good faith. Jomas Associates Limited cannot be held liable for any errors or omissions in these reports, or for any incorrect interpretation contained within them.

1.6.5 This investigation and report have been carried out in accordance with the relevant standards and guidance in place at the time of the works. Future changes to these may require a re-assessment of the recommendations made within this report.

1.6.6 *Our investigations exclude surveys to identify the presence of injurious and invasive weeds.*

1.6.7 ***This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.***

2 SITE SETTING

2.1 Site Information

2.1.1 The site location plan is appended to this report in Figure 1, Appendix 1.

Table 2.1: Site Information

Name of Site	Island Site
Address of Site	Island Site, Eskdale Road, Uxbridge, UB8 2RT
Approx. National Grid Ref.	504619 183170
Site Area (Approx)	0.58ha
Site Occupation	Commercial and office use
Local Authority	London Borough of Hillingdon

2.2 Walkover Survey

2.2.1 A site walkover survey was undertaken by Jomas Associates on 6 August 2024.

Table 2.2: Site Description

Area	Item	Details
On-site:	**Current Uses:**	The site is occupied by single storey warehouse comprising of two units. Offices (1-storey) are situated towards the eastern boundary of the site.
	Evidence of historic uses:	There was no evidence of historic uses of the site.
	Surfaces:	Much of the site is hard cover either by the buildings or by car parking areas. There are areas of soft landscaping present predominantly towards the east of the site. The hard cover is a mixture of concrete and asphalt.
	Vegetation:	Much of the vegetation around site is either shrubs or grass. Areas of gras are present towards the east of the site. Limited vegetation is scattered around the site. None of the vegetation seen appeared to be exhibiting any evidence of distress.
	Topography/Slope Stability:	The site is predominantly flat and level.
	Drainage:	The site appears to be connected to normal drainage facilities. Drain covers are situated around the site. No obvious evidence of drainage issues.

Area	Item	Details
	Services:	The site is assumed to be connected to services.
	Controlled waters:	No controlled waters were noted on site.
	Tanks:	No tanks were noted on site.
Neighbouring land:	**North:**	Eskdale Road and commercial uses.
	East:	Eskdale Road, construction depot.
	South:	Eskdale Road, offices and commercial.
	West:	Eskdale Road, offices and commercial.

2.2.2 Key features noted during the walkover are shown on a site walkover plan in Figure 2, together with site photos, in Figure 3.

2.3 Historical Mapping Information

2.3.1 The historical development of the site and its surrounding areas was evaluated following the review of a number of Ordnance Survey historic maps, procured from Groundsure, and provided in Appendix 3 of this report.

2.3.2 A summary produced from the review of the historical map is given in Table 2.3 below. Distances are taken from the site boundary.

Table 2.3: Historical Development

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1866 - 1868 1:528 1:2,500 1:10,560	The site is undeveloped, possible agricultural land.	Though the map is incomplete (1:10,560), the immediate surrounding areas appears to be undeveloped with houses present approximately 190m northeast. River Colne is located approximately 90m west. A water network "The Culvert" is present approximately 90m north. Grand Junction Canal is situated approximately 350m east of the site. Fray's River is located approximately 500m southeast. **Gas Works** present approximately 400m east. **Water Works** present approximately 750m northeast. **Gravel Pit** present approximately 750m east.
1878 - 1883 1:2,500 1:10,560	No significant change.	No significant change.

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1895 1:10,560	No significant change.	Gravel Pit that was present approximately 750m east appears to have been **infilled**.
1896 - 1900 1:2,500 1:10,560	No significant change.	**Uxbridge Sewage Works** present approximately 130m southeast. **Nursery** located approximately 250m east.
1914 - 1920 1:2,500 1:10,560	No significant change.	**Old Gravel Pit** noted approximately 160m north.
1932 1:10,560	No significant change.	No significant change.
1934 – 1938 1:2,500 1:10,560	No significant change.	**Ground working feature** shown 100m north-west. **Uxbridge Sewage Works** and the **Gas works** noted approximately 400m east have expanded. Nursery shown 1km south east. **Commercial style developments** shown >1km south east.
1960 1:10,560	No significant change.	There has been has some **industrial/commercial** development in the immediate surrounding areas.
1963 1:1,250	South-east of the site is occupied by a **depot**.	The area as a whole around the site has had extensive industrial style developments, including numerous **works** and **factories.** Ground working feature 100m north-west assumed **infilled.** The Old Gravel Pit appears to have been **infilled**. Eskdale road is adjacent to the west and east of the site.
1970 1:10,560	Incomplete mapping.	Incomplete mapping.
1971 – 1975 1:1,250 1:2,500 1:10,000	The site is predominantly occupied by a building noted as **"Engineering Works".**	Neighbouring site uses now include **cabinet works, paint works, chemical works, engineering works, paste works,** and **optical works**. Extensive gravel pit present, approximately 150m west of the site, appears to be water filled.
1978 - 1979 1:1,250	An **electrical substation** is present towards the south of the site.	Additional **works** sites developed immediately to the north of the site. **Electrical substation** present approximately 40m northwest.

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1986 – 1995 1:1,250 1:2,500 1:10,000	No significant change.	Gravel pit/lake to south-west has reduced in size, possibly **infilled**.
2001 – 2010 1:1,250 1:10,000	No significant change.	Gravel pit/lake 150m has further reduced in size, possibly **infilled**.
2024 1:10,000	No significant change.	No significant change. New water bodies shown 750m-1km north.

Potentially polluting/contaminating uses/activities shown in **bold**

2.3.3 Aerial photographs supplied as part of the Groundsure Enviro+GeoInsight report range from 1999 to 2022. These show that the site is located within an industrial area, consistent with the historic map review. There does not appear to be any significant on-site changes between the photograph editions, but major redevelopment of the plot to the south-east is shown, retaining industrial appearance.

2.4 Past Land Use

2.4.1 Groundsure provide some information on past land use on and in the vicinity of the site. Table 2.4 below summarises the information provided, which is presented in further detail in the Enviro+Geoinsight in Appendix 2. Where the identified features have appeared on more than one map they have been counted multiple times and therefore the reported numbers may be higher than the actual count.

Table 2.4: Past Land Use

Type of Use	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Historical Industrial Land Uses	Unspecified works from 1974 to 1988	131No reported; nearest entry is an unspecified depot, 10m south.	✓
Historical Tanks	None reported	85No reported; nearest entry is an unspecified tank, 254m south-east.	X
Historical Energy Features	2No reported on site as "Electricity Substation"	74No reported; nearest entry is an electricity substation, 23m west.	✓
Historical Petrol Stations	None reported	None reported	X
Historical Garages	None reported	9No reported; nearest entry is a garage, 214m north-east	X
Historical Military Land	None reported	None reported	X

* *From a land contamination/site development perspective*

2.5 Landfill, Waste and Potentially Infilled Surface Ground Workings

2.5.1 The Groundsure Enviro+Geoinsight Report provides information on active and historical landfills and waste sites. It also provides information on historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface; these features may or may not have been subsequently infilled. The following section summarises the information collected from the available sources.

Table 2.5: Landfill, Waste and Potentially Infilled Ground Surface Workings

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Active or Recent Landfill	None reported	None reported	X
Historical Landfill	None reported	BGS reports 3No historical landfills; nearest entry is 330m south. EA/NRW reports 6No historical landfills; nearest entry is 86m west.	✓
Historical Waste Sites	None reported	2No reported; nearest entry is a waste transfer station, 193m east.	X
Licensed Waste Sites	None reported	9No reported; nearest entry is a material recycling treatment facility, 452m south-east.	X
Waste Exemptions	None reported	17No reported; nearest entry is noted as "sorting mixed waste", 67m southeast.	X
Potentially Infilled Surface Ground Workings	None reported	"Infilled ground" reported 90m south-west Sand Pit – 66m west (1938) Gravel Pit – 127m south-west (1974) and 143m north (1920) Ponds – 144m north (1960) and 237m north-west (1974) Filter Beds– 178m east (1920) Sewage Works – 101m south-east (1938) and 176m east (1932)	✓

* *From a land contamination/site development perspective*

2.6 Current Industrial Land Use

2.6.1 The Groundsure Enviro+Geoinsight Report also provides information on various records relating to current industrial land use on and in the vicinity of the site. The following section summarises the information collected from the available sources.

Table 2.6: Current Industrial Land Use

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Recent Industrial Land Uses	2No reported for industrial products, 1No for industrial	70No reported; nearest entry is noted as "industrial products", 24m south.	✓

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
	features 1No reported for infrastructure and facilities (sub-station).		
Current or Recent Petrol Stations	None reported	1No reported 281m north, status: obsolete.	X
High Voltage Electricity Cables	None reported	28No reported; nearest entry is 97m west.	X
High Pressure Gas Pipelines	None reported	None reported	X
Sites Determined as Contaminated Land	None reported	None reported	X
Control of Major Accident Hazards (COMAH) and Notification of Installations Handling Hazardous Substances (NIHHS) Sites	None reported	2No reported; nearest entry is 367m east.	X
Regulated Explosive Sites	None reported	None reported	X
Hazardous Substance Storage/Usage	None reported	None reported	X
Historical Licensed Industrial Activities	None reported	2No reported; nearest entry is 57m southeast.	X
Licensed Industrial Activities	None reported	4No reported; nearest entry is 36m south and is noted as treating metals and plastics.	✓
Licensed Pollutant Release	None reported	10No reported; nearest entry is 27m southwest with “Chemical & Acid Processes”.	X
Radioactive Substance Authorisations	None reported	None reported	X
Licensed Discharge to Controlled Waters	None reported	12No reported; nearest entry is for surface water and sewage discharges, 148m north-west.	X
Pollutant Release to Surface Waters (Red List)	None reported	None reported	X
Pollutant Release to Public Sewer	None reported	3No reported; nearest entry is 57m southeast.	X
List 1 and List 2 Dangerous Substances	None reported	4No reported on list 1; nearest entry is for mercury and cadmium, 34m south. 1No reported 400m southeast on list 2 for chromium, copper, lead, nickel and zinc.	X
Pollution Incidents	None reported	9No reported; nearest entry is 80m northwest – no impact. Significant water impact reported 88m north for crude sewage (2003).	X
Pollution Inventory Substances	None reported	None reported	X

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Pollution Inventory Waste Transfers	None reported	1No reported as "Surface treating metals and plastic" within 500m of the site.	X
Pollution Inventory Radioactive Waste	None reported	None reported	X

* *From a land contamination/site development perspective*

2.7 Tunnels and Railways

2.7.1 The Groundsure Enviro+Geoinsight Report provides information on railway tunnels and railways on and within the vicinity of the site, as summarised in the table below.

Table 2.7: Tunnels and Railways

Feature	On site	Off-site (within 250m of site, unless stated otherwise)	Potential to Impact Site*
Underground Railways (London)	None reported	None reported	X
Underground Railways (Non-London)	None reported	None reported	X
Railway Tunnels	None reported	None reported	X
Historical Railway and Tunnel Features	None reported	2No reported; nearest entry is a railway siding 158m southwest.	X
Royal Mail Tunnels	None reported	None reported	X
Railways, Crossrail and HS2	None reported	1No reported 64m southwest. This is noted as "Dismantled"	X

* *From a land contamination/site development perspective*

2.8 Previous Site Investigations

2.8.1 Jomas Associates are not aware of any previous site investigations undertaken at the site prior to the writing of this report.

2.9 Local Authority Information

2.9.1 Jomas have made a request to London Borough of Hillingdon for information relating to contamination on the site and surrounding areas. A copy of the correspondence is included in Appendix 6.

2.9.2 A response is pending.

2.10 Planning Information

2.10.1 A review of the local authority's planning portal was undertaken on 15/08/2024 at https://planning.hillingdon.gov.uk/OcellaWeb/planningSearch.

2.10.2 Various applications were found on the planning portal however, no reports could be found relating to contamination or ground conditions within the vicinity of the site.

3 GEOLOGICAL & ENVIRONMENTAL SETTING

3.1 Introduction

3.1.1 The following section summarises the principal environmental resources (geological, hydrogeological and hydrological) of the site and its surroundings.

3.1.2 The data discussed herein is generally based on the information given within the Enviro+Geoinsight Report and published information provided by the Environment Agency and British Geological Survey.

3.2 Superficial and Solid Geology

3.2.1 The British Geological Survey indicates that the site is directly underlain by superficial deposits of Alluvium. The Alluvium is anticipated to be further underlain by Shepperton Gravel Member deposits, reported at the surface 90m south-west of site.

3.2.2 The BGS describes the Alluvium as consisting of:

> *"clay, silt, sand and gravel. It is the unconsolidated detrital material deposited by a river, stream or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain or delta, or as a cone or fan at the base of a mountain slope. Synonym: alluvial deposits. Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present."*

3.2.3 The Shepperton Gravel Member deposits are described by BGS as:

> *"Gravel with clay and sand."*

3.2.4 These superficial deposits overlie solid deposits of the London Clay Formation which can have a depth of up to 150m in eastern part of the London Basin. These are indicated by the BGS to consist of

> *"bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite."*

3.2.5 No artificial deposits are reported on site; however, given the identified site history, a thickness of Made Ground should be expected.

3.2.6 BS5930:2015 defines Made Ground as anthropogenic ground in which the material has been placed without engineering control and/or manufactured in some way, such as through crushing or washing, or arising from an industrial process. Great variations in material type, thickness and degree of compaction invariably occur.

3.2.7 No bedrock faults or other linear features are reported within 500m of the site at 1:10,000 scale.

3.3 British Geological Survey (BGS) Borehole Data

3.3.1 As part of the assessment, publicly available BGS borehole records were obtained and reviewed from the surrounding area. The local records obtained are presented in Appendix 5.

3.3.2 The nearest such record was located approximately 38m east of the site, from April 1984.

3.3.3 This showed the underlying ground conditions to comprise Made Ground to a depth of around 3.0mbgl (*"Flagstones and gravel overlying very soft brown, grey/blue clay" and " light brown with occasional brick fragments and gravel")*, underlain by Alluvium *"Very soft blue/grey silty CLAY with some gravel and occasional fine silty sand partings"* to around 4.4mbgl, underlain by London Clay Formation *"Firm grey/blue slightly silty CLAY…."* to the base of the borehole around 6.5mbgl.

3.3.4 During the drilling of the borehole groundwater was struck at (~2.65mbgl). The water (standing level) is noted at (~1.65mbgl).

3.3.5 All depths and measurements should be viewed as approximate, due to the age of the borehole and corresponding use of imperial measurements.

3.3.6 Despite the record summarised above, Jomas have done work in the vicinity of the site previously and anticipate the presence of Shepperton Gravel Member deposits to underlie the Alluvium.

3.4 Hydrogeology & Hydrology

3.4.1 General information about the hydrogeology of the site was obtained from the Enviro+GeoInsight and / or the DEFRA "MAGIC" website.

Groundwater Vulnerability

3.4.2 The EA operates a classification system to categorise the importance of groundwater resources (aquifers) and their sensitivity to contamination. Aquifers were formerly classified as major, minor and non-aquifers, based on the amenity value of the resource. A major aquifer is a significant resource capable of producing large quantities of water suitable for potable supply. Minor aquifers produce water in varying quantities or qualities, and if utilised are of local importance. Non aquifers are low permeability strata, which contain no significant exploitable groundwater and have very limited capacity to transmit contaminants.

3.4.3 Since 1 April 2010, the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. This comprises;

- **Secondary A** - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers;
- **Secondary B** - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
- **Secondary Undifferentiated** - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
- **Principal Aquifer** – this is a formation with a high primary permeability, supplying large quantities of water for public supply abstraction.
- **Unproductive Strata -** These are rock layers or superficial deposits with low permeability that have negligible significance for water supply or river base flow.

Source Protection Zones (SPZ)

3.4.4 In terms of aquifer protection, the EA generally adopts a three-fold classification of SPZs for public water supply abstraction wells.

- Zone I - or 'Inner Protection Zone' is located immediately adjacent to the groundwater source and is based on a 50-day travel time. It is designed to protect against the effects of human activity and biological/chemical contaminants that may have an immediate effect on the source.
- Zone II - or 'Outer Protection Zone' is defined by a 400-day travel time to the source. The travel time is designed to provide delay and attenuation of slowly degrading pollutants.
- Zone III - or 'Total Catchment' is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.

Hydrology

3.4.5 The hydrology of the site and the area covers water abstractions, rivers, streams, other water bodies and flooding.

3.4.6 The Environment Agency defines a floodplain as the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

3.4.7 There are two different kinds of area shown on the Flood Map for Planning. They can be described as follows:

Areas that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year;
- or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.

(For planning and development purposes, this is the same as Flood Zone 3, in England only.)

- The additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000) chance of occurring each year.

(For planning and development purposes, this is the same as Flood Zone 2, in England only.)

3.4.8 These two areas show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.

3.4.9 Outside of these areas flooding from rivers and the sea is very unlikely. There is less than a 0.1 per cent (1 in 1000) chance of flooding occurring each year. The majority of England and Wales falls within this area. (For planning and development purposes, this is the same as Flood Zone 1, in England only.)

3.4.10 Some areas benefit from flood defences and these are detailed on Environment Agency mapping.

3.4.11 Flood defences do not completely remove the chance of flooding, however, and can be overtopped or fail in extreme weather conditions.

Table 3.1: Summary of Hydrogeology & Hydrology

Feature		On Site	Off Site	Potential Receptor?
Aquifer	**Superficial:**	Secondary A	Principal, 90m southwest and 193m northwest Secondary A, 334m east	✓
	Solid:	Unproductive	Secondary A, 148m north Unproductive 334m east	**X**
Abstractions	**Groundwater**	None	23No. reported within 2km of the site; nearest entry as "Process water" with status as historical 437m south. Nearest active abstraction 1327m north for "Dewatering"	**X**

Feature		On Site	Off Site	Potential Receptor?
	Surface water	None	3No. reported within 2km of the site; nearest entry as "Spray Irrigation- Direct" with status as historical 565m northwest. No active surface water abstractions.	**X**
	Potable	None	No records within 2km.	**X**
Source Protection Zone		None	No records within 500m.	**X**
Surface Water Features		None	3No surface water features reported within 250m. 10No water networks reported within 250m. Nearest entry noted as "Inland river not influenced by normal tidal action", 70m north.	**X**
Flood Risk	**EA Flood Zone 2**	No	Not within 50m	-
	EA Flood Zone 3	No	Not within 50m	-
	RoFRaS	None	Not within 50m	-
	Historical Flood Events	2No reported within 250m of the site. Nearest entry was reported 226m south of the site. Type of flood: Fluvial Flood cause: Channel capacity exceeded (no raised defences)		-
	Flood Defences	There are no areas benefiting from flood defences within 250m of the study site.		-
	Groundwater Flooding	The risk of groundwater flooding at the site and within 50m of the site is reported as 'moderate'.		-

3.5 Sensitive Land Uses

3.5.1 The site is located within a SSSI Impact Risk Zone. As a result of this, all planning applications except householder applications require consultations.

3.5.2 The London Greenbelt is located 59m north of the site.

3.5.3 The nearest deciduous woodland is reported 65m west of the site.

3.5.4 The nearest Open Mosaic Habitat is reported 88m west of the site.

3.5.5 Open Access Land reported 198m northwest of the site.

3.5.6 The nearest designated ancient woodland is reported 728m west.

3.5.7 No other sensitive land use was identified within 2km of the site.

3.6 Radon

3.6.1 As reported, the site is not within a radon affected area, as less than 1% of properties are above the action level.

3.6.2 Consequently, no radon protective measures are necessary in the construction of new dwellings or extensions as described in publication BR211 (BRE, 2023).

4 POSSIBLE GEOLOGICAL HAZARDS

4.1 Database Information Review

4.1.1 The following are brief findings extracted from the Groundsure Enviro+Geoinsight Report, that relate to factors that may have a potential impact upon the engineering of the proposed development.

Table 4.1: Geological Hazards

Potential Hazard	Site check Hazard Rating	Details	Further Action Required?
Shrink swell clays	Very low	Ground conditions predominantly low plasticity.	No
Running sands	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.	No
Compressible deposits	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.	YES
Collapsible Deposits	Negligible	Deposits with potential to collapse when loaded and saturated are believed not to be present.	No
Landslides	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.	No
Ground dissolution soluble rocks	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.	No
Coal mining	None	The study site is not located within the specified search distance of an identified coal mining area.	No
Non-coal mining	None	2No reported within 1km of the site. Commodity: Chalk 636m west and 777m east. Potential for difficult ground conditions should be considered.	No

4.1.2 In addition, the Enviro+GeoInsight report notes the following:

- 21No. historical surface ground working features within 250m of the site. Nearest reported 65m west of the site for a refuse heap.
- No historical underground working features within 1km of the site.
- 3No. BritPits are reported within 1km of the site. The nearest is reported 146m north of the site, identified as producing sand and gravel. The operational status is given as “Ceased”.

- 2No areas of potential mining have been identified within 500m of the site. The nearest is reported 90m southwest of the site. The mineral type is noted as "Stone".

4.1.3 It is noted that the Groundsure reports that the potential for difficult ground conditions associated with chalk mining should be considered. There is no evidence of shallow chalk mine workings noted from historical map review, and the chalk is anticipated to be at significant depth and therefore the potential for issues related to chalk mining are not considered to be significant in the context of the proposed redevelopment of the site.

4.1.4 Existing hardstanding and foundations will need to be removed and grubbed out ahead of the development. This may require the use of hydraulic breaking.

4.1.5 The clearance of the site, including removal of foundations and services is likely to increase the depth of Made Ground on the site.

4.1.6 Foundations should not be formed within Made Ground or organic rich material (e.g. topsoil or alluvial deposits due to the unacceptable risk of total and differential settlement.

4.1.7 Foundations must be designed so as not to load nor undermine adjacent boundary walls and buildings.

4.1.8 The presence of Made Ground derived from demolition material may be a source of elevated sulphate, associated with plaster from the previous structures. If such levels are noted, sulphate resistant concrete may be required.

4.1.9 The BGS notes disseminated pyrite within the London Clay Formation and as such may be a source of elevated sulphate results. If such levels are noted, sulphate resistant concrete may be required.

4.1.10 The resultant thickness of Made Ground and the potential for clays beneath the proposed footprint means that a suspended floor slab may be required.

4.1.11 A geotechnical investigation is recommended to inform foundation design.

5 QUALITATIVE RISK ASSESSMENT

5.1 Legislative Framework

5.1.1 A qualitative risk assessment has been prepared for the site, based on the information collated. This highlights the potential sources, pathways and receptors. Intrusive investigations will be required to confirm the actual site conditions and risks.

5.1.2 Under Part IIA of the Environmental Protection Act 1990, the statutory definition of contaminated land is:

"*land which appears to the local authority in whose area it 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 is being caused, or there is significant possibility of such pollution being caused."

5.1.3 The Statutory Guidance provided in the DEFRA Circular 04/2012 lists the following categories of significant harm to **human health**:

- death; life threatening diseases (e.g. cancers); other diseases likely to have serious impacts on health; serious injury; birth defects; and impairment of reproductive functions.

5.1.4 Other health effects may also be considered by the local authority to constitute significant harm with a wide range of conditions that may or may not constitute significant harm (alone or in combination) including: physical injury; gastrointestinal disturbances; respiratory tract effects; cardio-vascular effects; central nervous system effects; skin ailments; effects on organs such as the liver or kidneys; or a wide range of other health impacts.

5.1.5 In deciding whether or not land is contaminated land on grounds of significant possibility of significant harm to human health there are four categories to be considered. Categories 1 and 2 would encompass land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health. Categories 3 and 4 would encompass land which is not capable of being determined on such grounds.

5.1.6 For non-human receptors the following types of harm should be considered to be significant harm:

Ecological System Effects

- Harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or

- Harm which significantly affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.
- In the case of European sites, harm should also be considered to be significant harm if it endangers the favourable conservation status of natural habitats at such locations or species typically found there. In deciding what constitutes such harm, the local authority should have regard to the advice of Natural England and to the requirements of the Conservation of Habitats and Species Regulations 2010.

Property Effects

- Crops: A substantial diminution in yield or other substantial loss in their value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.
- Buildings: Structural failure, substantial damage or substantial interference with any right of occupation. The local authority should regard substantial damage or substantial interference as occurring when any part of the building ceases to be capable of being used for the purpose for which it is or was intended. In the case of a scheduled Ancient Monument, substantial damage should also be regarded as occurring when the damage significantly impairs the historic, architectural, traditional, artistic or archaeological interest by reason of which the monument was scheduled.

5.1.7 Contaminated land will only be identified when a 'pollutant linkage' has been established.

5.1.8 A 'pollutant linkage' is defined in Part IIA as:

"A linkage between a contaminant Source and a Receptor by means of a Pathway".

5.1.9 Therefore, this report presents an assessment of the potential pollutant linkages that may be associated with the site, in order to determine whether additional investigations are required to assess their significance.

5.1.10 In accordance with the National Planning Policy Framework, where development is proposed, the developer is responsible for ensuring that the development is safe and suitable for use for the purpose for which it is intended, or can be made so by remedial action. In particular, the developer should carry out an adequate investigation to inform a risk assessment to determine:

- whether the land in question is already affected by contamination through source – pathway – receptor pollutant linkages and how those linkages are represented in a conceptual model;

- whether the development proposed will create new linkages, e.g. new pathways by which existing contaminants might reach existing or proposed receptors and whether it will introduce new vulnerable receptors; and
- what action is needed to break those linkages and avoid new ones, deal with any unacceptable risks and enable development and future occupancy of the site and neighbouring land.

5.1.11 A potential developer will need to satisfy the Local Authority that unacceptable risk from contamination will be successfully addressed through remediation without undue environmental impact during and following the development.

5.2 Conceptual Site Model

5.2.1 On the basis of the information summarised above, a conceptual site model (CSM) has been developed for the site. The CSM is used to guide the investigation activities at the site and identifies potential contamination sources, receptors (both on and off-site) and exposure pathways that may be present. The identification of such potential "pollutant linkages" is a key aspect of the evaluation of potentially contaminated land.

5.2.2 The site investigation is then undertaken in order to prove or disprove the presence of these potential source-pathway-receptor linkages. Under current legislation an environmental risk is only deemed to exist if there are proven linkages between all three elements (source, pathway and receptor).

5.2.3 This part of the report lists the potential sources, pathways and receptors at the site, and assesses based on current and future land use, whether pollution linkages are possible.

5.2.4 Potential pollutant linkages identified at the site are detailed below:

Table 5.1: Potential Sources, Pathways and Receptors

Source(s)	Pathway(s)	Receptor(s)

• Potential for Made Ground associated with previous development operations – on site (S1)
• Current and previous industrial use – on site (S2)
  ○ Depot
  ○ Engineering Works
• Potential for PCB contaminated ground associated with an electrical substation – on site (S3)
• Current and previous industrial use – off site (S4)
  ○ Numerous works in the immediate vicinity.
  ○ Uxbridge Sewage Works, approximately 130m southeast.
  ○ Gas works 400m east.
• Potential ground gas generation from infilled gravel pits/reported landfill – off site (S5)
  ○ Historical landfills 86m west/330m south.
  ○ Infilled gravel pit approx. 150m west.
  ○ Infilled gravel pit approx. 160m north.
	• Ingestion and dermal contact with contaminated soil (P1)
	• Inhalation or contact with potentially contaminated dust and vapours (P2)
	• Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff (P3)
	• Horizontal and vertical migration of contaminants within groundwater (P4)
	• Accumulation and Migration of Soil Gases (P5)
	• Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)
		• Construction workers (R1)
		• Maintenance workers (R2)
		• Neighbouring site users (R3)
		• Future site users (R4)
		• Building foundations and on site buried services (water mains, electricity and sewer) (R5)
		• Controlled waters – on site(R6)
		  ○ Secondary A Aquifer, on site.
		  ○ River 70m north

5.3 Qualitative Risk Estimation

5.3.1 Based on information previously presented in this report, a qualitative risk estimation was undertaken.

5.3.2 For each potential pollutant linkage identified in the conceptual model, the potential risk can be evaluated, based on the following principle:

Overall contamination risk = Probability of event occurring x Consequence of event occurring

5.3.3 In accordance with CIRIA C552, the consequence of a risk occurring has been classified into the following categories:

- Severe
- Medium
- Mild
- Minor

5.3.4 The probability of a risk occurring has been classified into the following categories:

- High Likelihood
- Likely
- Low Likelihood
- Unlikely

5.3.5 This relationship can be represented graphically as a matrix (Table 5.2).

Table 5.2: Overall Contamination Risk Matrix

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

5.3.6 The risk assessment process is based on guidance provided in CIRIA C552 (2001) *Contaminated Land Risk Assessment – A Guide to Good Practice*. Further information including definitions of descriptive terms used in the risk assessment process is included in Appendix 4.

5.3.7 The degree of risk is based on a combination of the potential sources and the sensitivity of the environment. The risk classifications can be cross checked with reference to Table A4.4 in Appendix 4.

5.3.8 Hazard assessment was also carried out, the outcome of which could be:

- Urgent Action (UA) required to break existing source-pathway-receptor link.
- Ground Investigation (GI) required to gather more information
- Watching Brief there is no evidence of potential contamination but the possibility of it exists and so the site should be monitored for local and olfactory evidence of contamination.
- No action required (NA)

5.3.9 The preliminary risk assessment for the site is presented in Table 5.3 below.

Table 5.3: Preliminary Risk Assessment for the Site

Sources	Pathways (P)	Receptors	Consequence of Impact	Probability of Impact	Risk Estimation	Hazard Assessment

• Potential for Made Ground associated with previous development operations – on site (S1)
• Current and previous industrial use – on site (S2)
  ○ Depot
  ○ Engineering Works
• Potential for PCB contaminated ground associated with an electrical substation – on site (S3)
• Current and previous industrial use – off site (S4)
  ○ Numerous works in the immediate vicinity.
  ○ Uxbridge Sewage Works, approximately 130m southeast.
  ○ Gas works 400m east.
• Potential ground gas generation from infilled gravel pits/reported landfill – off site (S5)
  ○ Historical landfills 86m west/330m south.
  ○ Infilled gravel pit approx. 150m west.
  ○ Infilled gravel pit approx. 160m north.
	• Ingestion and dermal contact with contaminated soil (P1)
	• Inhalation or contact with potentially contaminated dust and vapours (P2)
	• Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)
		• Construction workers (R1)
		• Maintenance workers (R2)
		• Neighbouring site users (R3)
		• Future site users (R4)
		• Building foundations and on site buried services (water mains, electricity and sewer) (R5)
			Medium	Likely	Moderate	GI – Ground Investigation

			Severe for Asbestos	Low	Moderate for Asbestos	
	• Accumulation and migration of soil gases (P5)		Severe	Low	Moderate	

	• Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff (P3)
	• Horizontal and vertical migration of contaminants within groundwater (P4)
		• Neighbouring site users (R3)
		• Building foundations and on site buried services (water mains, electricity and sewer) (R5)
		• Controlled waters – on site(R6)
		  ○ Secondary A Aquifer, on site.
		  ○ River 70m north
			Medium	Likely	Moderate	

5.3.10 It should be noted that the identification of potential pollutant linkages does not necessarily signify that the site is unsuitable for its current or proposed land use. It does however act as a way of focussing data collection at the site in accordance with regulatory guidance in LCRM.

5.4 Outcome of Risk Assessment

5.4.1 The risk estimation matrix indicates a "moderate" risk as defined above.

5.4.2 It is understood that the proposed development comprises the demolition of the existing building and the construction of a new warehouse with two units and offices. New parking spaces (including EV charging bays) with some areas of soft landscaping are anticipated.

5.4.3 Due to the potential presence of asbestos containing materials within the existing buildings on site, an asbestos survey should be undertaken with any asbestos containing materials found removed under suitably controlled conditions. There should be no risk to end users from asbestos within the fabric of the existing building if the potential asbestos containing materials are removed by suitably qualified and experienced specialists under controlled conditions.

5.4.4 A review of earliest available (1866) historical maps indicates that the site was undeveloped agricultural land at that time. By the map dated 1963, a portion of the site is shown to be occupied by a depot. The historical maps from 1971 show that this building has expanded and is relabelled as "Engineering Works". Few changes then occur to the site until the present day.

5.4.5 Before 1963, the surrounding areas is shown to comprise primarily undeveloped land with residential and industrial uses present from approximately 190m northeast and 130m southeast. From 1963, the surrounding area is shown to be dominated by industrial uses including paint works, cabinet works, and engineering works. The historical maps also show evidence of extensive ground workings to the south west, consistent with reported historic landfills.

5.4.6 It is recommended that an intrusive investigation is undertaken to clarify potential risks to the identified receptors and assess the extent of Made Ground soils present at the site.

5.4.7 Soil gas monitoring should be undertaken due to the presence of extensive historic landfills in the site vicinity and the probable presence of a potential migration pathway in the superficial deposits. This should be undertaken in accordance with CIRIA C665.

5.4.8 The above conclusions are made subject to approval by the statutory regulatory bodies.

5.5 List of Key Contaminants

5.5.1 The possible contamination implications for both on-site and off-site sources have been assessed based on the information presented in the report. This has been achieved using guidance publications by the Environment Agency, together with other sources.

5.5.2 In the case of the site uses identified as part of the desk study research, reference to DoE industry profiles would not indicate a specific use reference, although reference has been made to the miscellaneous industries profile.

5.5.3 Based on recommendations within the guidance publications, an initial soil and water chemical testing suite would need to consider a range of contaminants as follows:

- *Metals*: cadmium, chromium, copper, lead, mercury, nickel, zinc.
- *Semi-metals and non-metals*: arsenic, boron, sulphur.
- *Inorganic chemicals*: cyanide, nitrate, sulphate and sulphide.
- *Organic chemicals*: aromatic hydrocarbons, aliphatic hydrocarbons, petroleum hydrocarbons, phenol, polyaromatic hydrocarbons.
- *Others*: pH, Asbestos.
- Polychlorinated biphenyls (PCBs).

6 REFERENCES

BRE Report BR211; Radon: Guidance on protective measures for new buildings, 2023

Code of Practice for Ground Investigations BS5930: 2015

CL:AIRE; Petroleum Hydrocarbons in Groundwater, 2017

Environment Agency (2020); *Land Contamination Risk Management (LCRM)*. https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

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Investigation of Potentially Contaminated Sites – Code of Practice BS10175: 2011

Ministry of Housing, Communities & Local Government: *National Planning Policy Framework*. February 2019

Department of Environment Industry Profiles (1996) - Miscellaneous Land ISBN 1 85112 313 X

APPENDICES

APPENDIX 1 – FIGURES

APPENDIX 2 – GROUNDSURE REPORT

APPENDIX 3 – OS HISTORICAL MAPS

APPENDIX 4 – QUALITATIVE RISK ASSESSMENT METHODOLOGY

APPENDIX 5 – BGS BOREHOLE RECORDS

APPENDIX 6 – LOCAL AUTHORITY CORRESPONDENCE

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