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WSP

LAND QUALITY STATEMENT: PHASE 3 PROLOGIS PARK, HAYES

PROLOGIS DEVEOPMENTS LIMITED

17/04/2013

Confidentiality: Confidential

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
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Date	17 April 2013			
Prepared by	Elizabeth Beers			
Signature				
Checked by	Richard Clayton			
Signature				
Authorised by	Richard Clayton			
Signature				
Project number	00038063-R01			
File reference	G:\#Soil and Groundwater\DELTEK Projects\00038063 - Prologis Park, Hayes Planning Support\001 Land Quality Statement			

LAND QUALITY STATEMENT: PHASE 3 PROLOGIS PARK, HAYES

17/04/2013

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Executive Summary

KEY FINDINGS

A significant amount of assessment has previously been undertaken on the Phase 3 area of Prologis Park, Hayes for general investigation of ground conditions and more recently for delineation and validation of potentially contaminated soils.

Ground conditions underlying the Site have been encountered as Made Ground overlying Langley Silt, Lynch Hill Gravels and the London Clay formation. Groundwater has been recorded within the Lynch Hill Gravels superficial stratum and is considered to flow generally towards the south.

Previous investigation has indicated an area of potential concern comprising a former backfilled pond in the east of the Site which recorded localised asbestos, hydrocarbon and metal contamination. The wider Prologis Park Site was remediated and subsequently validated by 2006 (by Fitzpatrick Contractors and Crossfield Consulting respectively).

Assessment and validation undertaken by WSP in 2010 indicated that residual levels of hydrocarbon contamination in soils were at levels suitable for a commercial/industrial end use. Asbestos impacted materials were considered suitable for placement beneath hard standing and the adoption of robust health and safety procedures advocated.

Previous assessment undertaken by WSP in 2003 indicated that ground gas protection measures are not required for the Site.

CONTAMINATED LAND LIABILITY

The Site is not considered to constitute contaminated land under Part 2a of the Environmental Protection Act, 1990.

RECOMMENDATIONS

No further ground investigation works are considered necessary for the redevelopment of the Site for a commercial/industrial end use and sufficient mitigation of any residual contamination will be provided by the presence of hard standing and floor slabs.

WSP would recommend adoption of the following measures during construction:

- Completion of a watching brief with method statement to address contamination, in the event that it is encountered during excavations;
- Robust health and safety assessment to ensure that residual contamination risks are mitigated or managed, especially with regards to asbestos;
- Installation of capping layer in soft landscaped areas to break the direct contact and inhalation pathways of any residual contamination; and,
- Sign off of the Site by the regulating authorities which should be kept on file.

Please Note: This summary forms part of WSP Environmental Land Quality Statement (ref.: 00038063-R01). Under no circumstances is it to be used as an independent document.

WSP Environmental

1. Introduction

Table 1.1: Introduction

Title	Description
Instruction	WSP Environmental (WSP) was instructed by Turley Associates (Turley) on behalf of Prologis Developments Limited (Prologis) to undertake a review of historical information for Prologis Park, Hayes and produce a Land Quality Statement (LQS) for the Phase 3 area of the Site. The report highlights environmental considerations, predominantly with respect to ground conditions and is required to support a Planning Application for the Site. A Site location plan is presented as **Figure 1**.
Aims and Objectives	The overall aim of this review and LQS is to provide an assessment of the Site and advise Prologis whether there are any potential risks from contaminated land which may impact the Site and affect proposals for redevelopment. Geotechnical advice is not included as part of this assessment. The 'Site' refers to the Phase 3 area only (formerly called Phase 3b by WSP).
Confidentiality Statement	This report is addressed to and may be relied upon by the following parties: Turley Associates 25 Savile Row London W1S 2ES Prologis Developments Ltd Bond Street House, 14 Clifford Street London W1S 4JU This assessment has been prepared for the sole use and reliance of the above named parties. This report shall not be relied upon or transferred to any other parties without the express written authorisation of WSP and under the terms agreed with the Appointment agreed between WSP and Prologis. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party without the agreed reliance as stated above.
Scope of Works	The agreed scope of works includes the following: ■ Compile historic information relating to the Site, including recent works completed in the last 12 months; and, ■ Prepare a Land Quality Statement summarising Site conditions and works undertaken. WSP understand that a planning submission is required to support the development of Phase 3 at the Site and a Land Quality Statement to confirm that conditions remain appropriate for the proposed redevelopment and if required, recommend supplementary mitigation or verification works that may be required as part of the development works. Please refer to **Appendix A** for WSP's Methodology and Report Limitations.

2. Site Information

2.1 Site Details

The following Table 2.1 provides a summary of the Site setting and historical land use from current data sources and including information from historical reports.

Table 2.1: Site Setting

Site Address	Phase 3, Prologis Park, off Stockley Road, Hayes UB7 9BN
National Grid Coordinates	508029, 179601 (from approximate centre of site)
Approximate Size	3.5 hectares
Site Location	The Site is located in the north of Prologis Park, Hayes approximately 1.6 miles north of Heathrow Airport, 0.5 miles north of the M4 motorway (junction 4), 2.5 miles east of the M25 motorway (junction 15) and 1.6 miles south of Hayes. A Site location plan is presented as **Figure 1** and a Site layout plan as **Figure 2**.
Current Site Use	The Site is currently open land in the northeast of the wider Prologis Park which supports commercial properties currently leased to City Sprint, Gate Gourmet and HAL and an untenanted unit in the southeast corner.
Surrounding Area	Phase 3 is bounded to the south by the Prologis Park units noted above, with Bourne Farm recreation ground beyond; to the north by railway lines (Hayes and Harlington line) with commercial and light industrial properties beyond and to the west by a car park within Prologis Park (former WSP Phase 3a area) with railway lines and commercial/industrial properties beyond. Residential properties are present to the east.
Site History	The Site comprised agricultural land until the Second World War when the Site was part of as a Royal Ordnance Factory for the production of armaments. In the 1950s the Site was taken over by the Public Records Office and used as an MOD archive store. The Site was demolished to ground level circa 2006 and is part of the wider Prologis Park for commercial/industrial use. A backfilled pond was located in the east of the Site; this was excavated and replaced with clean fill materials during remediation circa 2006.
Geology and Hydrogeology	British Geological Survey (BGS) map Sheet 269, Windsor, scale 1:50,000, Solid and Drift edition and third party investigation data detailed in **Section 3** and **Appendix B** show the following on-site geological sequence: ■ Made Ground (no aquifer designation); ■ Langley Silt – clay and silt (Unproductive Strata); ■ Lynch Hill Gravel Member – (worked) sands and gravels of the fourth terrace (Principal Aquifer); and, ■ London Clay – clay, silt and sand (Unproductive Strata). Aquifer designations are shown in brackets and are taken from information on the Environment Agency (EA) website, accessed on 4th April 2013 (refer to **Appendix C** for EA aquifer classification system). The approximate extents of the underlying geol-

	ogy have been obtained from the BGS geological map, with a generalised description obtained from the BGS website, accessed on 4th April 2013. Areas to the west and south of the Site are shown as in-filled which coincide with areas of historic landfilling, shown on the EA website. The Coal Authority website, accessed on 4th April 2013 indicates that the Site is not located within an area affected by coal mining or brine extraction activities. The EA website indicates that the Site is not located in a Source Protection Zone and that current groundwater quality (under the River Basin Management Plan scheme) has been quantitatively assessed as good with poor chemical quality (Lower Thames Gravels).
Hydrology	The EA website indicates that the Site has not been assessed for risk of flooding by rivers and the sea however no at-risk areas, extents of extreme flooding, water storage areas or flood defences are shown in the vicinity of the Site. Surface water features in the vicinity of the Site include Stockley Road Lake approximately 50m to the west and southwest, the Grand Union Canal 165m to the north and a number of ornamental ponds on a commercial/industrial estate beyond the railway lines to the north. All of the noted surface water features are likely to be lined and therefore not in hydraulic continuity with underlying aquifers at the Site. Frays River is located approximately 2km west of the Site.
Environmental Sensitivity	Residential properties are located adjacent to the east of the Site. The Multi-Agency Geographical Information for the Countryside (MAGIC) website is a web-based interactive mapping service that displays ecological and archaeological information from a wide variety of sources. No designated ecologically sensitive features were identified within 1km of the Site on the MAGIC website (http://magic.defra.gov.uk, accessed on 4th April 2013) with the exception of a Nitrate Vulnerable Zone adjacent to the north and west of the Site.
Planning Portal	The Planning Portal for the London Borough of Hillingdon Council was accessed on 12th April 2013; no planning applications pertaining to the subject Site were noted.

3. Previous Works

3.1 Introduction

Assessment of the Prologis Park Site has been undertaken in various stages since circa 1997 by both third parties and WSP. A full review of previously issued reports has been undertaken where possible and is presented in **Appendix B**.

3.2 Timeline of Previous Works

The wider Prologis Park has been subject to both preliminary risk assessment via desk top study and intrusive investigation to evaluate land quality and geoenvironmental conditions between 1997 and 2004 by WSP and various third parties.

A subsequent demolition and remediation strategy was produced for the Site was produced by Burks Green and implemented by Fitzpatrick Contractors.

The Site was then validated by Crossfield Consulting in 2006 with the exception of previously identified areas of potential concern comprising a former backfilled pond within the current Phase 3 area and former heating tank farm located in the off-site Phase 3a area to the west (now a car park).

More recent assessment and validation works undertaken by WSP between 2010 and 2012 have focussed on the Phase 3 area, dividing the original boundary into Phase 3a in the west (including the former heating tanks) and Phase 3b in the east (including the former backfilled pond). Phase 3b now constitutes the current Phase 3 boundary.

A timeline of works is provided below in **Table 3.1**.

Table 3.1: Timeline of Previous Works

Item	Date	Work	Author	Comment
1	July 1997	Clearance of Unexploded Explosive Ordnance	33 Engineer Regiment (Explosive Ordnance Disposal)	Reviewed; appended to Item 6
2	September 1997	Radiological Assessment	DERA Radiation Protection Services	Reviewed; appended to Item 6
3	2007	Land Quality Assessment Phase I	Gibb Environmental	Findings referred to within Item 6
4	October 1998	Land Quality Assessment, Phase II: Desk Study Interpretive Report	Gibb Environmental	Findings referred to within Items 6 and 8
5	October 1998	Land Quality Statement Phase II: Intrusive Survey at Records Office	Gibb Environmental	Findings referred to within Items 6, 8 and 13
6	December 2000	Phase I Environmental Audit: MOD Record Office	WSP	Reviewed
7	Unknown	Desk Study	WS Atkins	Findings referred to within Item 13

Item	Date	Work	Author	Comment
8	December 2003	Phase II Geo-Environmental Assessment: MOD Records Office	WSP	Reviewed
9	2004	Environmental Statement: Geology, Geotechnics and Contamination Chapter	WSP	Reviewed
10	Unknown	Demolition and Remediation Strategy	Burks Green	Reviewed (no date or reference on available copy)
11	October 2006	Site Validation Report	Crossfield Consulting	Reviewed
12	November 2010	Validation Report Phase 3b Prologis Park	WSP	Reviewed
Off-site				
13	February 2001	Report on a Ground Investigation at TNT Archive Store	Norwest Holst	Reviewed
14	March 2005	Geo-Environmental Assessment: Prologis Roundabout	WSP	Reviewed
15	November 2010	Validation Report Phase 3a Prologis Park,	WSP	Reviewed
16	February 2012	Phase II Geotechnical Report: Unit DC2 Prologis Park, Hayes	WSP	Reviewed
17	March 2012	Environmental Assessment: Phase 3a Prologis Park	WSP	Reviewed
18	March 2012	Noise Assessment Report: Infinity Data Centre, Prologis Park	WSP Acoustics	Not reviewed – does not relate to land quality
19	June 2012	Contamination Watching Brief: Prologis Site	WSP	Reviewed
20	December 2012	Phases 1 and 2 Noise Assessment Report: Fox West Data Centre, Prologis Park	WSP Acoustics	Not reviewed – does not relate to land quality

3.3 Summary of Ground Conditions

A summary of encountered soil and groundwater conditions is presented in **Table 3.2** below.

Table 3.2: Summary of Ground Conditions from Previous Site Works

Category	Findings
Geology	Previous on-site investigation has encountered the following ground conditions: ■ Made Ground: ground level to maximum 1.6m metres below ground level (m bgl); ■ Langley Silt: minimum 0.1m bgl to maximum 3.3m bgl; ■ Lynch Hill Gravels: minimum 0.1m bgl to maximum 7.5m bgl; and, ■ London Clay: minimum 2.4m bgl to unproven depths.
Groundwater	Groundwater has previously been encountered as strikes during excavation between depths of 1.8m and 3.7m bgl within the Lynch Hill Gravels stratum and as rest levels during monitoring between depths of 1.53m and 1.86m bgl.
Contamination	An area of potential concern within the Phase 3 Site has been identified as a former backfilled pond in the east of the Site which recorded elevated concentrations of metals, hydrocarbons and asbestos. Recent assessment of this area post remediation concluded that residual concentrations were low and that the Site was suitable for commercial/industrial use with implementation of appropriate mitigation measures. Recorded concentrations in soil and groundwater above adopted Generic Assessment Criteria (GAC) remediation criteria were as follows: <u>Soils</u> ■ Total Polycyclic Aromatic Hydrocarbons (PAH): 610mg/kg (TP3 at 0.3m bgl, **Item 12** – 2010; remediation criteria of 500mg/kg); and, ■ Asbestos: present (TP9 at 0.3m bgl and TP10 at 1.4m bgl - **Item 12**). <u>Groundwater</u> No groundwater testing has been completed since December 2003 which recorded one very minor exceedence of the applied GAC, which is not considered to pose a risk to controlled waters. ■ Arsenic: 11µg/l (BH4 – **Item 8**); GAC 11µg/l. <u>Ground Gas</u> Ground gas assessment undertaken by WSP in December 2003 (**Item 8**) determined that ground gas protection measures were not required for the Site (assessment was undertaken for commercial and for residential development including some now off-site areas). <u>Conclusion</u> WSP consider that following implementation of mitigation measures, the Site will pose a low risk to human health and that the Site also currently poses a low risk to groundwater. Mitigation recommendations are presented in **Section 4**. <u>Contaminated Land Liability, Third Party Risk</u> The Site is considered to have low contaminated land liability and low risk of off-site migration to third party land.

3.4 Site Redevelopment

A development masterplan has been provided to WSP as Drawing 30587-PL101, dated 10th March 2013 (**Figure 4**). The proposed layout includes three commercial/industrial units (Units C, D and G) with two blocks of two storey offices blocks, external car parking and service yards, some soft landscaping and a proposed acoustic fence in the southeast between Unit G and the existing adjacent residential area.

4. Conclusions & Recommendations

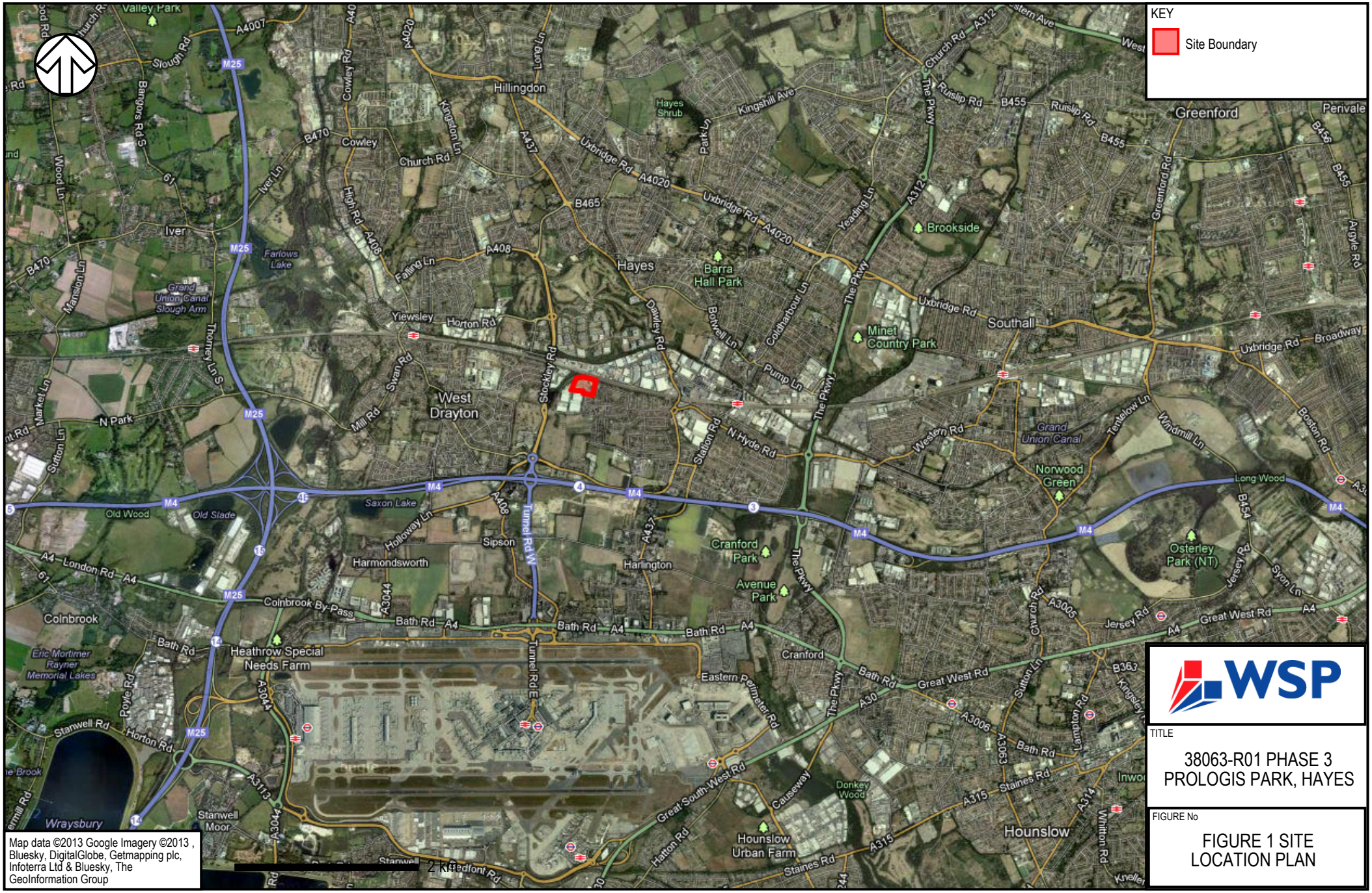
Conclusions	WSP were requested to produce a Land Quality Statement for Phase 3 of Prologis Park, Hayes in order to assess previous works undertaken on the Site and provide conclusions regarding the suitability of the site for commercial development. The Site was historically used for agriculture followed by development of the wider area into an armaments factory during the Second World War followed by use as an MOD records archive. The Site was demolished to ground level in circa 2006. Site assessment has been undertaken for Phase 3 and the wider Prologis Park since 1997 by various third parties and WSP. Post demolition and remediation assessment was recently undertaken by WSP in 2010 and identified localised elevated concentrations of hydrocarbon and asbestos contamination. Recent assessment by WSP has indicated that on-site localised asbestos contaminated soils should be reused beneath hard standing only during redevelopment provided appropriately robust safety management procedures are adopted. Hydrocarbon impacted soils were deemed low risk and of concentrations suitable for a commercial/industrial end use with a hard surface cover. The adoption of appropriate health and safety mitigation measures during future ground works were recommended. Assessment of the Site has determined that risks to human health and controlled waters are low and that ground gas protection measures are not required for the Site. WSP consider that contamination land liability is low.
Recommendations	Further contaminated land assessment work is not considered necessary for the redevelopment of the Site into a commercial/industrial end use, in keeping with the wider Prologis Park area. The installation of hard standing and concrete floor slab is considered to provide sufficient mitigation from any residual contamination. Recommendations for development phases on the Site are considered to include: ■ Completion of a watching brief with method statement to address contamination in the event that it is encountered during excavations; ■ Adoption of robust health and safety assessment to ensure that residual contamination risks are mitigated or managed, especially with regards to asbestos; ■ Installation of capping layer in soft landscaped areas to break the direct contact and inhalation pathways of any residual contamination. Depths should be agreed with the regulating authorities; and, ■ Agreements made with the regulators should be kept on file.

Please note: this summary forms part of WSP Environmental Land Quality Statement (ref.: 38063-R01). Under no circumstances is it to be used as an independent document.

WSP Environmental

Figures

Figure 1 Site Location Plan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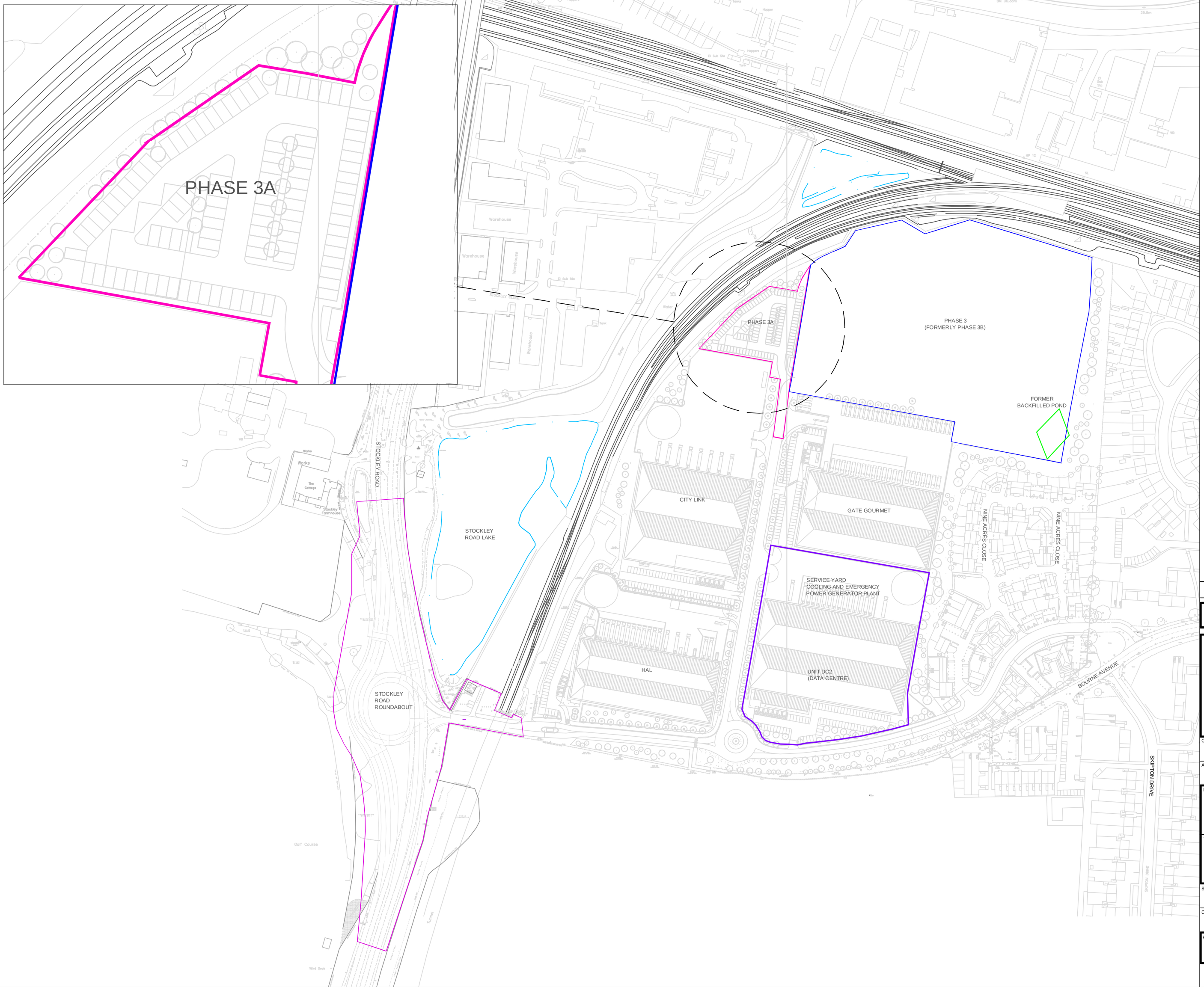
Site Boundary
Map data ©2013 Google Imagery ©2013 , Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, The GeoInformation Group
2 Km
WSP
TITLE
38063-R01 PHASE 3
PROLOGIS PARK, HAYES
FIGURE No
FIGURE 1 SITE
LOCATION PLAN

Figure 2 Site Layout Plan



DO NOT SCALE

KEY

- PHASE 3 BOUNDARY (FORMERLY CALLED PHASE 3B)
- PHASE 3A BOUNDARY (OFF-SITE)
- UNIT DC2 (DATA CENTRE) BOUNDARY (OFF-SITE)
- PHASE A BOUNDARY (OFF-SITE)
- FORMER ON-SITE AREA OF CONCERN (APPROXIMATE LOCATION
- WATER FEATURE
- RAILWAY LINES

REV	DATE	BY	DESCRIPTION	CHK	APD

DRAWING STATUS: FINAL

WSP

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Tel: +44 (0) 121 352 4700 Fax: +44 (0) 121 352 4701
http://www.wspgroup.com

CLIENT: PROLOGIS DEVELOPMENTS LTD

ARCHITECT: -

PROJECT: PHASE 3 PROLOGIS PARK, HAYES
LAND QUALITY STATEMENT

TITLE: SITE LAYOUT PLAN

SCALE@SIZE:	CHECKED:	APPROVED:
1:2,000@A2	EAB	RC
CAD FILE:	DESIGN/DRAWN:	DATE:
-	JKC	APRIL 2013

PROJECT No:	DRAWING No:	REV:
38063-001	FIGURE 2	-

Figure 3 Exploratory Hole Plan

DO NOT SCALE

KEY

- PHASE 3 BOUNDARY (FORMERLY PHASE 3B)
- PHASE 3A BOUNDARY (OFF-SITE)
- UNIT DC2 (DATA CENTRE) BOUNDARY (OFF-SITE)
- PHASE A BOUNDARY (OFF-SITE)
- FORMER AREA OF CONCERN
- WATER FEATURE
- RAILWAY LINES

NOTE: LOCATIONS ARE APPROXIMATE

PHG06 GIBB ENVIRONMENTAL OCTOBER 1998 (ITEM 5)

CBR06 WSP DECEMBER 2003 (ITEM 8)

TP8 WSP NOVEMBER 2010 (ITEM 12)

BHNH07 NORWEST HOLST FEBRUARY 2001 (ITEM 13)

TP5 WSP MARCH 2005 (ITEM 14)

TP1 WSP NOVEMBER 2010 (ITEM 15)

BH4 WSP FEBRUARY 2012 (ITEM 16)

TT04 WSP MARCH 2012 (ITEM 17)

TP106 WSP JUNE 2012 (ITEM 19)

A UNKNOWN BOREHOLE

NOTE: LOCATIONS ARE APPROXIMATE

REV	DATE	BY	DESCRIPTION	CHK	APD

DRAWING STATUS: FINAL

WSP

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CLIENT: PROLOGIS DEVELOPMENTS LTD

ARCHITECT: -

PROJECT: PHASE 3 PROLOGIS PARK, HAYES
LAND QUALITY STATEMENT

TITLE: EXPLORATORY HOLE LOCATION PLAN

SCALE@SIZE:	CHECKED:	APPROVED:
1:2,000@ A2	EAB	RC
CAD FILE: -	DESIGN/DRAWN: JKC	DATE: APRIL 2013

PROJECT No:	DRAWING No:	REV:
38063-001	FIGURE 3	-

Figure 4 Drawing 30587-PL101

01
101

SITE LAYOUT PLAN

1:1000

NOTES:

SUBJECT TO STATUTORY CONSENTS

BASED ON GREENHATCH SURVEY NO. 7159ENT_1 & 14285_OGL

BASED ON OS MAP REPRODUCED BY PERMISSION OF CONTROLLER OF HM STATIONARY OFFICE (c) CROWN COPYRIGHT

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BOUNDARIES BASED ON LAND REGISTRY TITLE NUMBER MX131015

ADOPTED HIGHWAY BOUNDARY BASED ON INFORAMTION RECEIVED FROM LONDON BOROUGH OF HILLINGDON

NORTH

0 25 50 100 m

REV	DATE	COMMENT	DRAW	CHCK
–	19.03.2013	FIRST ISSUE	VCN	PW

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PROLOGIS

TITLE
PHASE 3 - PROLOGIS PARK, HEATHROW

DRAWING
SITE LAYOUT PLAN

CLIENT
PROLOGIS UK LTD.

DATE	SCALE	DRAWN
MARCH 2013	1:1000 @ A1	PW
	STATUS: FOR PLANNING	CHECKED: PW

DRAWING NUMBER
30587-PL101

Appendices

Appendix A Methodology & Report Limitations

Methodology

This Environmental Assessment has been designed to provide information relating to:

- the current and former land uses on and surrounding the site;
- the environmental sensitivity of the site location as determined by factors including geology, hydrogeology, surface watercourses and neighbouring land uses; and,
- relevant records held by the environmental regulators.

Any relevant information provided by the Client has been reviewed, with action taken to ensure this information is taken into account and/or verified where necessary. All information is then assessed to define the potential for the site to give rise to environmental liabilities for the freehold/leasehold owner (as appropriate). Recommendations are made for additional work where this is necessary to fully define the site's environmental liabilities, and cost estimates of the financial implications of the findings can be provided under separate cover, where appropriate.

Risk Classification

This assessment has been undertaken with due regard to Contaminated Land Guidance documents issued by the Department for Environment, Food and Rural Affairs (and its Predecessors), the British Standards Institute (the BSi), the Royal Institution of Chartered Surveyors (RICS) and the American Society for Testing and Materials (ASTM) Standard E 1527-05. The methods used follow a risk-based approach, with the potential environmental risk assessed qualitatively using the 'source-pathway-target pollutant linkage' concept introduced in the Environmental Protection Act 1990.

Specific comment is made regarding the site's status under the Contaminated Land Regime implemented on the 1st April 2000 as Part IIA of the Environmental Protection Act 1990, and the actual or potential designation of the site as 'Contaminated Land' as defined in Section 78A(2). Unless specifically stated as relating to this definition, references to 'contamination' and 'contaminants' relate in general terms to the presence of potentially hazardous substances in, on or under the site.

In addition, consideration has been given to a wide range of related topics including (where appropriate): environmental processes; current and foreseeable environmental legislation; the practices and duties of environmental regulators; the health and safety of occupiers and neighbours as affected by contamination; effects on the structure of buildings; and financial implications. References to risk classifications are made according to the following definitions:

Low Risk

It is unlikely that the issue will arise as a liability/cost for the freehold/leasehold owner (as appropriate) of the site.

Medium Risk

It is possible that the issue could arise as a liability/cost for the freehold/leasehold owner (as appropriate) of the site. Further work is usually required to clarify the risk.

High Risk

It is likely that the issue will arise as a liability/cost for the site freehold/leasehold (as appropriate) owner of the site.

Environmental Risk Assessment

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. Within the context of current UK Legislation, the interpretation of a "significant risk" is termed to be one where:

- Significant harm is being caused or there is a significant possibility of such harm being caused, (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property); and / or, pollution of Controlled Waters is being caused.

The potential for harm to occur requires three conditions to be satisfied:

- Presence of substances (potential contaminants/pollutants) that may cause harm (Source of Pollution).
- The presence of a receptor which may be harmed, e.g. the water environment or humans, buildings, fauna and flora (The Receptor).
- The existence of a linkage between the source and the receptor (The Migration Pathway).

Therefore, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm.

The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the intended use of the site, its characteristics and its surroundings.

In order to assess the contamination risk at the subject site the above rational has been applied and is discussed within Section 6 in the context of Contamination Sources and Potential Pollutant Linkages.

Energy Performance Certificates

The Energy Performance of Building within the UK is derived from The Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007 SI 2007/991 and SI 2007/1669 and stems from the European Directive 2002/91/EC on the Energy Performance of Buildings ("the Directive"). Part 2 of these Regulations implements articles 7(1) and (2) of the Directive, and requires the production of energy performance certificates when buildings are constructed, sold or rented out.

Regulation 11 sets out the minimum requirements for energy performance certificates. In particular, certificates must be no more than 10 years old, except in circumstances where the Housing Act 2004 requires a home information pack, in which case a certificate is only valid if it is less than three months old at the first point of marketing, as that term is defined in the Home Information Pack Regulations 2007.

Part 7 deals with enforcement and makes provision for enforcement by way of civil penalties. Regulation 38 imposes a duty on local weights and measures authorities to enforce the duties relating to certificates and air-conditioning inspections. Regulation 40 empowers enforcement authorities to issue penalty charge notices for any breach.

Limitations

WSP Environment and Energy has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from WSP Environment and Energy; a charge may be levied against such approval.

WSP Environment and Energy accepts no responsibility or liability for:

a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and

b) this document to any third party with whom an agreement has not been executed.

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client) and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions

expressed in this report, WSP Environment and Energy reserves the right to review such information and, if warranted, to modify the opinions accordingly.

Where no site inspection is undertaken (for example a Desk Study Assessment or due to restricted site access), WSP cannot comment on the potential for environmental concerns associated with the current use or structure including the presence of asbestos.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

WSP are unaware of any proposed redevelopment plans and any reference made to actions that might be required in the event of redevelopment are made for information only.

Appendix B Review of Previous Reports

Item	Year	Site Area	Report Summary
On-site			
1	1997	Prologis Park and area now developed into housing	**Clearance of Unexploded Explosive Ordnance, MOD Bourne Avenue, Hayes, Middlesex by 33 Engineer Regiment (Explosive Ordnance Disposal), dated 31st July 1997, reference 48/Middlesex/14** ■ This report was appended to **Item 6** and the following pertinent points were noted: ■ Visual clearance of Unexploded Explosive Ordnance was undertaken on 10th July 1997. An instrument search of the Site was considered impractical due to buildings and areas of hard standing. ■ It was known that explosives had been used and/or stored on parts of the Site but no explosives or other dangerous substances (including special wastes) were recovered during the clearance. ■ It was noted that the current or previous users of the site were responsible for certifying the buildings to be free of explosives.
2	1997	Prologis Park and area now developed into housing	**Radiological Assessment-Bourne Lane, Hayes by DERA Radiation Protection Services for Gibb Environmental, dated 9th September 1997, reference 490/0001/8707/DRPS** ■ This correspondence was appended to **Item 6**. Following a request for information by Gibb Environmental, a letter confirming that no information about the Site was held by DRPS however the following pertinent points were noted: ■ The Site was used as an engineering workshop during WWII and DRPS recommended that a preliminary radiological survey was undertaken unless documentation could prove that a survey was not required. ■ A drawing was not included and the subject Site area was not noted.
3	1997	Assumed Prologis Park due to spread of subsequent exploratory hole locations (**Item 4**)	**Land Quality Statement Phase I by Gibb Environmental, dated 1997** ■ This report was referred to within **Item 6**. The date and reference of the report and full details including the subject Site were not noted.
4	1998	Prologis Park and area now developed into housing	**Land Quality Assessment, Phase II: Desk Study Interpretive Report at Records Office, Bourne Avenue by Gibb Environmental, dated October 1998 (no reference)** ■ This report was referred to within **Items 6** and **13** but full details were not noted. Approximate exploratory hole locations are shown on **Figure 3**.
5	1998	Prologis Park and area now developed into housing	**Land Quality Statement Phase II: Intrusive Survey at Records Office, Bourne Avenue by Gibb Environmental, dated October 1998 (no reference)** ■ A concise review of this report was completed within **Items 6, 13 and 19** with appended exploratory hole records, laboratory testing data and ground gas monitoring results, however the report has not been reviewed in full. Approximate exploratory hole locations are shown on **Figure 3**. ■ Fourteen probe holes and chemical assessment of soils was undertaken as part of these works (PHG1 to PHG13 and PHG2a). All probe holes were backfilled with arisings upon completion. ■ Encountered ground conditions comprised variable thicknesses of localised hard standing (tarmac and concrete between ground level and 0.15m bgl) Made Ground (between ground level and 1.35m bgl) overlying orange brown silty clays and sands and gravels (from 0.45m bgl to unproven depths). ■ Contamination observations included slight to strong hydrocarbon odours and grey discolouration in patches and streaks with hydrocarbon odours. ■ Volatile vapours were measured with a photo-ionisation detector (PID) which recorded background concentrations between 2.1ppm and 3.8ppm and concentrations between 2.1ppm and 9.0ppm in Made Ground and between 2.1ppm and 130ppm in superficial deposits. ■ Groundwater seepage was noted within two locations at 1.5m bgl within superficial deposits (PH1) and at 2.0m bgl at the interface of Made Ground and underlying superficial deposits (PH2a). ■ Relatively low concentrations of organic and inorganic contamination was recorded across the site with hotspots of total petroleum hydrocarbons (TPH) recorded in probe holes PH1 (1,111mg/kg – adjacent to heating oil ASTs) and PH13 (3,078mg/kg – oily materials encountered in services). ■ No significantly elevated concentrations of explosive chemicals were identified in areas of ordnance production; all analytical test results were recorded below laboratory limits of detection. ■ Two water samples were laboratory tested as a rinseate sample and wash water and did not relate to groundwater on-site. ■ Thirteen borehole locations were monitored for ground gases on one occasion, during a period of falling pressure; methane as not recorded above the limit of detection of the equipment (0.1%v/v) and carbon dioxide was recorded at concentrations between 0.2%v/v and 5.5%v/v. Flammable gases were recorded at concentrations below 1ppm.

Item	Year	Site Area	Report Summary
6	2000	Prologis Park and area now developed into housing	**Phase I Environmental Audit: MOD Record Office, Hayes, Middlesex by WSP Environmental Limited for ProLogis Developments Limited, dated 21st December 2000, reference 201201/B/01** ■ The purpose of the assessment was to complete an environmental audit to identify risks, potential liabilities and development constraints for the MOD records office which was proposed to be redeveloped for a commercial end use. ■ The Site was roughly rectangular in shape and approximately 12.7 hectares (Ha) in size, supporting two main buildings (building A and W orientated parallel to each other east-southeast and west-northwest), storage and office buildings, roadways and some open ground in the southwest located approximately 2km to the southwest of Hayes town centre and 5km northwest of Heathrow airport. ■ The Site was bounded by the Heathrow Express rail link to the north and west (former landfill) with industrial development and the Grand Junction Canal, A408 and golf course respectively beyond. Residential developments were located adjacent to the east and a former BAA landfill to the south. General environs comprised residential and industrial/commercial. ■ The Site was historically agricultural land until WWII when the development of a Royal Ordnance factory was completed for the production of armaments. The Site was taken over by the Public Records Office in the 1950s and at the time of writing was used as an archive store for the MOD and other governmental departments and organisations. A pond and stream were historically located in the east between 1894 and 1938 and railway sidings in the west from circa 1965 to 1974. ■ Potentially contaminative surrounding land uses within 500m of the Site included agricultural land, railway land, brick fields, gravel pits, chemical works and a cemetery. ■ Anticipated ground conditions comprised Made Ground, Langley Silt (brickearth – Non-Aquifer) (except southwestern corner), River Terrace Gravels (worked Lynch Hill Gravel (fourth terrace – southwestern corner – Minor Aquifer), London Clay (Non-Aquifer), Eocene Claygate Member (0-10m – Minor Aquifer) and Upper Cretaceous Chalk (Major Aquifer). ■ A groundwater abstraction was located 750m northeast of the Site for spray irrigation from chalk geology for 720m^3/day. ■ Surface water features on or adjacent to the Site were noted as follows: overgrown pond in the east of the site, Grand Union Canal (adjacent north and west) and lakes (adjacent west). A surface water abstraction was noted approximately 500m northwest of the Site for dust suppression (160m^3/day) from a non-tidal source, thought to be the canal. ■ Three discharge consents to the canal were noted 500m north and northwest of the Site for drainage, underground water and an unknown purpose. Seven pollution incidents were noted within 550m of the Site; one unsubstantiated incident was located on-site (category 4) and all incidents pertained to the Grand Union Canal. ■ Five previously licensed landfill sites were noted within 800m of the Site; the two closest records were for a site approximately 100m south of the subject and accepted asbestos, commercial, domestic and industrial wastes. ■ The Site was observed to lie within an area not affected by coal mining. Radon protection measures were not required. ■ Liaison with the Local Authority indicated that ground conditions were anticipated to be variable clays and gravels with foundation solutions generally comprising pad and beam or trench fill but not piled. Geotechnical investigation was recommended by Building Control. ■ Areas of Potential Concern (APCs) were previously identified by Gibb (**Items 3** and **4**) as asbestos, above ground heating oil storage tanks, underground diesel storage tank, substations on site (PCBs), previous ordnance engineering workshops, on-site migration of off-site landfill gases, area of oily materials encountered during services. WSP identified the following additional APCs: locomotive shed and sidings, former oil store/bunker, fuelling post, a garage area, overgrown and possibly in-filled pond, locomotive shed and crusher plant, pump house, compressor house, weighbridge, workshops and boiler, spirit store, uneven ground and worked ground. ■ Visual Site inspection and an asbestos survey undertaken by Symonds Travers Morgan Ltd (unknown date or reference) noted the presence of significant quantities of asbestos containing materials within buildings, such as asbestos cement board roofing. ■ WSP assessed environmental liability risks for the Site as high based on limited ground investigation data and unresolved APCs. Recommendations included intrusive ground investigation specifically with groundwater monitoring and testing, following asbestos assessment recommendations or removal of materials and Environmental Impact Assessment.
7	Unknown	Unknown	**Desk Study by WS Atkins** ■ This report was referred to within **Item 19** however no further details were provided. It is unknown if this report relates solely to the subject Site (Phase 3).

Item	Year	Site Area	Report Summary
8	2003	Prologis Park and area now developed into housing and off-site Stockley Road Roundabout	**Phase II Geo-Environmental Assessment: MOD Records Office, Hayes, Middlesex by WSP Environmental for ProLogis Developments Limited, dated December 2003, reference 12170423-002** ■ The purpose of the assessment was to identify potential geotechnical and environmental constraints to the redevelopment of the Site for a mixed residential (six housing blocks with communal landscaping, thirteen terraced houses with private gardens, access roads and car parking) and commercial end use (five distribution units with two and three storey offices, service yards, car parking and landscaped areas) and a new roundabout (to the west of the main subject site). ■ The subject Site was 14Ha in size and comprised two main storage units with several ancillary buildings including offices, garages, workshops, a fire station, compressor house and locomotive shed. The Site was bounded by the Heathrow Express rail link to the north and west with industrial developments and the Grand Junction Canal beyond (further beyond are the A408 and a golf course), a residential development to the east and a former BAA landfill to the south. ■ A summary of the previous Phase I report (**Item 6**) was included within the report, pertinent additional points included that the Site was situated on a gentle slope at a topographic level of approximately 32.0m AOD with terraces of the post diversionary River Thames (sloping south west). Regional topography indicated that groundwater was likely to flow towards the southwest. Review of British Geological Survey (BGS) mapping indicated that underlying geology was likely to comprise Langley Silt over Lynch Hill (fourth terrace) Gravels over London Clay. An area of worked ground was noted in the southwestern corner of the Site where the Langley Silt (or Brickearth) had been excavated to expose the underlying Lynch Hill Gravels likely associated with previous brick production. The area of the new proposed roundabout was anticipated to have a layer of topsoil at surface, following review of BGS logs. The closest noted disused landfill was recorded 20m south of the Site. ■ Ground investigation comprised six cable percussive boreholes to a maximum depth of 10.0m bgl and installed with monitoring wells, four hollow stem auger boreholes to a maximum depth of 8.0m bgl and installed with monitoring wells, fourteen large diameter probe holes to a maximum depth of 4.0m bgl (backfilled upon completion), fifteen trial pits to a maximum depth of 3.8m bgl (backfilled upon completion) with eight shallow in-situ CBR tests at 0.5m bgl. ■ Ground conditions were encountered as Made Ground between depths of 0.1m and 2.7m bgl, Langley Silt between 0.6m and 2.9m bgl (in localised areas), Lynch Hill Gravels between 1.3m and 7.5m bgl site-wide) and London Clay from 2.0m bgl to unproven depths. An area of Made Ground thought to be an in-filled pond was delineated by trial pit TP12 in the east of the Site. ■ Groundwater sampling was undertaken on one occasion and gas and groundwater monitoring was undertaken on two separate occasions (including one historical borehole (BH15)). ■ Groundwater strikes were encountered at depths of between 1.7m bgl and 4.4m bgl in the Lynch Hill Gravels and at 2.5m bgl in the London Clay formation. Groundwater rest levels were recorded between 1.64m and 1.96m bgl within the Langley Silt formation, between 1.32m and 2.55m bgl within the Lynch Hill Gravel formation. ■ Following chemical laboratory analysis of soil samples, statistical analysis was undertaken comprising use of the CLEA model mean and maximum value tests and consideration of the Site as two averaging areas: proposed residential area (Zone 1) and proposed commercial area (Zone 2) for the upper 1m soil profile and soils below 1m bgl were screened against relevant guideline values. ■ Averaging Zone 1 – results indicate that failures of the mean value test included lead, nickel, zinc and TPH and elevated PAH comprising a hotspot (TP12 at 0.5m bgl – backfilled pond). Chrysotile asbestos cement was recorded in borehole BH5 at 0.5m bgl. With the exception of the hotspots, the area was considered suitable for residential end use. ■ Averaging Zone 2 – results indicated that there were no failures of the mean value test for shallow soils and the areas was considered suitable for a commercial end use. No exceedences of GAC within soils below 1m bgl were recorded. One contamination observation was recorded within borehole WS08 at 2.4-2.6mbgl in the northwest of the Site comprising a slight hydrocarbon odour and staining. Elevated concentrations of TPH and VOCs within WS08 (northwest of the site) and PAH within WS11 and WS13 in the southeast and centre of the area respectively. ■ Laboratory analysis indicated slightly elevated concentrations of leachable TPH and PAH which were not considered to be significant in the context of risk to groundwater. ■ Marginal exceedances of Drinking Water Quality Standards for arsenic (maximum 17µg/l; GAC 10µg/l), selenium (BH1 - 1µg/l; GAC 10µg/l) and TPH (BH7 - diesel range) were recorded in groundwater samples. No obvious source for elevated TPH was identified and the concentration was considered unlikely to represent a significant issue. ■ Preliminary gas assessment indicated that the site represented a low risk and that gas protection measures were not necessary. ■ Potential geotechnical hazards on-site were identified as variable Made Ground, superficial deposits susceptible to settlement, shallow groundwater, swelling/shrinkage of high plasticity soils and the presence of remnant foundations and obstructions. ■ A foundation assessment was completed and recommendations were identified to be dependent on economic and loading requirements. ■ Contamination mitigation and remediation recommendations included removal of asbestos containing materials from buildings, decommissioning and subsequent validation of fuel storage tanks, excavation and off-site disposal of the in-filled pond area (TP12) and contingency for planning any additional contaminated soils encountered during demolition or construction phases, ground investigation in the vicinity of the proposed roundabout and materials characterisation of waste materials.
9	2004	Prologis Park and off-site Stockley Road roundabout	**Environmental Statement: Geology, Geotechnics and Contamination Chapter** ■ An Environmental Impact Assessment was completed for the Prologis Site and Stockley Road roundabout located to the west; the Chapter incorporated information from **Items 4, 5, 6 and 16** and identified the following impacts during construction and operational phases. ■ Construction phase: contaminated run-off, contaminated dusts, asbestos risks and fuel storage and electrical substations. ■ Operational phase: end user exposure to contaminated soils and suture site activities. ■ Mitigation was recommended to include appropriate storage of chemicals and fuel, excavation and off-site disposal of in-filled pond materials and contaminated materials with validation, a type 3 asbestos survey, dust suppression measures, decommissioning of fuel storage areas and subsequent validation, appropriate environmental management procedures with reference to guidance and legislation.
10	Unknown	Assumed Prologis Park site (no site plan provided)	**Demolition and Remediation Strategy for Prologis Park, Hayes, by Burks Green for Prologis Developments Ltd (no date or reference given on report review copy)** ■ A demolition and remediation strategy was produced for the Site which comprised approximately 15.9 hectares and supported two units for record storage and several smaller ancillary buildings (offices, garages, workshops, a fire station, compressor house and locomotive shed). The Site was historically part of an armaments factory, Public Records Office and MOD archive store. ■ Area of concern had previously been identified as a former pond to the north of a proposed residential area backfilled with contaminated wastes (elevated metals and hydrocarbons) and elevated hydrocarbons in the vicinity of the former bulk fuel storage tank in the northwest of the Site. Slightly elevated metals concentrations were noted site-wide which were considered to require limited mitigation. No significant groundwater contamination had been identified. ■ The remediation scope of works was suggested to include delineation, excavation and off-site disposal of contaminated soils (including backfilled pond and heating tanks areas) in excess of provided remediation criteria (using a cellular grid manner of excavation), completion of validation investigations across the Site to eliminate the presence of contamination hotspots (and subsequent treatment if appropriate) and provision of completion reports by the remediation contractor. Other proposed works included demolition of buildings and above ground structures, disconnection of services, removal of slabs, foundations and hard standing, backfill of excavations, removal of tanks and site re-profiling.

Item	Year	Site Area	Report Summary
11	2006	Prologis Park site excluding former heating tank area in Phase 3a and backfilled pond in Phase 3	**Site Validation Report: Prologis Park, Hayes by Crossfield Consulting Ltd for Fitzpatrick Contractors Ltd, dated October 2006, reference CCL01410.BA29** ■ A report was compiled by Crossfield Consulting to confirm that soils remaining on the Site met the compliance criteria set out in the report detailed as **Item 10**, with contractual works undertaken by Fitzpatrick Contractors Ltd (Fitzpatrick). The report does not cover the identified areas of concern comprising a backfilled pond in the northeast and former above ground storage tank in the northwest of the Site (in Phases 3a and 3b). ■ A total of forty eight soil samples were retrieved from beneath MOD buildings following demolition, within 600mm of final development levels and on a 50m grid for intended commercial end use areas and on a 25m grid in intended residential end use areas. ■ Laboratory results indicate that the concentrations recorded in the commercial area comply with remediation criteria presented in **Item 10**. Some elevated concentrations of arsenic, nickel and chromium were recorded however statistical analysis indicated that the concentrations were not significant and they were deemed suitable to remain on site.
12	2010	Phase 3 (formerly Phase 3b)	**Validation Report Phase 3B Prologis Park, Hayes by WSP Environmental for Prologis Developments Limited, dated November 2010, reference 12171314-001 R02** ■ This report comprised a Site investigation and validation report completed for the Phase 3b area of Prologis Park in accordance with a third party remediation strategy, prior to redevelopment into industrial units with associated loading bays and car parking. The scope of works comprised soil sampling on a 50m grid and collection of soil samples in representative strata within 600mm of final development levels. ■ At the time of writing, buildings on Site had been demolished and two stockpiles were present. The Site was bounded by a railway line with commercial properties beyond to the north, residential properties to the east, Prologis Park (undergoing redevelopment) to the south and the Phase 3a car park to the west. The Site was previously agricultural land, an armaments factory and records office prior to demolition. ■ Previous investigation had noted a backfilled pond in the southeast with soil samples containing asbestos cement and elevated concentrations of TPH and PAH. Previous recommendations including excavation of the pond area and off-site disposal off materials had been for a previously proposed residential end-use. ■ Eight trial pits were excavated to a maximum 3.3m bgl for good Site coverage (TP3 to TP9) and in the vicinity of the former pond (TP10). Made Ground was encountered to a maximum 1.6m bgl underlain by Langley Silt (unproven depths) and Lynch Hill Gravel (unproven depths). Groundwater strikes were noted between 0.9m and 2.55m bgl. ■ One exceedence of remediation compliance criteria was recorded in TP3 at 0.3m bgl for PAH (610mg/kg compared to a criterion of 500mg/kg). Individual PAH compounds fall below specified criteria. Two soil samples recorded the presence of chrysotile asbestos (TP9 at 0.3m bgl and TP10 at 1.4m bgl). ■ The Site was considered to pose a low environmental risk and hard standing installed as part of the development layout was considered sufficient to would break the direct contact and inhalation pathways identified for recorded contaminants. The report recommended the agreement of a cover soil layer with the Local Authority, robust health and safety assessment and potential removal of asbestos impacted soils.
Off-site (out of Phase 3 Area)			
13	2001	In east of Prologis Park	**Report on a Ground Investigation at TNT Archive Store, Hayes by Norwest Holst Soil Engineering Limited for Norwest Holst Construction Limited, dated 12th February 2001, reference MJB/TW/F11815** ■ The purpose of the works was to determine the ground conditions for the proposed development of an archive warehouse. A finalised development plan was not available at the time of investigation, however it was understood that the development was to include a heavily reinforced concrete frame in the north with column loads of 3,500kN to 5,800kN on suspended ground slabs and a lighter high bay racking building in the south with loads of 105kN on a 2.6m x 0.875m grid and unspecified settlement loads. Access restrictions limited the number and depth of exploratory hole locations. ■ A desk study was not undertaken by Norwest Holst (NHSEL) as a report had previously been completed by WS Atkins (**Item 7**). ■ The subject area was located in the area of the previous LC and IWM stores to the west of the Site at approximately 31.0metres Above Ordnance Datum (m AOD). At the time of writing the Site supported two buildings with surrounding areas of vegetation (grass, shrubs and small trees) and hard covered car parking. The Site was originally developed as a factory for the production of field guns. ■ Geological mapping for the Site indicated underlying Made Ground, Brick Earth, Terrace Gravels and London Clay (tertiary age). ■ Previous intrusive investigation undertaken in September 1998 (Gibb, **Item 5**) comprised thirteen window sample boreholes and fifty geoprobe holes to a maximum 3.0m bgl (metres below ground level). ■ The NHSEL investigation comprised two cable percussive boreholes (BH2 and BH6) to a maximum depth of 16.0m bgl with in-situ and laboratory geotechnical testing. ■ Encountered geology comprised Made Ground to a typical depth of 1.2m bgl (clays, sands and gravels), Terrace Gravels to a maximum depth of 5.8m bgl (medium dense to dense flint) and London Clay from 4.8m bgl to unproven depths (maximum 16m bgl) (stiff to very stiff fissured grey clay). ■ Groundwater strikes were not recorded (water was added during drilling). ■ Foundations recommendations based on encountered ground conditions and geotechnical testing included a piled solution for the main building and shallow spread solutions for lighter structures and ancillary buildings using Class 1 concrete. Supplementary borehole investigation was also recommended. ■ Contamination assessment was not undertaken as part of the works.
14	2005	Off-site Stockley Road roundabout	**Geo-Environmental Assessment: Prologis Roundabout, Hayes by WSP Environmental for Prologis (UK) Developments Limited, dated March 2005, reference 12170423-002** ■ A report was commissioned by Prologis to investigate a parcel of land (0.48 hectares) directly to the west of the former Records Office off Bourne Avenue, Hayes for environmental and geotechnical issues that may have posed constraints to the development of a roundabout. ■ At the time of writing the Site was a parcel of undeveloped rough grassland with Japanese Knotweed bounded to the north and west by a golf course, to the south by commercial properties and to the east by the A408 road. The Site had previously been a brick field then Stockley Brick Works. Surrounding features were noted as the Great Western Railway (350m north) and previous gravel and clay pits (adjacent west and 300m south). ■ The Site was thought to be part of a landfill which was active at the time of reporting and accepted domestic and refuse wastes. ■ Ground investigation comprised five cable percussive boreholes to a maximum15.45m bgl backfilled with monitoring well standpipes and eight trial pits to a maximum 3.3m bgl. Four subsequent rounds of grass and groundwater monitoring and one round of groundwater sampling were undertaken. ■ Encountered ground conditions comprised Made Ground to a maximum 7.3m bgl, Lynch Hill Gravel to a maximum 8.3m bgl and London Clay to unproven depths. Langley Silt was encountered in BH4 and BH5 in the north and east of the site. Groundwater strikes were encountered between 5.0 and 7.3m bgl within the Lynch Hill Gravel stratum and above the impermeable London Clay. ■ The Site was not divided into averaging areas and localised exceedences of adopted GAC for a commercial/industrial end use were noted for zinc, lead, TPH and PAH. One sample of Made Ground tested positive for chrysotile asbestos fibres. Two olfactory observations of hydrocarbon odours were noted, one of which corresponded to an elevated TPH result. ■ No significant exceedences of GAC applied to leachate or groundwater samples were noted. ■ Ground gas assessment indicated that gases were being generated by Made Ground strata (including domestic refuse) and Lynch Hill Gravels, however low flow rates determined that gas protection measure were not required but design of the roundabout should account for the potential that ground gases could accumulate within void spaces. ■ An assessment of foundation and ground improvement solutions was undertaken but was dependent on final designs for the development.

Item	Year	Site Area	Report Summary
15	2010	Western part of Phase 3 (Phase 3a)	**Validation Report Phase 3a Prologis Park, Hayes by WSP Environmental for Prologis Developments Limited, dated November 2010, reference 12171314-001 R01** ■ This report comprised a Site investigation and validation report completed for the Phase 3a area of Prologis Park in accordance with a third party remediation strategy, prior to redevelopment into a car park. The scope of works comprised soil sampling on a 50m grid and collection of soil samples in representative strata within 600mm of final development levels. ■ At the time of writing buildings on the Site had been demolished and stockpiled materials was present across the Site. A railway line with commercial properties beyond was located to the north and west, Phase 2B to the east and Prologis Park undergoing redevelopment to the south. The Site was previously agricultural land, an armaments factory and records office prior to demolition. ■ Previous investigations had identified three heating oil tanks with observations of hydrocarbon odours and staining in the vicinity and elevated concentrations of TPH and VOC in tested soil samples. The remediation strategy recommended further investigation. ■ Two trial pits were excavated to a maximum depth of 3.1m bgl, in the vicinity of the heating oil tanks (TP2) and for general Site coverage (TP1) (some access was limited due to the presence of stock-piles). Made Ground was encountered to a maximum 1.3m bgl underlain by Langley Silt to a maximum 2.2m bgl and Lynch Hill Gravel to unproven depths. Groundwater ingress was noted between 2.5m and 3.1m bgl. An oily sheen and hydrocarbon odour were observed in TP2 (2.8 to 3.1m bgl). ■ No exceedences of remediation compliance criteria were noted, however one sample recorded the presence of chrysotile asbestos within Made Ground (TP1 at 0.4m bgl). ■ The Site was considered to pose a low environmental risk and hard standing installed as part of the development layout was considered sufficient to break the direct contact and inhalation pathways iden-tified for recorded contaminants. The report recommended the removal of the site stockpile to enable investigation below, health and safety assessment, agreement of cover soil specification and valida-tion with the Local Authority and possible removal of asbestos.
16	2012	Off-site unit in south of Prologis Park	**Phase II Geotechnical Report: Unit DC2 Prologis Park, Hayes by WSP Environmental for Mace, dated 20th February 2012, reference 28183-001** ■ A Preliminary Phase II Geotechnical Assessment was undertaken on the Site to assess ground conditions and support pile design prior to refurbishment of Unit DC2 into a data centre. Approximately 150 piles were required due to increased loadings associated with the proposed end use. ■ The building comprised a commercial warehouse unit approximately 8,951m^2 with an internal height of 12m and a potential floor loading of 50kN/m^2. Two storey offices, car parking and a service yard were also part of the Site boundary. ■ The scope of works was determined by Mace and comprised eight cable percussive boreholes to a maximum depth of 7.0m bgl, the approximate locations of which are shown on **Figure 3**. A concrete slab of 0.17 to 0.18m thick was present at surface in all exploratory hole locations underlain by Made Ground between 0.17 and 2.0m bgl, Langley Silt between 0.3 and 2.10m bgl (not encountered within boreholes in the east of the site), Lynch Hill Gravels between 1.2m and 5.5m bgl and London Clay from 5.2m bgl to unproven depths. Groundwater strikes were not observed due to water added during drilling. ■ Recommendations included reference to the report detailed above as **Item 8**, allowance for the instability of the pile bore through the Lynch Hill Gravels formation and the potential presence of groundwa-ter at circa 4m bgl in the method of construction and support to prevent collapse of the pile bore, where appropriate.
17	2012	Western part of Phase 3 (Phase 3a)	**Environmental Assessment: Phase 3a Prologis Park, Hayes by WSP Environmental for Prologis Developments Ltd, dated March 2012, reference 27672-0001** ■ Site investigation was required in response to correspondence from the Environment Agency (EA) regarding additional information to discharge Planning Condition 16 relating to disposal of surface water runoff for the Site. Concerns raised by the EA included whether the depth of the proposed soakaway was at the same level as the groundwater table, assessment of the extent of previously noted hydro-carbon contamination and assessment of contamination concentrations to confirm risk to the underlying Principle Aquifer. ■ The subject Site was approximately 0.3Ha and roughly triangular in shape and at the time of writing was undeveloped open unsurfaced land on a gentle southwestern facing slope at approximately31.6m AOD. ■ Ground investigation comprised the advancement of three hollow stem auger boreholes (HS1101 to HSA1103) and five trial pits (TT01 to TT05). ■ Ground conditions were encountered as Made Ground to a maximum of 2.6m bgl (reworked materials in the northwest of the Site in the vicinity of former storage tanks). River Terrace Gravels (Lynch Hill Gravels and Maidenhead Formation) were encountered at surface in the east and centre of the Site to proven depths of 5.2m bgl, underlain by London Clay between 3.6m bgl to unproven depths. Langley Silt was recorded in two trial pits from 2010 located in the northeast and southwest of the Site between depths of 0.75 and 2.2m bgl. Encountered geology was generally consistent with previous investiga-tions. ■ Groundwater strikes were recorded between depths of 2.5 and 2.6m bgl within the Lynch Hill Gravel stratum. Rest levels were monitored at levels between 1.43 and 1.96m bgl also within River Terrace Gravels strata. Groundwater flow direction was thought to be to the south or southwest. No measureable thickness of free phase product was recorded. ■ Contamination observations were all associated with hydrocarbons (sheen, odour and staining) and were localised within the vicinity of the former heating oil tanks and to the south. Elevated PID concen-trations were recorded between 1 and 19ppm. ■ Twenty one samples from both the investigation and previous assessment were screened using WSP generic assessment criteria (GAC) for a commercial/industrial end use and no exceedences were recorded. Three locations have recorded the presence of asbestos (TP01 at 0.4m bgl from 2010, TT01 at 0.1m bgl and TT02 at 0.2m bgl). ■ Elevated concentrations of petroleum hydrocarbons and PAH were recorded within dissolved phase groundwater above the conservative screening criteria, however, no measurable thicknesses of non-aqueous phase liquids were recorded. Groundwater samples were collected as part of the WSP 2003 (**Item 9**) ground investigations at locations between Phase 3a and Frays River (the primary surface water receptor). Groundwater was collected from twelve monitoring wells on two occasions and recorded concentrations of TPH at less than the detection limit of the tests. The closest borehole to the Phase 3a area was BH7; the sample from BH7 was tested for a range of determinands including TPH. None of the individual contaminant concentrations exceeded the GAC and no visual evidence of contamination was noted. The petroleum hydrocarbons recorded in groundwater was concentrated within the C16 to C21 range, which is considered to be of low solubility and therefore less mobile that the lighter petroleum hydrocarbons fractions. ■ No elevated hydrocarbon concentrations were recorded in down gradient boreholes during the previous monitoring periods, and there is no evidence to suggest that the elevated concentrations in groundwater are widespread or that off-site migration is occurring. The contamination was detected locally within the groundwater and wider previous monitoring did not record the presence of hydrocar-bons within the down-gradient wells. No evidence of non-aqueous phase liquids has been recorded; however, some petroleum hydrocarbons fractions have been recorded above their respective limits of solubility. ■ As the tanks had been removed, and the Site will be hard surfaced following development, the localised elevated dissolved phase concentrations detected within the groundwater in the vicinity of HSA1103 were not considered to pose an on-going risk to off-site receptors. In addition, given that Prologis had decided to move the soakaway to a downstream location, therefore the risks of further mo-bilising the contamination by increased groundwater recharge through the area were considered reduced. ■ The report concluded that groundwater levels were lower than the base of the proposed soakaway drainage system.
18	2012	Off-site unit in south of Prologis Park	**Noise Assessment Report: Infinity Data Centre, Prologis Park by WSP Acoustics for Mace (Science, Technology and Waste) on behalf of Infinity SDC Limited, dated 2nd March 2012, reference 29037** ■ This report does not relate to land quality and therefore has not been reviewed as part of this assessment.

Item	Year	Site Area	Report Summary
19	2012	Western part of Phase 3 (Phase 3a)	**Contamination Watching Brief: Prologis Site, Hayes, by WSP Environmental for Prologis UK Limited dated 28th June 2012, reference 30405-00001-L01** ■ WSP were instructed by Prologis to provide a watching brief during installation of soakaways and an interceptor tank at the Site following completion of (**Item 14**). ■ WSP Risk Management Services (WSP RMS) completed a walkover to provide advice to Volker Fitzpatrick regarding on-site asbestos containing materials (ACM) prior to works commencing. Friable amosite insulation board was noted at surface and recommendations included damping down prior to and during construction. Ten trial pits (TP101 to TP110) were advanced to a maximum 0.6m bgl to characterise ACM within hardcore deposits. Excavated materials were stockpiled prior to off-site disposal. ■ One composite environmental sample was collected from each trial pit from surface to a maximum 0.3m bgl and tested for asbestos identification and quantification only. Chrysotile asbestos was identified within seven of ten samples with quantifications between 0.001%v/v and 0.0065%v/v. Health and safety control measures were implemented during construction works including air monitoring, working upwind of asbestos, Respiratory Protective Equipment for personnel working in the vicinity of open excavations, damping down of excavations and arisings, restriction of Site traffic to minimise dust, segregation and stockpiling of suspected ACM containing soils. No evidence of asbestos was recorded during air monitoring by WSP. ■ Excavation works for the installation of an interceptor were undertaken separately and observations comprised groundwater ingress at 2m bgl (base of excavation), no evidence of hydrocarbon contamination was noted. ■ An excavation for a soakaway (to 1.8m bgl) was undertaken as a separate item and encountered Made Ground to 1.6m bgl; no contamination observations or groundwater strikes were encountered. ■ WSP considered that the soakaway, interceptor and associated drainage runs were placed within material that is not significantly impacted by hydrocarbon contamination and groundwater levels were considered to be below the base of the soakaways. Therefore, the risk posed to controlled waters was considered to be low and no further works necessary. ■ Provided that any on-going excavation works took into account the potential for asbestos and adopt the appropriate control measures, no significant risks relating to human health were identified. It was anticipated that encountered materials could be suitable for re-use beneath buildings and hard standing with confirmation of the approach by the regulatory authorities and suitable documentation.
20	2012	Off-site unit in south of Prologis Park	**Phases 1 and 2 Noise Assessment Report: Fox West Data Centre, Prologis Park by WSP Acoustics for Mace (Science, Technology and Waste) on behalf of Infinity SDC Limited, dated 5th December 2012, reference 34906** ■ This report does not relate to land quality and therefore has not been reviewed as part of this assessment.

Appendix C Report References

Environment Agency Aquifer Classifications

The Environment Agency (EA) divide the underlying strata in England and Wales into Principal Aquifer, Secondary Aquifer and Unproductive Strata in line with the updated Groundwater Protection Policy (GP3) and the Water Framework Directive (WFD). This replaces the former designation of Major, Minor and Non Aquifers. The following is derived from the main policy document.

Principal Aquifers

These are geological strata that exhibit high intergranular and/or fracture permeability. They usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. Principal Aquifers equate in most cases to aquifers previously designated as Major Aquifer.

Secondary Aquifers

These include a wide range of geological strata with a correspondingly wide range of permeability and storage. Secondary aquifers are subdivided into two types:

Secondary A - permeable strata 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 generally equate to aquifers formerly classified as 'Minor Aquifers'

Secondary B - predominantly lower permeability strata which may in part have the ability to store and yield limited amounts of groundwater by virtue of localised features such as fissures, thin permeable horizons and weathering. These are generally the water bearing parts of the former 'Non-Aquifers'

In cases where it has not been possible to attribute either category A or B to a rock type, a designation of Secondary Undifferentiated has been assigned. In most cases, this means that the stratum in question has previously been designated as both Minor and Non-Aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata

These are geological strata with low permeability that have negligible significance for water supply or river base flow.

Regulatory Information Sources

Reference has been made to the Landmark Information Group data provision service. This includes information and data collated from several organisations, including the Environment Agency (EA), Department for Environment, Food & Rural Affairs (DEFRA), Health & Safety Executive (HSE), the Health Protection Agency (HPA), and the Coal Authority

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