APPENDIX 7.1: GEO-ENVIRONMENTAL REPORT

Ham Close Regeneration

Planning Application:

Geo-environmental Report

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Geo-Environmental Report

Project:	Ham Close, Ham, Richmond Upon Thames, TW10 7PG
For:	Hill Residential Ltd
Ref:	CRM.1027.087.GE.R.004.
Status:	Revision D
Date:	April 2022
Author:	Steve Rhodes **Director**
Reviewer:	Richard Hamilton **Director of Geoenvironmental**

Executive Summary

Proposed Development

This document is a report of this survey and has been produced to support a planning submission for the site which seeks the demolition of the existing buildings on-site and phased mixed-use development comprising 452 residential homes (Class C3) up to six storeys, a Community/Leisure Facility (Class F2) of up to three storeys in height, a "MakerLabs" (sui generis) of up to two storeys together with basement car parking and site wide landscaping.

Investigation

Site investigation, desk study and monitoring visits were undertaken by Enzygo Geoenvironmental Ltd.

Ground Conditions

Ground Conditions comprise Made Ground over firm clay and loose becoming dense with depth sand and gravel. Shallow groundwater was not encountered.

Contamination

Elevated PAH, Lead and Arsenic was encountered together with asbestos. Remediation and management procedures are proposed.

Foundations

Spread foundations should be suitable for domestic houses but piled foundations are likely to be required for apartments.

Pavement Design

An equilibrium CBR of 3% is recommended. Soils are not considered to be frost susceptible.

Buried Concrete

It is recommended that Class AC-1s conditions of Special Digest 1 are used.

Ground Gas and Radon

No radon risk has been identified. No significant ground gas has been measured.

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1.0 INTRODUCTION

Background

1.1 Enzygo Geoenvironmental Limited has been commissioned to prepare a Geo-Environmental Report for a site at Ham Close, Ham, Richmond Upon Thames, TW10 7PG.

Proposed Development

1.2 This document is a report of this survey and has been produced to support a planning submission for the site which seeks the demolition of the existing buildings on-site and phased mixed-use development comprising 452 residential homes (Class C3) up to six storeys, a Community/Leisure Facility (Class F2) of up to three storeys in height, a "MakerLabs" (sui generis) of up to two storeys together with basement car parking and site wide landscaping.

Objectives

1.3 The objectives of the study are to:

- Review an existing Phase I desk study, a copy of which is included in Appendix A;
- Undertake a ground investigation;
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors; and
- Provide a factual and interpretative report relating to the desk study and site investigations. Provide a revised conceptual model and recommendations on any potential development issues and mitigation measures, where appropriate.
- Provide geotechnical recommendations in relation to foundations and infrastructure.

Risk Classification

1.4 Enzygo Geoenvironmental has utilised the available information, together with our experience to assess the likely risks to development from land quality issues. Definitions of the risk terms used are provided on the following table.

Risk	Description
Negligible	No contamination risk has been identified which is likely to affect development.
Low	No significant contaminated land risks have been encountered affecting development and a low risk that remediation will be required.
Low-Moderate	There are unlikely to be significant contaminated land issue associated with the site which will adversely affect its re-development. However, minor or localised contamination may be present requiring remediation. Remediation should be possible under a discovery strategy and with a call out service.
Moderate	Some potential contaminated land risks have been encountered or identified which may affect re- development. The risks identified are unlikely to affect the entire site or preclude development. Remediation is considered feasible as part of the development process and no further investigation is considered necessary.
Moderate-High	Some potentially significant contaminated land risks have been identified at the property that requires remediation. It is recommended that a separate remedial methodology is prepared supported by a site-specific risk assessment
High	Significant potential contaminated land risks have been identified and remediation is required supported by further intrusive ground investigation, risk assessment and remedial design.

1.5 Where adverse risks from ground instability are identified these are discussed within the report.

2.0 SITE SETTING

Site Description

Item	Description
Site Address	Ham Close, Ham, Richmond Upon Thames, TW10 7PG
National Grid Reference	Site centred at National Grid Reference TQ0030585 and Ordnance Survey Co-ordinates 550309, 158566.
Site Area	4.7 Ha

Current Site Description

2.1 The following site description has been compiled from the site inspection undertaken by Enzygo Geoenvironmental staff, together with current maps, aerial photographs and a topographical survey.

2.2 The site comprises existing residential buildings arranged in five storey blocks, four storey deck access flats and three storey 'T' shaped blocks. The public realm consists of large areas of surface parking and amenity grassland with scattered trees. The Youth Centre and associated car park occupies a central location on the site. Ham Village Green sits at the eastern edge of the site. The site is bound by Woodville Road to the north, Wiggins Lane and Ham Street to the east, Ham Clinic and Ashburnham Road to the south and St Richard's C of E Primary School playing fields and the children's garden pre-school to the west.

2.3 Internal roadways, parking areas and lock-up garages were present between the apartment blocks.

2.4 Within the southern area of the site an amenity hall, clinic and estate office are present with associated parking.

2.5 The eastern area of the site is open land vegetated with grass and including footpaths.

2.6 An electricity sub station is present on the western boundary. This appears to be of modern construction with no evidence of leakage. The sub-station is not considered a significant risk.

Surrounding Area

2.7 The surrounding land uses are summarised as follows:

Direction	Land Use
South	Ashburnham Road with residential development beyond.
East	Wiggins Lan with residential development beyond.
West	School and open space.
North	Woodville Road with residential development beyond.

2.8 No significant sources of potential contamination were noted on or adjacent to the site.

3.0 SITE HISTORY

3.1 A review of historical Ordnance Survey maps and information pertinent to the site obtained from the existing desk study report is summarised below:

3.2 The site is shown as open land prior to construction of a farm in the eastern part of the site by 1868.

3.3 The site was redeveloped for residential use by 1947. A ruin is shown in the eastern part of the site by 1959 which is likely to be from bomb damage.

3.4 The current residential development is shown by 1983 and with open space in the east.

3.5 There is the potential for Made Ground associated with historic buildings, demolished prior to the current development. No other significant potential sources identified on or near to the site.

3.6 No significant off-site contamination sources are identified.

3.7 A low Unexploded Ordnance Risk was identified in relation to ground investigation works.

4.0 ENVIRONMENTAL SETTING

Ground Conditions

4.1 The British Geological Survey (BGS) indicates that the site is underlain by the following geological sequence:

Geological Unit	Type	Description	Aquifer Classification
Drift	Kempton Park Gravels	Sand and Gravel	Secondary A
Solid	London Clay	Clay	Unproductive

4.2 There are no records of Made Ground below the site. Made Ground is shown 41m south west. Given the distance from the site this is not considered a significant risk.

4.3 There are no records of landslips on the site.

4.4 BGS borehole records on site show 0.6m of Made ground over gravel and with London Clay encountered at depths of 6m.

Groundwater

4.5 The Desk Study Report shows that the site is not within a Source Protection Zone.

4.6 BGS records show that the site is at potential risk of groundwater flooding.

Coal Mining

4.7 No historical or current coal mining extraction has been identified within 1000m of the site.

Non Coal Mining

4.8 No other mining activity has been identified within 1000m of the site.

Cavities

4.9 No natural cavities or solution features are identified on site.

Hydrology

4.10 There are no water courses on the site.

4.11 Environment Agency records show that the site is not within an Environment Agency Flood Zone.

Radon Risk Potential

4.12 The Groundsure GeoInsight Report indicates that the site is not within a Radon Affected Area. No radon protective measures are necessary in the construction of new dwellings.

Natural Hazards Finding

4.13 BGS information presented within the Groundsure Geoinsight report identifies the following:

Hazard	Risk Designation (Groundsure)
Coal Mining.	None Identified.
Collapsible Ground.	Very Low.
Compressible Ground.	Very Low.
Ground Dissolution.	Very Low.
Landslide.	Very Low.
Running Sand.	Very Low.
Swelling / Shrinking Clay.	Very Low.

4.14 No significant geotechnical risks are identified.

Sensitive Land Uses

4.15 There are no sites of special interest on or surrounding the site.

4.16 English Heritage has not identified any listed buildings or scheduled ancient monuments on or close to the site. No sensitive geology has been identified at the site.

Environmental Sensitivity

4.17 Overall the site is currently considered to be of low/moderate sensitivity due to the following:

- The underlying stratum is classified as a Secondary A Aquifer;
- Not within a source protection zone;
- No surface water courses on or adjacent to the site; and
- No sensitive ecology is noted adjacent to or on the site.

4.18 The proposed end use of the site is residential and as such future sensitivity will be high for end users.

Industrial Land Uses

4.19 No significant current industrial activities are identified on or adjacent to the site.

Landfill Sites and Waste Treatment Sites

4.20 There are no active or historic landfills within 250m of the site.

Planning Records

4.21 A review of London Borough of Richmond's planning history shows no relevant information for the site.

5.0 PREVIOUS REPORTS

5.1 No previous ground investigation reports were provided.

6.0 PRELIMINARY CONCEPTUAL MODEL

6.1 Based on the desk study information the following Preliminary Conceptual Model has been prepared:

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
Human Health					
Asbestos, Hydrocarbon and metals.	Unforeseen Contamination.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Normal site management practices and PPE will address risk.
			Site users.	Negligible.	No source identified.
Asbestos, Hydrocarbon and metals.	Made Ground.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Normal PPE will address risk.
			Site users.	Very Low.	If present can easily be addressed through development.
Hydrocarbon and metals.	Potential migration from off-site source.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	No significant off site sources identified.
			Site users.		
Ground Gas.	Historic Landfill.	Inhalation & Explosive.	Construction Workers.	Dismissed.	No source identified.
			Site users.		
	Potential Made Ground.	Inhalation & Explosive.	Construction Workers.	Dismissed.	No significant source identified.
			Site users.		
Groundwater					
Hydrocarbon and metals.	Potential spillage on site.	Vertical Migration.	Groundwater.	Dismissed.	No source identified.
Surface Water					
Hydrocarbon and metals.	Potential spillage on site.	Horizontal Migration.	River Network.	Dismissed.	No source or credible receptor.
Environmental Receptors					
On site contaminants		Ingestion dermal and inhalation.	Ecology.	Dismissed.	No sensitive ecology designation.
		Direct.	Archaeology.	Dismissed.	None present.
		Direct.	Geology.	Dismissed.	No sensitive receptor present.
		Phytotoxic.	Woodland.	Dismissed.	None present.
		Phytotoxic.	Crops.	Dismissed.	No source identified.
		Ingestion dermal and inhalation.	Livestock.	Dismissed.	No source identified.
Building Services					
On site contaminants		Direct.	Historic Buildings.	Dismissed.	None present.
		Direct.	Proposed Buildings.	Dismissed.	No source identified.
		Permeate into pipework.	Water Pipes.	Dismissed.	No significant source identified.

6.2 There is a very low risk from Made Ground, including former buildings which will be investigated. Should contamination be present this can easily be addressed through development. No other significant risks are identified.

7.0 SITE INVESTIGATION

General

7.1 A ground investigation was undertaken based on the findings of the desk study. The locations of the exploratory holes are shown on Drawing CRM.1027.087.GE.D.001.

Site Works

7.2 The site investigation works comprised window sampler holes (WS1 to WS18) advanced between 27th and 29th April 2021 and six deep boreholes (BH1 to BH6) advanced between 16th and 19th August 2021.

7.3 A subsequent visit was undertaken during October 2021 with six window sampler holes (WS101 to WS106) being advanced on 25th October 2021 in areas of car park where access was not previously permitted. Six soakaway tests (SA1 to SA6) were undertaken on 26th and 27th October 2021.

7.4 Exploratory hole locations were determined to provide general coverage of the site within areas where access was permitted by the land owner. The investigation works are summarised in the table below:

Rational	Exploratory Holes	Notes
Site Coverage.	WS1 to WS18.	Across site.
Car park areas	WS101 to WS106	Car parks
Soakaways	SA1 to SA6	To assess viability of soil infiltration.
Monitoring.	WS5 WS6 WS7 WS9 WS14 WS16 & WS18.	Installations.
Deep foundations.	BH1 to BH6.	Deep boreholes.

7.5 Strength of soils were assessed using Standard Penetration Tests (SPT). The results of which are included on the borehole logs presented in Appendix B.

7.6 Representative soil samples were collected for chemical and geotechnical testing. Soil samples destined for chemical analysis were collected in appropriate containers provided by the analytical laboratory. Samples were stored in cool boxes prior to dispatch to the laboratory for analysis. All samples were collected using appropriate sampling equipment that was cleaned at each sampling location.

7.7 Generally samples were collected from Made Ground, which may contain potential inclusions of contaminating materials and materials displaying evidence of potential contamination.

7.8 In the absence of any evidence of contamination samples were collected near surface as this material is more likely to be contaminated by surface spillages and also will potentially be in contact with future residents.

Monitoring

7.9 Return visits to monitor groundwater levels were undertaken and during these visits ground gas was also measured.

Laboratory Testing

7.10 Samples for geotechnical testing were sent to the laboratories of I2, which is UKAS accredited, for the following analysis:

- California Bearing Ratio(CBR) tests undertaken on re-compacted samples
- Atterberg Limits Determinations;
- Moisture Content; and
- Soluble sulphate and pH.

7.11 Samples for chemical analysis were sent to the laboratories of The I2 Ltd who are UKAS and MCERTS accredited. Samples were tested for the CLEA metal suite, pH, sulphate, cyanide, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAH), organic carbon, banded Total Petroleum Hydrocarbon (TPH), asbestos quantification, and two stage WAC tests.

8.0 GROUND AND GROUNDWATER CONDITIONS

Summary of Ground and Groundwater Conditions

8.1 The investigations undertaken by Enzygo Geoenvironmental Ltd identify the following strata:

Strata	Summary Description	Thickness (m)
Made Ground	Brown and grey clayey fine sand and flint gravel with fragments of brick concrete and ash.	0.4 to 1.2
Kempton Park Gravels	Firm and stiff brown clay and gravelly clay.	0 to 0.9
	Loose becoming medium dense and dense with depth brown sand and flint gravel.	3.8 to 5.3
London Clay	Stiff grey brown silty clay with occasional claystone gravel.	>20
Groundwater	Seepages	2.2m to 4.3 bgl.

8.2 Details of the ground and groundwater conditions encountered are given on the exploratory hole records included in Appendix B and are summarised in the sections below:

Made Ground

8.3 Made Ground was encountered across the site comprising brown and grey clayey fine sand and flint gravel with fragments of brick concrete and ash.

8.4 This material is consistent with typical Made Ground comprising natural soils with anthropogenic inclusions associated with demolition and removal of historic buildings

Kempton Park Gravels

8.5 The Kempton Park Gravels were encountered at depths of between 0.4m and 1.2m below ground level (bgl). The upper horizon of the Kempton Park Gravels generally comprised firm and stiff brown clay and gravelly clay.

8.6 The clay layer was underlain by loose becoming medium dense and dense with depth brown sand and flint gravel. The granular Kempton Park Gravels were encountered at depths of between 0.4m and 1.5m bgl.

London Clay

8.7 The London Clay was only encountered in deep boreholes and comprised stiff grey brown silty clay with occasional claystone gravel.

Visual and Olfactory Evidence of Contamination

8.8 Potential asbestos fragments were encountered in Window Sampler boreholes WS6 and WS8. No other visual or olfactory evidence of contamination was encountered during the site works. Samples of potential asbestos were collected for laboratory testing and this is discussed in Section 9.

Soil Strength

8.9 Undrained shear strength of cohesive Kempton Park Gravels were calculated using the correlations of Stroud and Butler. These show the undrained shear strength values to vary from 45kN/m^2 to 100kN/m^2 at 1m bgl. Granular soils ere noted to be loose medium dense and dense with depth. SPT values increasing 7 at 1m bgl to over 50 at 4m bgl being recorded.

8.10 London Clay was noted to have undrained shear strength values increasing from 60kN/m^2 at 6m to 170kN/m^2 at 25m bgl.

Groundwater

8.11 Groundwater was encountered as a seepages at depths of between 2.2m to 4.3 bgl from within the Kempton Park Gravels. The depth to groundwater measured during the monitoring visit is summarised on the table below:

Exploratory Hole	Depth m(bgl)					
	12.5.21	19.5.21	2.6.21	16.6.21	30.6.21	14.7.21
WS5	Dry	Dry	Dry	Dry	Dry	Dry
WS6	Dry	Dry	Dry	Dry	Dry	Dry
WS7	Dry	Dry	Dry	Dry	Dry	Dry
WS9	Dry	Dry	Dry	Dry	Dry	Dry
WS14	Dry	Dry	Dry	Dry	Dry	Dry
WS16	Dry	Dry	Dry	Dry	Dry	Dry
WS18	Dry	Dry	Dry	Dry	Dry	Dry

Ground Gas

8.12 Ground gas was monitored during the return visit to monitor groundwater levels and the results are summarised on the table below:

Exploratory Hole	Atmos pressure (Mb)	Flow (l/hr)	CH4		CO2		O2
			Concentration (%)	GSV (l/hr)	Concentration (%)	GSV (l/hr)	Concentration (%)
12.5.21							
WS5	997	<0.1	<0.1	<0.0001	1.8	<0.0018	19.5
WS6	997	<0.1	<0.1	<0.0001	1.8	<0.0018	19.4
WS7	997	<0.1	<0.1	<0.0001	1.5	<0.0015	19.1
WS9	997	<0.1	<0.1	<0.0001	1.2	<0.0012	19.3

WS14	997	<0.1	<0.1	<0.0001	1.6	<0.0016	18.9
WS16	997	<0.1	<0.1	<0.0001	0.8	<0.0008	18.8
19.5.21							
WS5	1017	<0.1	<0.1	<0.0001	1.9	<0.0019	18.1
WS6	1017	<0.1	<0.1	<0.0001	1.1	<0.0011	18.8
WS7	1017	<0.1	<0.1	<0.0001	2.0	<0.0020	18.0
WS9	1017	<0.1	<0.1	<0.0001	1.3	<0.0013	19.6
WS14	1017	<0.1	<0.1	<0.0001	1.7	<0.0017	18.2
WS16	1017	<0.1	<0.1	<0.0001	1.4	<0.0014	18.9
WS18	1017	<0.1	<0.1	<0.0001	1.1	<0.0011	19.6
2.6.21							
WS5	1014	<0.1	<0.1	<0.0001	2.1	<0.0021	18.2
WS6	1014	<0.1	<0.1	<0.0001	1.2	<0.0012	18.6
WS7	1014	<0.1	<0.1	<0.0001	1.7	<0.0017	18.5
WS9	1014	<0.1	<0.1	<0.0001	1.2	<0.0012	19.1
WS14	1014	<0.1	<0.1	<0.0001	1.6	<0.0016	18.8
WS16	1014	<0.1	<0.1	<0.0001	1.5	<0.0015	18.7
WS18	1014	<0.1	<0.1	<0.0001	1.0	<0.0010	19.7
16.6.21							
WS5	1009	<0.1	<0.1	<0.0001	2.1	<0.0023	18.3
WS6	1009	<0.1	<0.1	<0.0001	1.4	<0.0014	18.7
WS7	1009	<0.1	<0.1	<0.0001	1.5	<0.0015	18.8
WS9	1009	<0.1	<0.1	<0.0001	1.3	<0.0013	19.2
WS14	1009	<0.1	<0.1	<0.0001	1.6	<0.0016	18.9
WS16	1009	<0.1	<0.1	<0.0001	1.7	<0.0017	18.5
WS18	1009	<0.1	<0.1	<0.0001	0.7	<0.0007	19.9
30.6.21							
WS5	1015	<0.1	<0.1	<0.0001	1.8	<0.0018	18.2
WS6	1015	<0.1	<0.1	<0.0001	1.3	<0.0013	18.9
WS7	1015	<0.1	<0.1	<0.0001	1.6	<0.0016	18.7
WS9	1015	<0.1	<0.1	<0.0001	1.4	<0.0014	18.9
WS14	1015	<0.1	<0.1	<0.0001	1.5	<0.0015	19.0
WS16	1015	<0.1	<0.1	<0.0001	1.6	<0.0016	18.8
WS18	1015	<0.1	<0.1	<0.0001	1.0	<0.0010	19.2
14.7.21							
WS5	1017	<0.1	<0.1	<0.0001	1.9	<0.0019	18.3
WS6	1017	<0.1	<0.1	<0.0001	1.5	<0.0015	18.9
WS7	1017	<0.1	<0.1	<0.0001	1.6	<0.0016	18.7
WS9	1017	<0.1	<0.1	<0.0001	1.2	<0.0012	18.7
WS14	1017	<0.1	<0.1	<0.0001	1.7	<0.0017	18.8
WS16	1017	<0.1	<0.1	<0.0001	0.9	<0.0009	19.3
WS18	1017	<0.1	<0.1	<0.0001	0.8	<0.008	19.5

8.13 No significant ground gas has been measured.

Soakaways

8.14 Results of the soakaway testing is provided on the table below:

Soakaway	Depth (m bgl)	Test No	Soil Infiltration Rate	
SA 1	2.0	Test 1	Insufficient soakage	
SA 2	2.0	Test 1	$9.1E^{-6}$ m/s	
SA 3	2.0	Test 1	Insufficient soakage	
SA4	2.1	Test 1	$5.6E^{-6}$ m/s	
SA5	2.0	Test 1	Insufficient soakage	
SA6	2.0	Test 1	$7.7E^{-4}$m/s	Extrapolated

9.0 CONTAMINATION ASSESSMENT

General

9.1 A Tier I risk assessment has been undertaken using available and current screening values for human health and where appropriate controlled waters. The risk assessment is undertaken based on the findings of the preliminary conceptual model presented in Section 6. Based on the contamination testing and Tier I assessment a revised Conceptual Model has been prepared, which is presented later in this section.

9.2 Where significant risks are identified remedial measures are recommended.

Human Health

9.3 Assessment of the risks to human health has been undertaken by comparing the soil quality data with reference values obtained from the Contaminated Land Exposure Assessment (CLEA), Soil Guideline Values (SGV) and General Acceptance Criteria (GAC) published by LQM and derived in consultation with the Chartered Institute of Environmental Health. The LQM/CIEH S4ULs values are used and summary tables of the reference values are included in Appendix C.

9.4 Where an exceedance is identified the risk is assessed by considering the sensitivity of the proposed development and the potential pathway. The proposed development comprises conventional residential houses with domestic gardens.

9.5 The GAC values for residential use with plant uptake are used as the development includes domestic properties.

9.6 The soil quality shows exceedances of the GAC values for the following contaminants.

Exploratory Hole	Determinant	Concentration (mg/kg)	
		GAC	Soil
WS2 0.2m	Asbestos	Absent	0.006%
	Arsenic	37	40
WS6 0.4m	Asbestos	Absent	<0.001%
WS8 0.4m	Asbestos	Absent	3.127%
	Benzo(b)fluoranthene	2.6	3.4
	Benzo(a)pyrene	2.2	2.6
	Dibenzo(a,h)anthracene	0.24	0.53
	Lead	200	320
WS1 0.4m	Benzo(b)fluoranthene	2.6	8.1
	Benzo(a)pyrene	2.2	7.0
	Dibenzo(a,h)anthracene	0.24	1.1
	Lead	200	310
WS10 0.4m	Lead	200	250

WS102 @ 0.3m	Lead	200	1400
WS104 @ 0.3m	Lead	200	510
WS105 @ 0.35m	Lead	200	320

9.7 No other exceedances were recorded.

Controlled Waters

9.8 Risk to groundwater resources is dismissed due to the absence of any significant source of mobile contamination.

9.9 The risk to surface waters risk has been dismissed within the Initial Conceptual Model. No new risks are identified.

Ground Gas

9.10 Following the guidance provided in Section 3 of CIRIA C665 an initial assessment is undertaken to determine if there are any significant sources of potential ground gas. Such sources include landfills, organic clays and made ground incorporating putrescible materials such as rags, paper and wood. Where no significant source is identified no further assessment is necessary.

9.11 This approach is further supported by supplementary guidance given in RB17, published by CL:AIRE which confirms that gas monitoring is not generally required on sites where Made Ground is less than 5m thick and with low organic matter content or on natural soils such as alluvial clays and Chalk as the ground gas sources are not considered significant. The supplementary guidance given in RB17 also takes account of the current requirements for sealing of floor slabs and substructures to meet air tightness requirements under Part L of the Building Regulations which were not considered in CIRIA C665. The advice given in RB17 is consistent with CIRIA C665 and the Local Authority Guide to Ground Gas published by CIEH.

9.12 Where significant potential risk from ground gas is identified from the Initial Conceptual Model and the intrusive ground investigation works ground gas monitoring is undertaken and the results of the monitoring are compared against the Gas Screening Values given in CIRIA Report 665. From this the Characteristic Situation is identified and remedial measures proposed.

9.13 When assessing the risk and type of remedial measures appropriate consideration is given to the likely construction of the development, the nature of the gas posing a risk and the nature of the likely source. The use of engineering judgement when determining risk from

ground gas is consistent with the recommendations given in CIRIA C665 using a pollutant linkage model.

9.14 Gas monitoring was undertaken during return visits which has not recorded elevated concentrations of Methane and no flow. Based on the gas monitoring undertake the Gas Screening Value is less than 0.07l/hr and therefore falls within Characteristic Situation 1 (CS1).

9.15 Additional monitoring is being undertaken.

Revised Conceptual Model

9.16 The Initial Conceptual Model presented in Section 6 has been revised based on the findings of the ground investigation and the revised Conceptual Model is presented below:

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
Human Health					
Asbestos, Hydrocarbon and metals.	Made Ground.	Ingestion dermal and inhalation.	Construction Workers.	Low	Management procedures proposed.
			Site users.	Low	Remediation proposed.
Asbestos, Hydrocarbon and metals.	Unforeseen Contamination.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Normal PPE will address risk.
			Site users.	Negligible.	No source identified.
Hydrocarbon and metals.	Potential migration from off-site source.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	No source and no exceedance of GAC.
			Site users.		
Ground Gas.	Historic Landfill.	Inhalation & Explosive.	Construction Workers.	Dismissed.	No significant source identified and no significant ground gas measured.
			Site users.		
	Potential Made Ground.	Inhalation & Explosive.	Construction Workers.		
			Site users.		
Groundwater					
Hydrocarbon and metals.	Potential spillage on site	Vertical Migration.	Groundwater	Dismissed.	No mobile source identified.
Surface Water					
Hydrocarbon and metals.	Potential spillage on site	Horizontal Migration.	River Network	Dismissed.	No source or credible receptor.
Environmental Receptors					
On site contaminants		Ingestion dermal and inhalation.	Ecology.	Dismissed.	No sensitive ecology designation.
		Direct.	Archaeology.	Dismissed.	None present.
		Direct.	Geology.	Dismissed.	No sensitive receptor present.
		Phytotoxic.	Woodland.	Dismissed.	None present.
		Phytotoxic.	Crops.	Dismissed.	No source identified.
		Ingestion dermal and inhalation.	Livestock.	Dismissed.	No source identified.
Building Services					
On site contaminants		Direct.	Historic Buildings.	Dismissed.	None present.
		Direct.	Proposed Buildings.	Dismissed.	No source identified.
		Permeate into pipework.	Water Pipes.	Dismissed.	No significant source identified.

9.17 Elevated Lead, Arsenic and PAH have been identified and it is recommended that remediation is undertaken.

9.18 Within areas of buildings and pavements the use of hardstanding will provide remediation by breaking the potential pollutant linkage. Within proposed soft landscape areas it is

recommended that clean cover soils are provided comprising 600mm in domestic garden areas and 400mm in communal areas over a geotextile no dig layer. Validation of the cover soils should be undertaken using hand pits with testing of cover soils.

9.19 Asbestos contaminated material has been identified during the ground investigation and it is possible that further material could be encountered during construction works. The use of clean cover soils discussed above will provide remediation to protect future site users. Measures should to be incorporated in to the Contractors Construction Stage Health and Safety Plan and asbestos management plan as required under the Construction Design and Management (CDM) Regulations to mitigate risk to construction works. Measures may include:

- Designing temporary works to minimise disturbance of the Back fill material;
- Separating material and disposal of soils containing asbestos;
- Wetting down during excavation;
- Sheeting of stockpiles where asbestos is suspected;
- Testing of soils and off-site disposal of any soils found or suspected of containing asbestos;
- Preventing access to the construction site by members of the public;
- Use of good hygiene measures, including washing down of plant; and
- Use of appropriate PPE, including face masks..

9.20 If unforeseen contamination is encountered during construction works such as localised spillage outside the areas investigated an Environmental consultant will be available on a 'call out' basis to undertake an assessment of risk. If 'unforeseen contamination' is encountered such as hydrocarbon contamination or solvent odours the discovery strategy will be to remove the source as it is likely to be very limited in extent or encapsulate it on site as appropriate and the Local Planning Authority advised.

9.21 As part of this discovery strategy it is recommended that additional investigation by trial pits is undertaken in areas of existing hardstanding where access can not currently be obtained to identify potential areas of contamination. This supplementary investigation is best undertaken following demolition works where safe access can be gained.

Waste Classification

9.22 Two part WAC test has been undertaken, the results of which are included in Appendix C. These show no exceedances above the inert threshold values PAH, TPH or TOC. Exceedance above leachable thresholds for Inert Waste by Antimony and Lead were recorded. In addition, asbestos above 0.1% has been recorded.

9.23 The Waste Management paper 2 has been updated to version 3 which states that sites which previously could be considered 'uncontaminated land' surplus soils if they did not exceed the GAC values now requires the landfill to make an appropriate assessment of the waste classification. As such final assessment, will be undertaken by the receiving landfill based on the requirements of their permit.

9.24 Based on the results received it is considered that Made Ground is likely to be classified as Stable Non Reactive Waste.

10.0 GEOTECHNICAL ASSESSMENT

Proposed Development

10.1 This document is a report of this survey and has been produced to support a planning submission for the site which seeks the demolition of the existing buildings on-site and phased mixed-use development comprising 452 residential homes (Class C3) up to six storeys, a Community/Leisure Facility (Class F2) of up to three storeys in height, a "MakerLabs" (sui generis) of up to two storeys together with basement car parking and site wide landscaping.

10.2 It is considered that the scheme meets the criteria of Geotechnical Category 1 of Eurocode 7.

Ground Conditions

10.3 Ground Conditions comprise Made Ground over firm clay and loose becoming dense with depth sand and gravel. This is underlain by London Clay comprising stiff clay.

10.4 Additional groundwater monitoring is being undertaken shortly pre-planning application and that the basement will be designed accordingly with the groundwater flood risk in mind.

Site Preparation

10.5 The site should be cleared and any vegetation below areas of proposed development stripped in accordance with Series 200 of the Specification for Highway Works. This should include:

- Any redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill; and
- Any tree roots should be grubbed out.

Foundations

10.6 It is considered that conventional strip foundations should be suitable for low rise buildings with wall loadings of 75kN/m or les assuming an allowable bearing capacity of 100kN/m^2 for natural soils at depths of 1.5m bgl. Within the natural firm clay or medium dense sand and gravel. An assessment of likely settlements has been undertaken and these are estimated to be less than 25mm.

10.7 Foundations may need to be stepped down locally where Made Ground is deeper. Foundations may also need to be deepened in accordance with NHBC requirements for building near trees. Foundations should be designed assuming soils of moderate shrinkage potential. It is recommended that foundations are reinforced to allow them to span both clay and granular soils.

10.8 No evidence of desiccation was noted.

10.9 It is likely that apartment blocks and structures with wall loadings above 75kN per m will require piled foundations.

10.10 For preliminary purposes and an initial pile assessment has been undertaken using the following assumptions:

- Upper 1.5m is ignored.
- Soil properties have been taken from the ground investigation and laboratory testing.
- A global factor of safety of 2.5 has been used, together with factors of 1.5 on shaft resistance and 3 on base resistance.

10.11 The following preliminary pile working loads have been calculated:

Pile depth (m bgl)	Working Load kN					
	200mm	250mm	300mm	350mm	450mm	600mm
10	80	100	125	150	200	300
15	150	180	235	280	370	530
20	220	290	350	420	560	770
25	320	400	500	590	780	1080

10.12 Final design should be undertaken by a specialist piling contractor who ca use case studies to negotiate more economic pile designs.

Ground Floor Slab

10.13 Based on thickness of Made Ground suspended floor slabs are recommended.

Pavement Construction

10.14 An assessment of the likely California Bearing Ratio (CBR) has been assessed from the following sources:

- Description of the materials encountered in the exploratory holes; and

- Guidance given in HD25/94.

10.15 Based on the above it is considered that an equilibrium CBR of 3% is suitable.

10.16 It is recommended that the sub-formation is proof rolled with any soft materials being excavated and replaced with suitable compacted capping.

10.17 Soils are not considered to be frost susceptible.

Drainage

10.18 Soakaway testing identified poor soil infiltration rates due to the clay content of the sand and gravel deposits. Soakaway drainage is not considered feasible.

10.19 Chemical results should be provided to the water authority to confirm the design of potable water supply pipes.

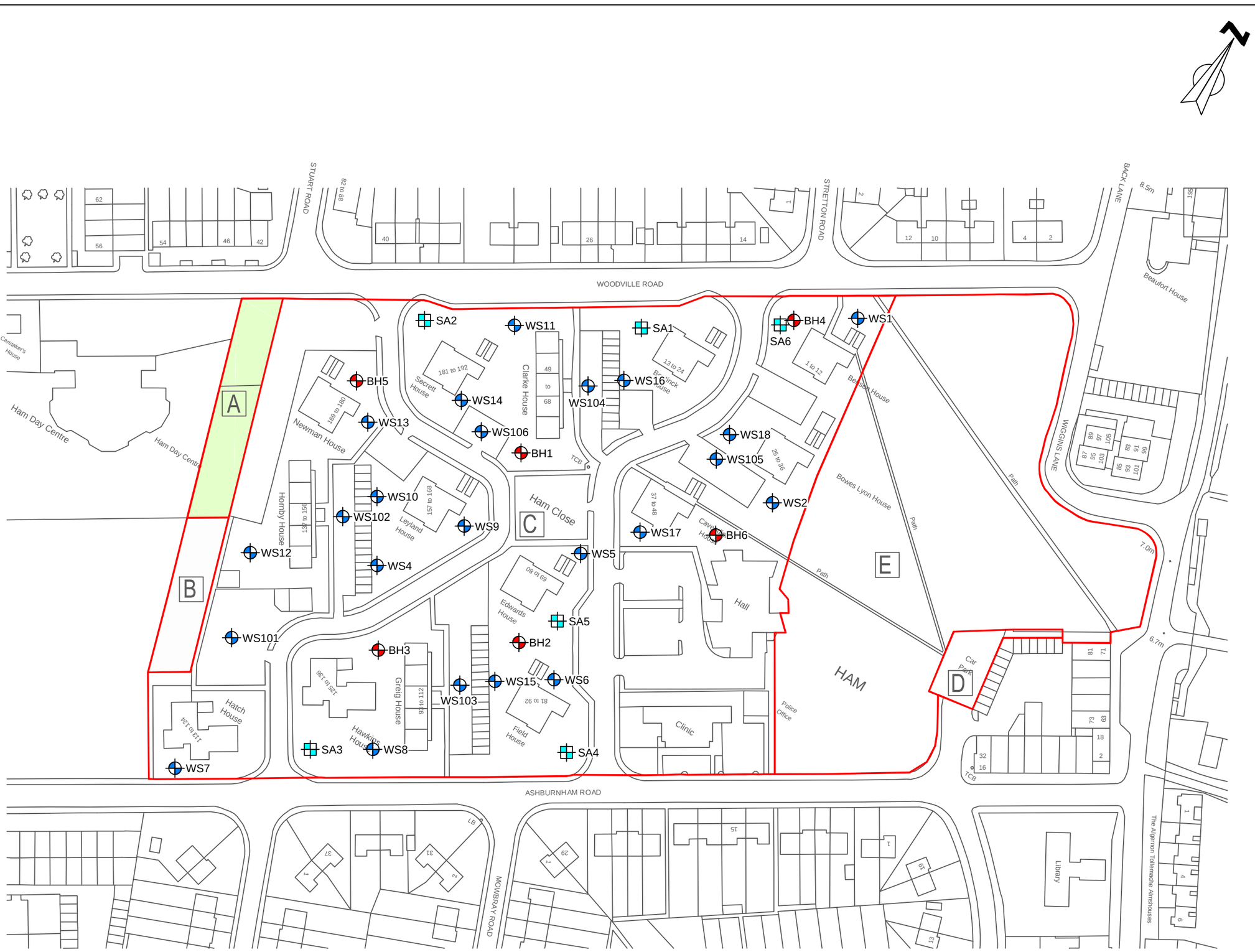
Buried Concrete

10.20 Results of the sulphate and pH testing indicate that shallow soils have soluble sulphate concentrations are generally less than 0.5 g/l consistent with DS1 Conditions. Samples from the London Clay below 6m bgl recorded a concentration above 0.5 g/l within the London Clay at 25m bgl but the soils have a neutral pH. Taking account of pH and sulphate concentrations it is considered that shallow buried concrete can be deigned to Class AC1-s.

Excavation and Materials Re-Use

10.21 Site observations indicated that excavations should be feasible in the near surface. Where access is required the excavations should be designed in accordance with CIRIA RR97.

10.22 Significant dewatering of excavations is not likely to be required.



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Key

- Site Boundary
- Window Sampler Locations (WS)
- Borehole Locations (BH)
- Soakaway Locations (SA)

enzygo environmental consultants

Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT: Hill Partnership

SCALE: 1:1000@A3

PROJECT REF: CRM.1027.087

DRAWN: VR

CHECKED: MG

DATE: October 2021

PROJECT: Richmond

TITLE: Site Plan

DRAWING NO: CRM.1027.087.GE.D.001.B

Chelmer
Consultancy Services
'Groundbreaking Services'

Desk Top Study Report

Site	Ham Close
	Richmond Upon Thames
	London
	TW10 7PG
Client	Richmond Housing Partnership
Date	11th August 2017
Our Ref	DTS/9324

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
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PHASE 1 ENVIRONMENTAL REPORT
of a site at
HAM CLOSE, RICHMOND UPON THAMES, LONDON, TW10 7PG
for
RICHMOND HOUSING PARTNERSHIP

Project No 9324
Report ref: 9324-P1E-1
Issued: 11 August 2017
Revision:

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CONTENTS

1 EXECUTIVE SUMMARY

Details	Summary	
Proposed Development	Residential with soft landscaping	
Current Site Use	Residential and commercial	
Site History	Historical mapping shows site initially used as farm land later developed for residential and commercial use	
Surrounding Area	Residential	
Environmental Setting	Geology	Superficial: Kempton Park Gravel Formation Bedrock: London Clay Formation
	Hydrogeology	Superficial: Secondary A Aquifer Bedrock: Unproductive Strata
		Source Protection Zone: SPZ NA
Potential Contamination Sources	The site walkover, historical mapping and environmental searches have identified the following potential sources of contamination. • Car park, lock up garages, electricity substations on site • Demolition debris & imported hard core • Nearby commercial activity • Naturally occurring contaminants • Unknown nature of fill material on-site & off site	
Risk Assessment Findings	Risk ratings of moderate or greater indicate potentially complete source-pathway-receptor linkages that can require further investigation and remedial measures. The following moderate or greater risks have been identified at the site. • Migration, build up in buildings and explosion of hazardous gases • Site users in contact with contaminated soil • Site users inhaling contaminated dust • Proposed buildings in contact with contaminated soil • Site users and workers inhaling fibres (asbestos)	
Recommendations	Some preliminary intrusive environmental site investigation is recommended to determine if either contamination and, or, landfill gas are present on the property. It is not considered that an upgraded water supply pipe is required, however it is recommended that this report is provided to the water supplier with a request for the testing, if any, that they require. It is considered that provided the recommendations of this report are implemented there is no increased risk to human health from redevelopment of the site for the proposed use.	

Risk Summary

Very Low	Low	Moderate / Low	Moderate	High

		Receptors					
		Residents & Site Users	Construction & Maintenance Operatives	Neighbours	Proposed Building	Aquifer	Watercourse
Sources	Car park, lock up garages, electricity substations, demolition debris & imported hard core on site						
	Demolition debris & imported hard core (asbestos)						
	Unknown nature of fill material on-site & off site						
	Nearby commercial activity						
	Nursery (off site)						
	Naturally occurring contaminants						

2 BRIEF

Mr Alec Thomson of Pellings requested a phase 1 environmental desk top study for a site at Ham Close, Richmond upon Thames, London, TW10 7PG on behalf of Richmond Housing Partnership.

The purpose of this report is to assess the risks to sensitive receptors both on and off-site due to soil and groundwater contamination as a result of the proposed development. It is based upon information provided by the client, a site visit, walk over and a Landmark Envirocheck, historical aerial photographs and maps.

This report is based upon available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the Client. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.

3 SITE VISIT

The site was visited on 21 July 2017. The weather was dry and sunny. Access was available to all external areas of the site, except for the school playing field and the Ham Day Centre and a visual inspection was undertaken. A photographic record was made during the visit and this is contained in appendix B.

The client's confidentiality was maintained at all times during discussion with third parties.

4 SITE LOCATION

The site is situated in the area of Ham, in the London borough of Richmond upon Thames. Refer to Figure 1.

The National Grid Reference for the approximate site centre is 517160, 172360.

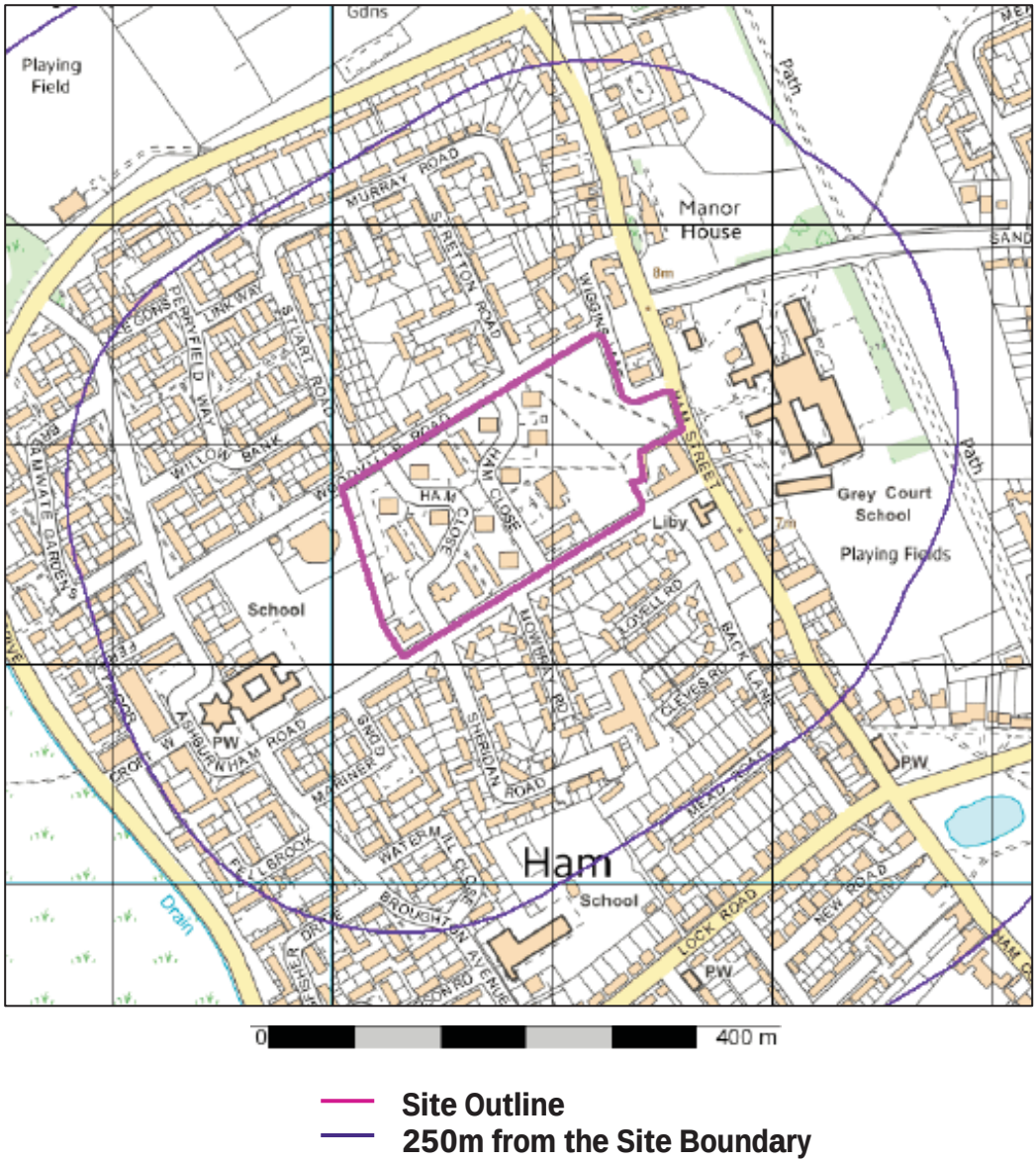


Figure 1: Site Location Plan

5 SITE DESCRIPTION

The site is very approximately rectangular shaped in plan and occupies 4.58ha. The north boundary is defined by Woodville Road. The eastern boundary at the southern end is defined by the estate boundary wall, the boundary then runs north-northeast across the school playing field and the Ham Day Centre. The southern boundary is defined by Ashburnham Road. The western boundary is formed by Wiggins Lane and Ham Street and in the southeast corner by the service yard and shops fronting onto Ham Street and Ashburnham Road.

Photograph 1: View of the site from the east

The east end of the site is grassed communal open space with an asphalt surfaced car park in the southeast corner. There is an electricity sub-station in the service yard, immediately next to the southeast corner of the site.

The greater part of the remainder of the site comprises a residential estate, with three, four and five storey blocks, three runs of lock-up garages, small enclosed individual storage areas, asphalt surfaced car parks, a Community Hall, a Clinic the Ham Friends Club building and associated asphalt surfaced estate roads. Areas between the blocks are laid to grass with some trees and bushes. There is an electricity sub-station on site near the west boundary.

There is a school to the east of the site, a school playing field and the Ham Day Centre to the west of the site and a terrace of small shops with a service yard and electricity sub-station to the southeast of the site. Other than the above the surrounding area appears to be residential.

6 GROUND CONDITIONS

6.1 Geology

Reference to the geological survey of Great Britain indicates that beneath made ground, the area generally is underlain by superficial deposits comprising sand and gravel which is described as Kempton Park Gravel Formation.

The superficial deposits are underlain by bedrock comprising clay and silt described as London Clay Formation.

6.2 Hydrogeology

The Environment Agency maps show the site to be located over a Secondary A Aquifer in the superficial or drift deposits, in the bedrock they show the site to be over an Unproductive Strata.

Secondary A Aquifers comprise 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.

The soils overlying the aquifers are assumed to have a high leaching potential (U) and a worst case vulnerability classification (H) is assumed due to a lack of data available for restored workings and urban areas.

The Environment Agency maps show the site is not located within a source protection zone of a borehole abstraction point.

The Environment Agency define a zone according to how the groundwater behaves in that area. From this a model of the groundwater environment is developed on which to define the zones.

Groundwater source catchments are divided into three zones:

SPZ1 – Inner protection zone

Defined as the 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres.

SPZ2 – Outer protection zone

Defined by a 400 day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction.

SPZ3 – Source catchment protection zone

Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final Source Catchment Protection Zone can be defined as the whole aquifer recharge area where the ratio of groundwater abstraction to aquifer recharge (average recharge multiplied by outcrop area) is >0.75.

6.3 Hydrology

The nearest water course to the site would appear to be a drain which is approximately 295 metres to the southwest at the nearest point. This is considered to be too distant to be significantly impacted by the site

The Environment Agency maps show the site is not located within a flood zone.

The British Geological Society data shows the site lies in an area with potential for groundwater flooding of property situated below ground level and potential for groundwater flooding to occur at surface.

Copy of extracts from the Landmark report are contained in appendix C.

6.4 Ground Stability Hazards

Infilled ground has been identified 41 to the south west, worked ground (Undivided) has been identified 361 to the west and 320 to the south east.

The ground beneath the site has been identified as having a very low risk of potential ground instability due to collapsible ground, landslide ground, running sand ground. These risks would be expected to manifest themselves as excessive settlement in the buildings on the site. However, the risks identified are considered unlikely to be of concern to any new buildings, as the foundation design will be based upon geotechnical information obtained from a site-specific intrusive investigation.

6.5 Mining Activities

Reference to the Coal Authority data indicates that the site is not within an area of known coal mining. There is no other known mining in the area.

6.6 Radon Gas

The Landmark Envirocheck Data also advises that the site lies within an area where less than 1% of properties are above the action level and that no protection measures are required in the construction of new properties.

6.7 Sensitive Land Use

Environmentally Sensitive Areas include Nitrate Sensitive Areas, Sites of Special Scientific Interest (SSSI's), Areas of Outstanding Natural Beauty (AONB), National Parks, National Nature Reserves, Special Areas of Conservation, Special Protection Areas and RAMSAR sites. According to the Landmark Envirocheck Data, the Site is not located on or close to any such Environmentally Sensitive Areas.

7 SITE HISTORY

Copies of the Historical Ordnance Survey maps that have been obtained from The Landmark information group are contained in appendix D.

The maps have been reviewed and items of interest and potential sources of contamination, both on the site and within the surrounding area up to 500 metres from the site boundary are noted hereunder.

Site Usage

From	To	Description
1850	1868	Site appears to be occupied by open land with a path way across the south and east part of the site.
1868	1896	Site appears to be occupied by buildings in the eastern part of the site and the site is labelled as a farm.
1896	1947	Site appears to have change of buildings in the eastern part of the site.
1947	1959	Site appears to now be a residential area with some open grass space.
1959	1969	There appears to be a ruin in the east part of the site.
1969	1983	Ruin appears to no longer be onsite. The site appears to no longer have any residential buildings in the east part of the site and a development of residential housing in the west part of the site. The west part of the site overlays part of a school adjacent to the site. Appears to be a clinic in the southern part of the site.
1983	2017	A car park shown in the south-eastern part of the site.

Surrounding Area

From	To	Name	Direction	Distance (m)
1868	1959	Pit	E	206
1871	-	Pond	SE	403
1913	1934	Smithy	SE	250
1913	1959	Gravel Pit	W	527
1913	1959	Sewage Works	S	155
1913	-	Riffle Range	NW	323

From	To	Name	Direction	Distance (m)
1933	1960	Cedar Nursery	N	107
1934	1959	Sand and Gravel Works	W	542
1934	1960	Sand and Ballast Works	SW	340
1959	1969	Lake	NW	111
1933	1971	Tanks/Disused Works	S	212
1959	-	Plant Nursery	N	296
1973	-	Pumping Station	S	202
1973	-	Tank	S	195

8 PROPOSED DEVELOPMENT

Plan details for the proposed redevelopment is not available. Proposed development will be residential dwellings with private and communal gardens and non-residential buildings.

9 POTENTIAL CONTAMINATION

9.1 General

From observations made during the site visit and review of the historical maps and the Landmark information, potential sources of on-site contamination and off-site contamination have been identified.

No significant potential sources of contamination have been identified beyond a 250 metre boundary which are considered likely to have any impact on the site. Where there are similar industries and activities in the same direction, only the nearest has been listed.

Copies of the relevant extracts are contained in appendix C.

The legislative framework for the regulation of contaminated land is embodied in Part IIA of the Environmental Protection Act 1990, implemented in the Contaminated Land (England) Regulations 2000. This legislation allows for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment. The approach adopted by UK contaminated land policy is that of "suitability for use" which implies that the land should be suitable for its current use and made suitable for any proposed future use.

In this preliminary contamination assessment, the site has been modelled using the Source-Pathway-Receptor approach to produce a site specific conceptual model.

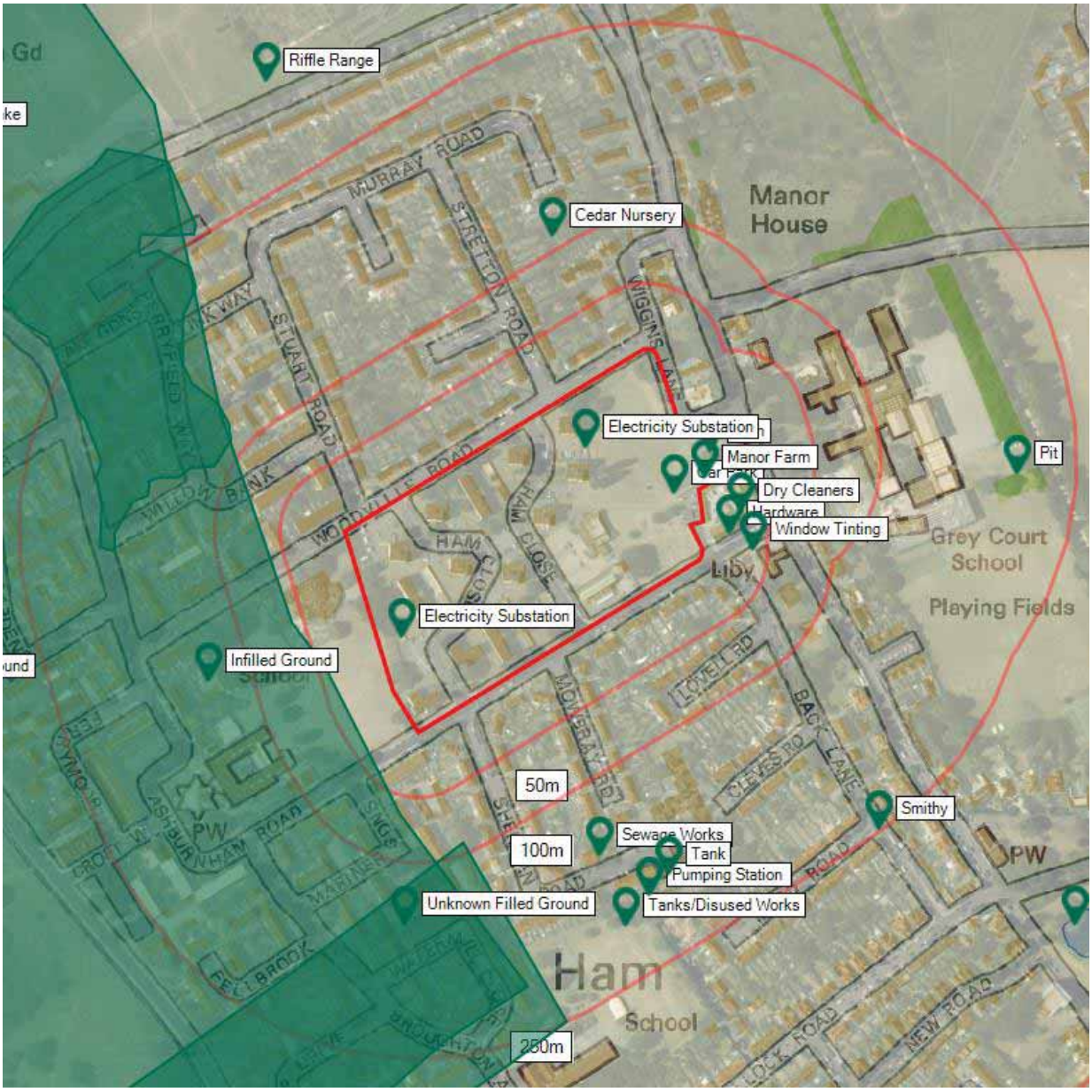
- **Source** - substances or potential contaminants which may cause harm
- **Pathway** - a linkage or route between a source and receptor
- **Receptor** - humans, plant life, groundwater etc., which could be harmed by a contaminant

Geological records indicate that the site is underlain by an aquifer in the superficial stratum and therefore there is a potential for contaminants to be transported both to and from site in the groundwater.

9.2 Off Site Contamination

Description	Direction	Distance (m)
Discharge Consents:		
Sewage Discharge to Tidal Thames from 1989 to 2010 – Status: Surrendered	SE	214
Sewage Discharge to Tidal Thames from 2010 to 2015 – Status: Temporary Consents	SE	214
Local Authority Pollution Prevention & Controls:		
PG6/46 Dry Cleaning - Permitted	E	19
Category 1 and 2 Pollution Incidents to Controlled Waters:		

Description	Direction	Distance (m)
None identified.	-	-
Prosecutions Relating to Authorised Processes:		
None identified.	-	-
Substantiated Category 1 and 2 Pollution Incidents:		
None identified.	-	-
Control of Major Accident Hazards Sites (COMAH) & Planning Hazardous Substance Consents		
None identified.	-	-
Landfill and Other Waste Sites:		
Unknown Filled Ground (Pit, Quarry etc) - 1992	S	92
Historical and Current Land Uses:		
Dry Cleaners	E	19
Hardware	E	20
Dry Cleaners	E	20
Window Tinting	E	26
Blast Cleaning	S	138
Laboratory Equipment, Instruments & Supplies	SW	155
Photo & Digital Imaging Bureaus	SW	158
Cinema Equipment	W	160
Office Furniture & Equipment	SE	194
Cleaning Services - Domestic	SW	199
Washing Machines - Servicing & Repairs	SW	241
Artificial Ground and Made Ground:		
Infilled Ground	SW	41



Potentially contaminating commercial activities have been identified in the vicinity, the general topography falls to the south, southwest and west towards River Thames this is assumed to be the general direction of the hydraulic gradient, sources to the north, northeast and east are therefore considered to have the potential to impact the site.

Potential sources identified on the historical maps and data sheet include: dry cleaners 19m and 20m, east; hardware 20m, east; window tinting 26 m, east and cedar nursery 107 m, north of the site. A potential source of contamination may also include the electricity sub-station in the service yard, immediately next to the southeast corner of the site.

Credible pathways for ground gas exist from an area of *Unknown Filled Ground*–92m south, Infilled ground 41m southwest and a pit 206m east from the site. These risks are considered further within the risk assessment.

9.3 On Site Contamination

There is potential contamination of the site from its use as a car park, lock up garages and electricity substations present on the site.

Review of the historic maps show the site has undergone redevelopment. Demolition debris may be present at the site and may comprise a potential source of contamination, including asbestos. Any hardcore below ground slabs or paved areas may also comprise a potential source of contamination.

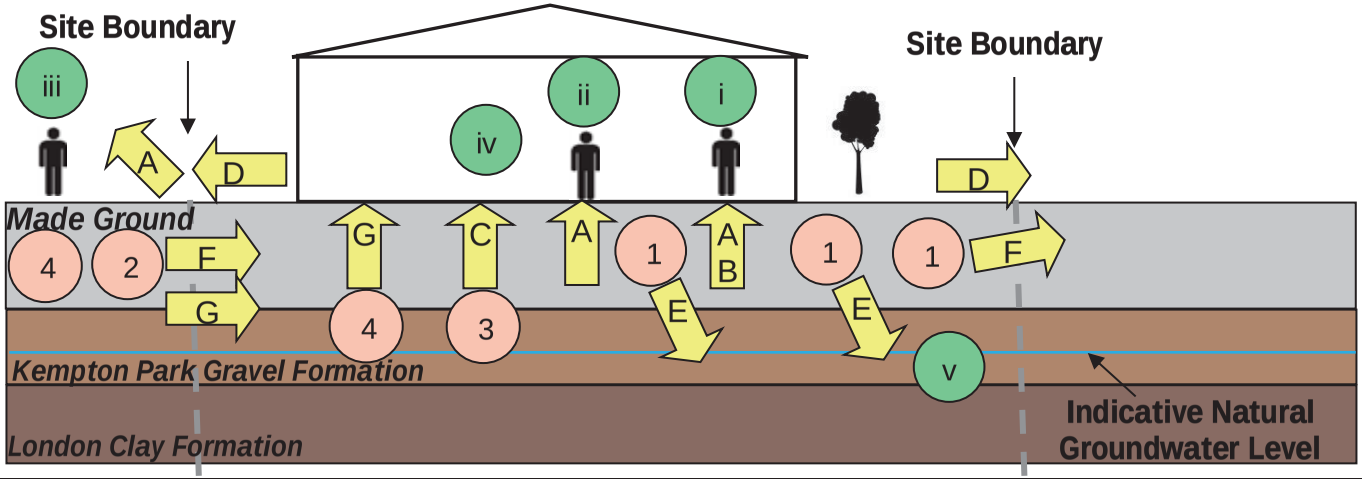
From review of the historical maps, the site would appear to have undergone major redevelopment. It is therefore considered there may potentially be a significant depth of fill material beneath the site, this is considered a potential on-site source of ground gas.

Richmond Upon Thames was subjected to bombing runs during World War II. In accordance with CIRIA C681 a non-specialist UXO assessment of the site has been undertaken. Several records of high explosive bombs have been identified within the site on The Bomb Sight project web-mapping tool, recorded locations are shown on middle section of the site parallel to Woodville Road and Ashburnham Road. It is considered that as the area has since undergone redevelopment, any bombs would have been identified at the time and dealt with during construction. However, those working on the site should be made aware of the potential for unexploded ordnance and given appropriate guidance. Information to be contained in site Health & Safety Plan.

9.4 Preliminary Conceptual Model

		Potential pathways											
		Inhalation of contaminated vapour	Inhalation of contaminated dust	Direct Soil Ingestion	Direct dermal contact	Inhalation of asbestos	Drinking contaminated water supply	Direct contact of soil with building materials	Surface water run-off	Surface water percolation to groundwater	Migration via groundwater	Build-up of ground gas	Comments on discounted pathways
Receptors	Site Users / Residents	Y	Y	Y	Y	Y	Y					Y	
	Construction / Maintenance Operatives	Y	Y	Y	Y	Y						Y	
	Neighbours	Y	Y			Y			Y		Y	Y	
	Proposed Building							Y				Y	
	Watercourse								N		N		Nearest water course too far to be impacted by site.
	Aquifer									Y			

Schematic Conceptual Model



(Not to Scale)

Sources		Pathways		Receptors	
1	Car park, lock up garages, electricity substations, demolition debris & imported hard core (On Site)	A	Inhalation, ingestion, dermal contact, vapours	i	Residents & Site User
2	Nearby commercial activity (Off Site)	B	Drinking contaminated water supply	ii	Construction & Maintenance Operatives
3	Naturally occurring contaminants	C	Direct contact of soil with building materials	iii	Neighbours
4	Unknown nature of fill material on-site & off site	D	Surface water run-off	iv	Proposed Building
		E	Surface water percolation to groundwater	v	Groundwater (Secondary A Aquifer)
		F	Migration via groundwater		
		G	Vertical and lateral migration of soil gases		

10 RISK ASSESSMENT

The level of information provided by the Landmark report and historic Ordnance Survey maps, together with the other information within the report is considered suitable to provide the data for a satisfactory risk assessment for the site. While there will always be uncertainties due to known or unknown gaps in information it is considered that sufficient information is available to reduce those uncertainties to within acceptable limits for the nature of the site under review.

An asbestos survey of existing structures and infrastructure (as defined under Section 5(a) of the Control of Asbestos Regulations 2012) was beyond the brief of this report. The risk assessment has been undertaken on the basis that should asbestos be identified within buildings or infrastructure, these materials will be removed appropriately by licensed contractors and asbestos materials disposed of in accordance with legal requirements prior to demolition or other works in order to avoid contaminating soils at the site.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Car park, lock up garages, electricity substations, demolition debris & imported hard core	Metals Hydrocarbons PAHs, PCB	Residents & Site Users	Dermal contact	Medium	Likely	Moderate risk	Contamination testing
			Inhalation of vapours, indoors and outdoors	Mild	Low likelihood	Low risk	
			Soil Ingestion	Medium	Likely	Moderate risk	
			Inhalation of contaminated dust	Medium	Likely	Moderate risk	
			Drinking of water from supply impacted by contaminated soil	Mild	Low likelihood	Low risk	It is not considered that an upgraded water supply pipe is required, however it is recommended that this report is provided to the water supplier for their comment.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Car park, lock up garages, electricity substations, demolition debris & imported hard core	Metals Hydrocarbons PAHs, PCB	Construction operatives	Dermal contact	Mild	Likely	Moderate/Low risk	Information to be contained in site Health & Safety Plan. Use of appropriate ppe and normal good hygiene measures. Appropriate dust control measures during construction.
			Inhalation of vapours, indoors and outdoors	Minor	Low likelihood	Very low risk	
			Soil Ingestion	Mild	Likely	Moderate/Low risk	
			Inhalation of contaminated dust	Mild	Likely	Moderate/Low risk	
		Maintenance Operatives	Dermal contact	Mild	Low likelihood	Low risk	Information to be contained in site Health & Safety Plan.
			Inhalation of vapours, indoors and outdoors	Minor	Low likelihood	Very low risk	
			Soil Ingestion	Mild	Low likelihood	Low risk	
			Inhalation of contaminated dust	Mild	Low likelihood	Low risk	

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Car park, lock up garages, electricity substations, demolition debris & imported hard core	Metals Hydrocarbons PAHs, PCB	Neighbours	Inhalation of vapours, indoors and outdoors	Minor	Unlikely	Very low risk	No further action required
			Inhalation of contaminated dust	Mild	Likely	Moderate/Low risk	Appropriate dust control measures during construction.
			Inhalation of contaminated dust (post construction)	Mild	Low likelihood	Low risk	Contamination testing
			Surface water run-off	Mild	Likely	Moderate/Low risk	
			Migration via groundwater	Mild	Likely	Moderate/Low risk	

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Car park, lock up garages, electricity substations, demolition debris & imported hard core	Metals Hydrocarbons PAHs, PCB	Aquifer	Vertical percolation to groundwater via Foundations & Drainage	Mild	Likely	Moderate/Low risk	Foundations and drainage should be designed in such a way that they do not create a pathway for surface water percolation.
			Vertical percolation to groundwater via soft landscaped and permeable areas	Mild	Likely	Moderate/Low risk	Contamination testing

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Unknown nature of fill material on-site & off site	Methane & carbon dioxide	Structures & other confined spaces	Migration via permeable strata & build up in buildings & other confined spaces	Severe	Likely	High risk	Ground gas monitoring to be undertaken. Gas protection measures installed if required. Information to be contained in site Health & Safety Plan.
		Construction & Maintenance Operatives		Severe	Low likelihood	Moderate risk	
		Residents & Site Users		Severe	Likely	High risk	
		Neighbours		Severe	Low likelihood	Moderate risk	
Demolition debris & imported hard core	Asbestos	Residents & Site Users	Inhalation (during construction)	Severe	Low likelihood	Moderate risk	Any debris from earlier demolition found during site strip is to be inspected for asbestos by a suitably experienced contractor.
		Construction operatives		Severe	Low likelihood	Moderate risk	
		Maintenance Operatives		Severe	Unlikely	Moderate/Low risk	Information to be contained in site Health & Safety Plan.
		Neighbours		Severe	Unlikely	Moderate/Low risk	Dust control during any ground works

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Demolition debris & imported hard core	Asbestos	Residents & Site Users	Inhalation of contaminated dust (post construction)	Severe	Low likelihood	Moderate risk	Contamination testing
		Neighbours		Severe	Unlikely	Moderate/Low risk	
Naturally occurring contaminants, Car park, lock up garages, electricity substations, demolition debris & imported hard core	Sulphates, pH	Proposed Building	Direct contact of soil with building materials	Medium	Likely	Moderate risk	As the protection of concrete is normally resolved in the building design process, the designer of the foundations should determine the requirement to undertake any investigation.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Nearby commercial activity (Off Site)	Metals Hydrocarbons PAHs, PCB	Residents & Site Users	Lateral migration of groundwater transporting contaminants to soil/made ground on site	Medium	Low likelihood	Moderate/low risk	Contamination testing
		Construction & Maintenance Operatives		Mild	Low likelihood	Low risk	Information to be contained in site Health & Safety Plan.
		Residents & Site Users	Drinking water supply impacted by groundwater transporting contaminants to site	Medium	Low likelihood	Moderate/low risk	It is not considered that an upgraded water supply pipe is required, however it is recommended that this report is provided to the water supplier for their comment.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Nursery (offsite)	Pesticides	Residents & Site Users	Lateral migration of groundwater transporting contaminants to soil/made ground on site	Mild	Low likelihood	Low risk	No further action required
		Construction & Maintenance Operatives		Mild	Unlikely	Very Low risk	
		Residents & Site Users	Drinking water supply impacted by groundwater transporting contaminants to site	Mild	Low likelihood	Low risk	

Any visual or olfactory evidence of contamination noted during works should be investigated by a suitably qualified person and their recommendations implemented.

11 SITE WORK

11.1 Investigations

11.1.1 In order to determine if the current or former usage of the property is a potential cause of contamination it is recommended that some site investigation should be undertaken based upon the requirements of BS 10175: 2001 which is the code of practice for the investigation of potentially contaminated sites. It is proposed that soil samples be taken from representative locations around the site and tested for a typical range of determinands, comprising asbestos, heavy metals, pH, speciated aromatic and aliphatic hydrocarbons and speciated PAHs and PCBs.

11.1.2 Due to the unknown nature of fill material on-site & off site monitoring for ground gas should be undertaken, in accordance with BS 8576, in order to determine if gas has migrated to the property. Furthermore, if the site has been filled in the past monitoring will determine if ground gas is being generated by the fill material.

11.2 Site Preparation

During the works a watching brief should be maintained by an experienced person. Should any visual or olfactory evidence of contamination be noted during the Chelmer Site Investigation Laboratories Ltd and the local authority Environmental Health Officer (EHO) should be contacted. Chelmer Site Investigation Laboratories Ltd shall assess if further intrusive investigation and remediation is required. Proposals will be issued to the EHO for comment prior to undertaking the additional investigation or implementing the remediation strategy.

The form of investigation proposed in 11.1.1 will indicate if there is any contamination present and if it is necessary will enable remedial works to be formulated.

If any potentially contaminated spoil is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported. It is recommended that consideration is given to this testing as part of the phase 2 investigation. Guidance can be obtained from Environment Agency document *Waste Sampling and Testing for Disposal to Landfill*.

11.3External Works

In regard to water supply reference should be made to the UK Water Industry Research (UKWIR) publication *"Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites"* (Ref 10/WM/03/21; the *'UKWIR Guidance')*. This document provides guidance to ensure that water quality is safeguarded by identifying suitable pipe materials and components to be used below ground in potentially contaminated sites. It is not considered that an upgraded water supply pipe is required, however it is recommended that this report is provided to the water supplier for their comment.

12 SITE DEVELOPMENT CONSIDERATIONS

During the course of the site visit and preparation of this report the following items, whilst not within the scope of this report, have come to our attention and should be considered. This is not necessarily an exhaustive list.

12.1 An intrusive geotechnical investigation may be required to provide detailed information about the engineering nature of the ground, in order to allow the most suitable foundations in terms of economy and performance to be designed. This should follow the recommendations of BS 5930, the Code of Practice for site investigations with tests carried out to satisfy the requirements of BS 1377, the Code of Practice for methods of tests for soils for civil engineering purposes. It is recommended that this includes testing for sulphates.

12.2 As redevelopment of the property is proposed it is recommended that a full topographical survey is undertaken, if one is not available. This should identify all relevant features, boundaries and levels relating to the site and should also include ground levels on the adjacent properties and roads.

12.3 If it is proposed to make use of the existing drainage system, or any existing connections to the mains sewers. A CCTV survey should be considered in order to determine both the general condition and suitability for the proposed use.

12.4 If any excavation works are proposed, it is recommended that all the relevant utility companies are contacted to ascertain what pipes, cables, wires, lines and other apparatus exist close to where the work is to take place.

12.5 An asbestos survey of existing structures and infrastructure (as defined under Section 5(a) of the Control of Asbestos Regulations 2012) was beyond the brief of this report. Advice should be sought regarding the potential presence and management of asbestos within existing structures and infrastructure.

13 CONCLUSIONS

Based upon the information currently available, there would in principle, appear to be some significant contamination issues associated with the site, however, the following should be considered at this stage. It is considered that provided the recommendations of this report are implemented there is no increased risk to human health from redevelopment of the site for the proposed residential and commercial use.

13.1 There is potential contamination of the site from its uses as a car park, lock up garages and electricity substations and from demolition debris and imported hard core below ground slabs and paved areas.

13.2 It is recommended that some preliminary intrusive environmental site investigation is undertaken to determine if contamination is present on the property.

13.3 Study of the historical maps indicate that there is potential for the site to have been impacted by nearby commercial activities.

13.4 Due to the unknown nature of fill material on-site & off site, monitoring of potential ground gases, over a suitable period of time, will be required in order to determinate the requirements for gas mitigation measures. Information to be contained in Health & Safety Plan.

13.5 It is not considered that an upgraded water supply pipe is required, however it is recommended that this report is provided to the water supplier for their comment.

13.6 Should any visual or olfactory evidence of contamination be noted during the works this should be investigated by a suitably qualified person and their recommendations implemented.

13.7 If any potentially contaminated spoil is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported.

14 REFERENCES

Card, G. B., Wilson, S., & Mortimer, S. (2012). *A Pragmatic Approach to Ground Gas Risk Assessment*. London, UK: Contaminated Land: Applications in Real Environments.

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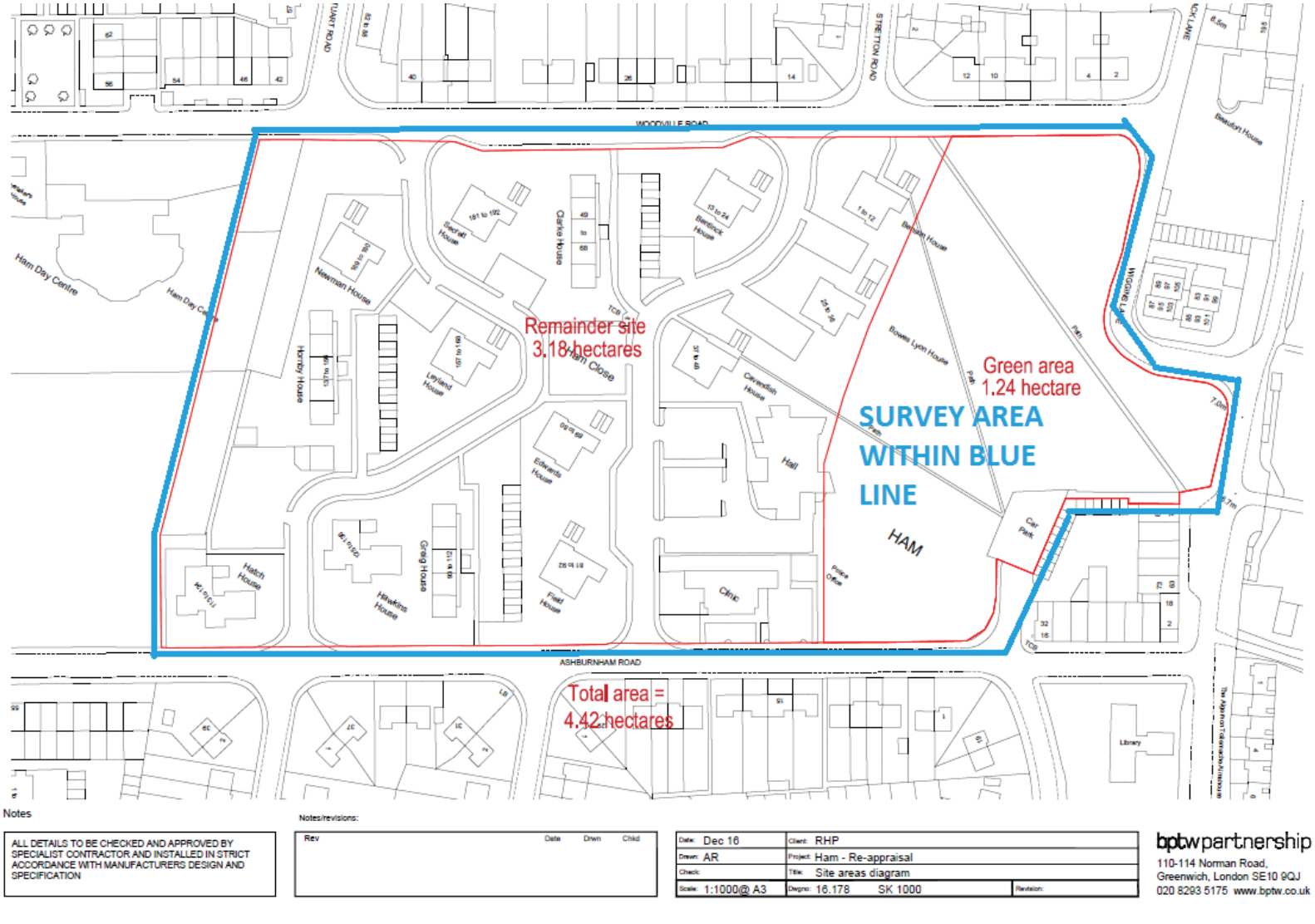
Appendix A – Site Location Plan



Notes

ALL DETAILS TO BE CHECKED AND APPROVED BY SPECIALIST CONTRACTOR AND INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS DESIGN AND SPECIFICATION

Notes/revisions:

Rev	Date	Drwn	Chkd

Date: Dec 16	Client: RHP		
Drawn: AR	Project: Ham - Re-appraisal		
Check:	Title: Site areas diagram		
Scale: 1:1000@ A3	Dwgno: 16.178 SK 1000	Revision:	

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9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership

Appendix B – Photographs

View across site from northwest corner

View across site from the east

Appendix C – Landmark Report Extracts

Where the overview indicates that no data has been found the relevant detail report sections may have been omitted.

Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NW (W)	0	1	517160 172357
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (SE)	0	1	517200 172300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (E)	88	1	517400 172450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (S)	257	1	517050 171950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A12NE (W)	322	1	516700 172450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (E)	431	1	517750 172400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (NW)	475	1	516600 172600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (W)	480	1	516550 172500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SW (E)	482	1	517750 172200
1	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Ham Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp 1082 Permit Version: 2 Effective Date: 3rd September 2010 Issued Date: 3rd September 2010 Revocation Date: 13th October 2015 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Saline Estuary Receiving Water: Tidal Thames **Status: Surrendered under EPR 2010** Positional Accuracy: Located by supplier to within 100m	A13SE (SE)	214	2	517300 172100
1	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Ham Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp 1082 Permit Version: 1 Effective Date: 2nd November 1989 Issued Date: 2nd November 1989 Revocation Date: 2nd September 2010 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Saline Estuary Receiving Water: Tidal Thames **Status: Temporary Consents (Water Act 1989, Section 113)** Positional Accuracy: Located by supplier to within 100m	A13SE (SE)	214	2	517300 172100

Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	**Discharge Consents** Operator: Environment Agency Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: Teddington Lockteddingtonmiddlesex Authority: Environment Agency, Thames Region Catchment Area: Thames-Teddington/Beverley Brook Reference: Casm.1384 Permit Version: 1 Effective Date: 21st March 2006 Issued Date: 3rd May 2006 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Land/Soakaway Receiving Water: Into Land **Status: New Consent, by Application, granted by Secretary of State** Positional Accuracy: Located by supplier to within 10m	A7SE (SW)	768	2	516620 171580
3	**Discharge Consents** Operator: British Aerospace Plc Property Type: MAKING OF OTHER TRANSPORT EQUIP/SHIPS/TRAINS/BIKES Location: British Aerospace Plc, Kingstonupon Thames, Surrey Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctcr.1987 Permit Version: 1 Effective Date: 25th April 1983 Issued Date: 25th April 1983 Revocation Date: 17th June 1993 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A3NE (S)	966	2	517400 171300
4	**Discharge Consents** Operator: J E Perry Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: Palm Beach, Eel Pie Island, Twickenham, London Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctwc.0573 Permit Version: 1 Effective Date: 20th December 1985 Issued Date: 20th December 1985 Revocation Date: 16th April 1991 Discharge Type: Unknown Discharge Environment: Saline Estuary Receiving Water: River Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	983	2	516500 173200
5	**Local Authority Pollution Prevention and Controls** Name: Ks Dry Cleaners Location: 65 Ham Street, Richmond, Tw10 7hw Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: LBRUT/DC/29 Dated: 29th March 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A13NE (E)	19	3	517314 172389
6	**Local Authority Pollution Prevention and Controls** Name: Divine Dry Cleaners Location: 424 Richmond Road, Ham, Kt2 5pu Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: LBRUT/DC/66 Dated: 1st April 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A9SW (SE)	935	3	517805 171565

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
7	**Local Authority Pollution Prevention and Controls** Name: Ham Cross Service Station Location: 297 Richmond Road, KINGSTON UPON THAMES, Surrey, KT2 5QU Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: 16/PVR Dated: 31st December 1998 Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Automatically positioned to the address	A9SW (SE)	935	3	517745 171527
	Nearest Surface Water Feature	A12SE (SW)	295	-	516804 172060
8	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Richmond, EEL PIE ISLAND Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed incident Incident Date: 19th February 1999 Incident Reference: THSE1999042077 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 10m	A13NE (E)	182	2	517500 172400
9	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 25th May 1993 Incident Reference: SE930143 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	628	2	516900 171600
10	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Unknown Note: Not Supplied Incident Date: 3rd February 1996 Incident Reference: SE960049 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	687	2	516600 171700
11	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Teddinton Lock Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: Not Supplied Incident Reference: SE950308 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SE (SW)	708	2	516700 171600

Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
12	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 15th October 1990 Incident Reference: SE900296 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	709	2	517000 171500
12	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Richmond Upon, TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Natural Note: Confirmed incident Incident Date: 30th April 1999 Incident Reference: THSE1999042983 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 10m	A8SW (S)	714	2	517000 171495
13	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: HAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 22nd March 1996 Incident Reference: SE960127 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18NW (N)	715	2	517100 173200
14	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 26th February 1990 Incident Reference: SE900046 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NW (SW)	729	2	516400 171900
15	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Chemicals - Unknown Note: Not Supplied Incident Date: 27th March 1996 Incident Reference: SE960135 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SE (SW)	754	2	516800 171500
16	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Ferry Road, TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Chemicals - Unknown Note: Confirmed As A Pollution Incident Incident Date: 10th May 1990 Incident Reference: SE900141 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SE (SW)	795	2	516700 171500

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
17	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Broom Road Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 7th August 1989 Incident Reference: N1090418 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	807	2	517100 171400
18	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Teddington Lock Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Yes Incident Date: 17th July 1992 Incident Reference: SE920227 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	809	2	517000 171400
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 17th May 1991 Incident Reference: SE910115 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	821	2	516200 172500
20	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Riverside, TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 7th August 1990 Incident Reference: SE900241 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	827	2	516800 173200
21	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 22nd September 1990 Incident Reference: SE900286 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SE (SW)	846	2	516600 171500
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: River Thames At, TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 11th June 1997 Incident Reference: THSE1997032324 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SE (S)	847	2	516805 171400

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 6th October 1990 Incident Reference: SE900292 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SE (S)	849	2	516800 171400
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 2nd February 1996 Incident Reference: SE960075 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SE (S)	852	2	516805 171395
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Lensburyclub Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 26th July 1991 Incident Reference: SE910214 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SE (S)	853	2	516800 171395
23	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Ferry Road, TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Natural Note: No Pollution Found Incident Date: 17th November 1998 Incident Reference: THSE1998041140 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SE (SW)	885	2	516700 171400
24	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: RICHMOND Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 26th June 1997 Incident Reference: THSE1997032339 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SW (SW)	900	2	516400 171600
25	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Marble Hill Park Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 17th November 1991 Incident Reference: SE910330 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A23SE (N)	903	2	517300 173400

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
26	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 19th September 1989 Incident Reference: S1890460 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A3NW (S)	909	2	517000 171300
27	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 9th April 1998 Incident Reference: 38469 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A11NE (W)	910	2	516100 172395
27	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Swanisland, TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 17th February 1997 Incident Reference: THSE1997031884 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A11NE (W)	910	2	516100 172400
28	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: 1 Strawberry Vale Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 8th March 1989 Incident Reference: SE890072 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NW (SW)	911	2	516200 171900
29	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: British Aerospace Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 18th August 1993 Incident Reference: SE930248 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NW (SW)	917	2	516300 171700
29	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: British Aerospace Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 1st September 1993 Incident Reference: SE930262 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NW (SW)	920	2	516300 171695

Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
30	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Swan Island Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 12th December 1989 Incident Reference: SE690431 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A11NE (W)	920	2	516100 172500
31	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 20th August 1993 Incident Reference: SE930250 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A3NE (S)	966	2	517400 171300
31	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 24th February 1996 Incident Reference: S1960079 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A3NE (S)	968	2	517405 171300
31	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: British Aerospace Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: Not Supplied Incident Reference: SE930192 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A3NE (S)	971	2	517400 171295
31	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: British Aerospace Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Yes Incident Date: Not Supplied Incident Reference: SE940332 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A3NE (S)	973	2	517405 171295
32	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: KINGSTON Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 8th February 1991 Incident Reference: SE910033 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A9SW (SE)	967	2	517600 171400

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
33	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: STRAWBERRY HILL Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 11th August 1992 Incident Reference: SE920269 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A11NE (W)	973	2	516040 172450
34	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Swan Island Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 26th May 1992 Incident Reference: SE920170 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A11NE (W)	991	2	516030 172510
	River Quality Name: Not Supplied GQA Grade: Unclassified Tidal River Reach: Not Supplied Estimated Distance (km): Not Supplied Flow Rate: Not Supplied Flow Type: Not Supplied Year: 1995	A18NW (N)	750	2	516857 173164
	River Quality Name: Thames GQA Grade: River Quality B Reach: Hogsmill - Teddington Estimated Distance (km): 2.7 Flow Rate: Flow less than 80 cumecs Flow Type: River Year: 2000	A8SW (S)	844	2	516915 171375

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
35	**River Quality Chemistry Sampling Points** Name: Thames Reach: Hogsmill To Teddington Estimated Distance: 2.70 Objective: Not Supplied Positional Accuracy: Located by supplier to within 10m Year: 1990 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1993 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1994 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1995 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1996 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1997 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1998 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 1999 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2000 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2001 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2002 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2003 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2004 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2005 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2006 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2007 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2008 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2009 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied	A8SW (S)	837	2	517020 171370
36	**Substantiated Pollution Incident Register** Authority: Environment Agency - Thames Region, South East Area Incident Date: 11th March 2002 Incident Reference: 63255 Water Impact: Category 2 - Significant Incident Air Impact: Category 4 - No Impact Land Impact: Category 4 - No Impact Positional Accuracy: Located by supplier to within 10m Pollutant: Oils - Diesel (Including Agricultural)	A7SE (SW)	714	2	516740 171570

Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: D.G.Tilles & R.H.Tilles Licence Number: 28/39/34/0008 Permit Version: 102 Location: Borehole At The Exiles Ground, Twickenham Authority: Environment Agency, Thames Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: The Exiles Ground, Twickenham Authorised Start: 01 October Authorised End: 30 September Permit Start Date: 14th September 2001 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A24NE (NE)	1487	2	517840 173860
	Water Abstractions Operator: Threadneedle Property Part. Licence Number: 28/39/34/0008 Permit Version: 101 Location: Borehole At The Exiles Ground, Twickenham Authority: Environment Agency, Thames Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: The Exiles Ground, Twickenham Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 31st March 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A24NE (NE)	1487	2	517840 173860
	Water Abstractions Operator: Cable & Wireless (Meadowbank) Ltd Licence Number: 28/39/34/0008 Permit Version: 100 Location: Borehole At The Exiles Ground, Twickenham Authority: Environment Agency, Thames Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 56 Yearly Rate (m3): 5300 Details: The Exiles Ground, Twickenham Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 15th October 1996 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A24NE (NE)	1487	2	517840 173860
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (U) - Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise Map Sheet: Sheet 39 West London Scale: 1:100,000	A13NW (W)	0	2	517160 172357
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Designation: Unproductive Strata	A13NW (W)	0	1	517160 172357
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A13NW (W)	0	1	517160 172357
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				

Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Flood Defences None				
41	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 379.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A12SE (SW)	295	4	516804 172060
42	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 300.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A12SE (SW)	309	4	516768 172102
43	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 15.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A12NE (W)	339	4	516671 172391
44	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 125.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A14NE (E)	711	4	518001 172613
45	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 162.9 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A14NE (E)	721	4	518023 172568
46	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 424.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Thames Primacy: 2	A7SE (SW)	726	4	516785 171536
47	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 239.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Thames Primacy: 2	A7SE (SW)	731	4	516643 171609
48	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 21.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Thames Primacy: 2	A7SE (SW)	745	4	516681 171568
49	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 873.4 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A14NE (E)	750	4	518020 172685

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Local Authority Landfill Coverage Name: London Borough of Richmond Upon Thames - Has no landfill data to supply		0	5	517160 172357
	Local Authority Landfill Coverage Name: Royal Borough of Kingston Upon Thames - Has supplied landfill data		667	6	517531 171710
77	**Potentially Infilled Land (Non-Water)** Bearing Ref: S Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A13SW (S)	92	-	517100 172121
78	**Potentially Infilled Land (Non-Water)** Bearing Ref: NW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A13NW (NW)	329	-	516880 172668

Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Thames Group	A13NW (W)	0	1	517160 172357
	BGS Estimated Soil Chemistry No data available				
79	**BGS Recorded Mineral Sites** Site Name: Ham Location: , Ham, Richmond, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 19674 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A12NE (NW)	457	1	516620 172600
80	**BGS Recorded Mineral Sites** Site Name: Ham Location: , Ham, Richmond, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 19676 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A7NE (SW)	480	1	516825 171790
81	**BGS Recorded Mineral Sites** Site Name: Ham Location: , Ham, Richmond, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 19675 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A12SE (SW)	577	1	516500 172050
82	**BGS Recorded Mineral Sites** Site Name: Ham Gravel Pit Location: , Ham, Richmond, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 164161 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary, Devensian Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A12SW (W)	611	1	516417 172208
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517196, 172203 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.90 mg/kg Cadmium Measured Concentration: 0.60 mg/kg Chromium Measured Concentration: 89.60 mg/kg Lead Measured Concentration: 246.20 mg/kg Nickel Measured Concentration: 25.70 mg/kg	A13SE (S)	71	1	517196 172203

Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516775, 172208 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 15.30 mg/kg Cadmium Measured Concentration: 0.50 mg/kg Chromium Measured Concentration: 68.70 mg/kg Lead Measured Concentration: 160.00 mg/kg Nickel Measured Concentration: 27.70 mg/kg	A12SE (W)	268	1	516775 172208
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517162, 172797 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 35.90 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 59.80 mg/kg Lead Measured Concentration: 418.30 mg/kg Nickel Measured Concentration: 41.40 mg/kg	A18SW (N)	308	1	517162 172797
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517224, 171792 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 16.20 mg/kg Cadmium Measured Concentration: 0.40 mg/kg Chromium Measured Concentration: 61.20 mg/kg Lead Measured Concentration: 239.30 mg/kg Nickel Measured Concentration: 20.90 mg/kg	A8NE (S)	444	1	517224 171792
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516653, 172693 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 16.30 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 70.90 mg/kg Lead Measured Concentration: 79.80 mg/kg Nickel Measured Concentration: 22.10 mg/kg	A17SE (NW)	488	1	516653 172693
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516754, 171749 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 16.10 mg/kg Cadmium Measured Concentration: 0.40 mg/kg Chromium Measured Concentration: 61.40 mg/kg Lead Measured Concentration: 208.10 mg/kg Nickel Measured Concentration: 25.30 mg/kg	A7NE (SW)	553	1	516754 171749

Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517870, 172143 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 17.80 mg/kg Cadmium Measured Concentration: 0.60 mg/kg Chromium Measured Concentration: 53.80 mg/kg Lead Measured Concentration: 81.50 mg/kg Nickel Measured Concentration: 15.50 mg/kg	A14SE (E)	614	1	517870 172143
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517880, 172804 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 13.90 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 44.00 mg/kg Lead Measured Concentration: 161.70 mg/kg Nickel Measured Concentration: 17.70 mg/kg	A19SE (NE)	674	1	517880 172804
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517228, 173180 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.30 mg/kg Cadmium Measured Concentration: 0.50 mg/kg Chromium Measured Concentration: 61.50 mg/kg Lead Measured Concentration: 75.40 mg/kg Nickel Measured Concentration: 20.70 mg/kg	A18NE (N)	681	1	517228 173180
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516303, 172232 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 28.10 mg/kg Cadmium Measured Concentration: 0.60 mg/kg Chromium Measured Concentration: 49.80 mg/kg Lead Measured Concentration: 98.50 mg/kg Nickel Measured Concentration: 27.70 mg/kg	A12SW (W)	718	1	516303 172232
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517788, 171803 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 14.30 mg/kg Cadmium Measured Concentration: 0.40 mg/kg Chromium Measured Concentration: 51.60 mg/kg Lead Measured Concentration: 85.20 mg/kg Nickel Measured Concentration: 14.20 mg/kg	A9NW (SE)	738	1	517788 171803

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516264, 172716 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 22.90 mg/kg Cadmium Measured Concentration: 0.40 mg/kg Chromium Measured Concentration: 60.00 mg/kg Lead Measured Concentration: 89.90 mg/kg Nickel Measured Concentration: 30.20 mg/kg	A17SW (W)	826	1	516264 172716
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517785, 173299 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 22.20 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 71.00 mg/kg Lead Measured Concentration: 203.80 mg/kg Nickel Measured Concentration: 30.40 mg/kg	A19NW (NE)	967	1	517785 173299
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 518303, 172289 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 22.20 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 61.00 mg/kg Lead Measured Concentration: 134.70 mg/kg Nickel Measured Concentration: 18.70 mg/kg	A15SW (E)	992	1	518303 172289
	BGS Urban Soil Chemistry Averages Source: British Geological Survey, National Geoscience Information Service Sample Area: London Count Id: 7209 Arsenic Minimum Concentration: 1.00 mg/kg Arsenic Average Concentration: 17.00 mg/kg Arsenic Maximum Concentration: 161.00 mg/kg Cadmium Minimum Concentration: 0.10 mg/kg Cadmium Average Concentration: 0.90 mg/kg Cadmium Maximum Concentration: 165.20 mg/kg Chromium Minimum Concentration: 13.00 mg/kg Chromium Average Concentration: 79.00 mg/kg Chromium Maximum Concentration: 2094.00 mg/kg Lead Minimum Concentration: 11.00 mg/kg Lead Average Concentration: 280.00 mg/kg Lead Maximum Concentration: 10000.00 mg/kg Nickel Minimum Concentration: 2.00 mg/kg Nickel Average Concentration: 28.00 mg/kg Nickel Maximum Concentration: 506.00 mg/kg	A13NW (W)	0	1	517160 172357

Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	41	1	516986 172263
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	78	1	517300 172260
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357

Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
83	**Contemporary Trade Directory Entries** Name: K S Dry Cleaners Ltd Location: 65, Ham Street, Richmond, TW10 7HW Classification: Dry Cleaners **Status:** Active Positional Accuracy: Automatically positioned to the address	A13NE (E)	19	-	517311 172387
83	**Contemporary Trade Directory Entries** Name: Peter'S Cleaners Location: 65, Ham Street, Richmond, Surrey, TW10 7HW Classification: Dry Cleaners **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13NE (E)	20	-	517312 172387
83	**Contemporary Trade Directory Entries** Name: Mica Hardware Location: 12, Ashburnham Road, Richmond, Surrey, TW10 7NF Classification: Hardware **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13NE (E)	20	-	517302 172362
83	**Contemporary Trade Directory Entries** Name: Peels Of London Ltd Location: 63, Ham Street, Richmond, Surrey, TW10 7HW Classification: Window Tinting **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13NE (E)	26	-	517315 172382
84	**Contemporary Trade Directory Entries** Name: Www.Enviro-Blast-Clean.Com Location: 32, Mowbray Road, Richmond, Surrey, TW10 7NQ Classification: Blast Cleaning **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SE (S)	138	-	517212 172135
85	**Contemporary Trade Directory Entries** Name: Star Optical Location: 202, Ashburnham Road, Richmond, Surrey, TW10 7NL Classification: Laboratory Equipment, Instruments & Supplies **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SW (SW)	155	-	516888 172223
85	**Contemporary Trade Directory Entries** Name: Mercury Multimedia Ltd Location: 206, Ashburnham Road, RICHMOND, Surrey, TW10 7NL Classification: Photo & Digital Imaging Bureaus **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SW (SW)	158	-	516882 172233
85	**Contemporary Trade Directory Entries** Name: Express Installers Location: 89, Woodville Road, Richmond, TW10 7QW Classification: Cinema Equipment **Status:** Active Positional Accuracy: Automatically positioned to the address	A13SW (W)	160	-	516873 172258
86	**Contemporary Trade Directory Entries** Name: Intech Marketing (Uk) Ltd Location: 32, Back Lane, Richmond, Surrey, TW10 7LF Classification: Office Furniture & Equipment **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SE (SE)	194	-	517400 172186
87	**Contemporary Trade Directory Entries** Name: Sparkles Location: 89, Ashburnham Road, Richmond, Surrey, TW10 7NN Classification: Cleaning Services - Domestic **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SW (SW)	199	-	516907 172085
87	**Contemporary Trade Directory Entries** Name: G T Harris Location: 26, Fellbrook, Richmond, Surrey, TW10 7UW Classification: Washing Machines - Servicing & Repairs **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SW (SW)	241	-	516889 172041
88	**Contemporary Trade Directory Entries** Name: A S Motors Location: Central Garage,Croft Way,Off Dukes Av, Ham, Richmond, Surrey, TW10 7NP Classification: Mot Testing Centres **Status:** Inactive Positional Accuracy: Manually positioned to the road within the address or location	A13SW (SW)	251	-	516828 172112

Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
89	**Contemporary Trade Directory Entries** Name: Designer Carpets Location: 2, Ham Street, Richmond, Surrey, TW10 7HT Classification: Carpets & Rugs - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	273	-	517480 172153
89	**Contemporary Trade Directory Entries** Name: M W Carpets Ltd Location: 2, Ham Street, Richmond, Surrey, TW10 7HT Classification: Carpets & Rugs - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	273	-	517480 172153
90	**Contemporary Trade Directory Entries** Name: Lifetime Shutters & Blinds Ltd Location: 63, Perryfield Way, Richmond, Surrey, TW10 7SL Classification: Shutters - Internal **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	278	-	516905 172622
91	**Contemporary Trade Directory Entries** Name: B & S Car Disposal Service Location: 29, Meadlands Drive, Richmond, Surrey, TW10 7EF Classification: Car Breakers & Dismantlers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	388	-	517566 172737
92	**Contemporary Trade Directory Entries** Name: Key Cleaning Location: Flat 1, 200, Riverside Drive, Richmond, Surrey, TW10 7RP Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NW (S)	415	-	517006 171795
93	**Contemporary Trade Directory Entries** Name: M K B Enterprise Ltd Location: 5, Broughton Avenue, Richmond, Surrey, TW10 7TT Classification: Electronic Component Manufacturers & Distributors **Status: Active** Positional Accuracy: Automatically positioned to the address	A8NE (S)	433	-	517194 171793
94	**Contemporary Trade Directory Entries** Name: Az Clean Ltd Location: 10, Mornington Walk, Richmond, Surrey, TW10 7LY Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NE (SE)	445	-	517469 171932
95	**Contemporary Trade Directory Entries** Name: Surrey Auto Services Location: 156, Dukes Avenue, Richmond, TW10 7YL Classification: Garage Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A8NE (S)	498	-	517289 171762
96	**Contemporary Trade Directory Entries** Name: Airs & Graces Location: 4, Beaufort Road, Richmond, Surrey, TW10 7XS Classification: Cleaning Services - Domestic **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NE (S)	525	-	517189 171696
97	**Contemporary Trade Directory Entries** Name: M J W Print Ltd Location: 7, Lauderdale Drive, Richmond, Surrey, TW10 7BS Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14NE (E)	570	-	517872 172550
98	**Contemporary Trade Directory Entries** Name: London Cleaning Service Location: 64, Beaufort Court, Beaufort Road, Richmond, Surrey, TW10 7YQ Classification: Cleaning Services - Domestic **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SW (S)	573	-	517129 171637
99	**Contemporary Trade Directory Entries** Name: Oscar Pet Foods Location: 28, Buckingham Road, Richmond, Surrey, TW10 7EQ Classification: Pet Foods & Animal Feeds **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	597	-	517788 172803

Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
120	**Contemporary Trade Directory Entries** Name: B 'N' S Salvage Location: Flat 26, Cranmer Court, Richmond Road, Kingston upon Thames, Surrey, KT2 5PY Classification: Car Breakers & Dismantlers **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A9SW (SE)	987	-	517819 171512
121	**Contemporary Trade Directory Entries** Name: Smart Fleet Location: 47, Northweald Lane, Kingston upon Thames, Surrey, KT2 5GN Classification: Car Dealers **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A4NW (S)	987	-	517518 171330
122	**Contemporary Trade Directory Entries** Name: Kemetyl Location: Broom Road, Teddington, Middlesex, TW11 9NU Classification: Chemical Manufacturers **Status:** Inactive Positional Accuracy: Manually positioned within the geographical locality	A3NW (S)	990	-	516967 171221
123	**Fuel Station Entries** Name: A S Motors Of Ham Location: Croftway, Riverside Drive, Ham, RICHMOND, Surrey, TW10 7NP Brand: Obsolete Premises Type: Not Applicable **Status:** Obsolete Positional Accuracy: Manually positioned to the address or location	A12SE (SW)	260	-	516810 172129
124	**Fuel Station Entries** Name: Ham Cross Service Station Location: 297, Richmond Road, Kingston upon Thames, Surrey, KT2 5QU Brand: Texaco Premises Type: Petrol Station **Status:** Open Positional Accuracy: Automatically positioned to the address	A9SW (SE)	935	-	517745 171527
125	**Points of Interest - Commercial Services** Name: Tooth Removals Sarl Location: 10 Watermill Close, Richmond, TW10 7UH Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A13SW (S)	189	7	517099 172020
126	**Points of Interest - Commercial Services** Name: Crown Ltd Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
126	**Points of Interest - Commercial Services** Name: Crown Motorcycles Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
126	**Points of Interest - Commercial Services** Name: Vetech Motor Services Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
126	**Points of Interest - Commercial Services** Name: Crown Garage Kingston Ltd Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
126	**Points of Interest - Commercial Services** Name: Ham Cross Garage Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527

Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
126	**Points of Interest - Commercial Services** Name: Vetech Motor Services Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	936	7	517745 171526
126	**Points of Interest - Commercial Services** Name: Crown Garages Kingston Ltd Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	936	7	517745 171526
127	**Points of Interest - Commercial Services** Name: L J Motorcycle Repairs Location: Unit D1 1, Strawberry Vale, Twickenham, TW1 4RP Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A11NE (W)	980	7	516036 172478
128	**Points of Interest - Education and Health** Name: Cassel Hospital Location: 1 Ham Common, Richmond, TW10 7JF Category: Health Practitioners and Establishments Class Code: Hospitals Positional Accuracy: Positioned to address or location	A9NW (SE)	695	7	517708 171791
129	**Points of Interest - Manufacturing and Production** Name: Tank Location: TW10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A13SE (S)	201	7	517267 172095
130	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A9NW (SE)	768	7	517822 171795
131	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	914	7	516100 172454
131	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	918	7	516096 172454
131	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	985	7	516030 172468
131	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	989	7	516026 172469
132	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NE (NW)	935	7	516573 173189
133	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NW (NW)	963	7	516452 173145

Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
133	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NW (NW)	978	7	516428 173146
133	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NW (NW)	979	7	516443 173158
133	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NW (NW)	979	7	516428 173147
133	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NW (NW)	980	7	516443 173159
134	**Points of Interest - Public Infrastructure** Name: Metropolitan Police Service Location: 18 Ashburnham Road, Richmond, TW10 7NF Category: Central and Local Government Class Code: Police Stations Positional Accuracy: Positioned to address or location	A13NE (E)	33	7	517324 172379
134	**Points of Interest - Public Infrastructure** Name: Metropolitan Police Service Location: 18 Ashburnham Road, Richmond, TW10 7NF Category: Central and Local Government Class Code: Police Stations Positional Accuracy: Positioned to address or location	A13NE (E)	33	7	517324 172379
135	**Points of Interest - Public Infrastructure** Name: Tesco Petrol Filling Station Location: 185 Ashburnham Road, Richmond, TW10 7NR Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A12SE (SW)	235	7	516818 172182
136	**Points of Interest - Public Infrastructure** Name: Outfall Location: TW10 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A12SW (W)	725	7	516340 172066
137	**Points of Interest - Public Infrastructure** Name: Sluices Location: TW10 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	752	7	516893 171474
137	**Points of Interest - Public Infrastructure** Name: Sluice Location: TW10 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	767	7	516957 171447
138	**Points of Interest - Public Infrastructure** Name: Sluices Location: TW11 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	797	7	517008 171411
138	**Points of Interest - Public Infrastructure** Name: Sluices Location: TW11 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	819	7	517019 171389

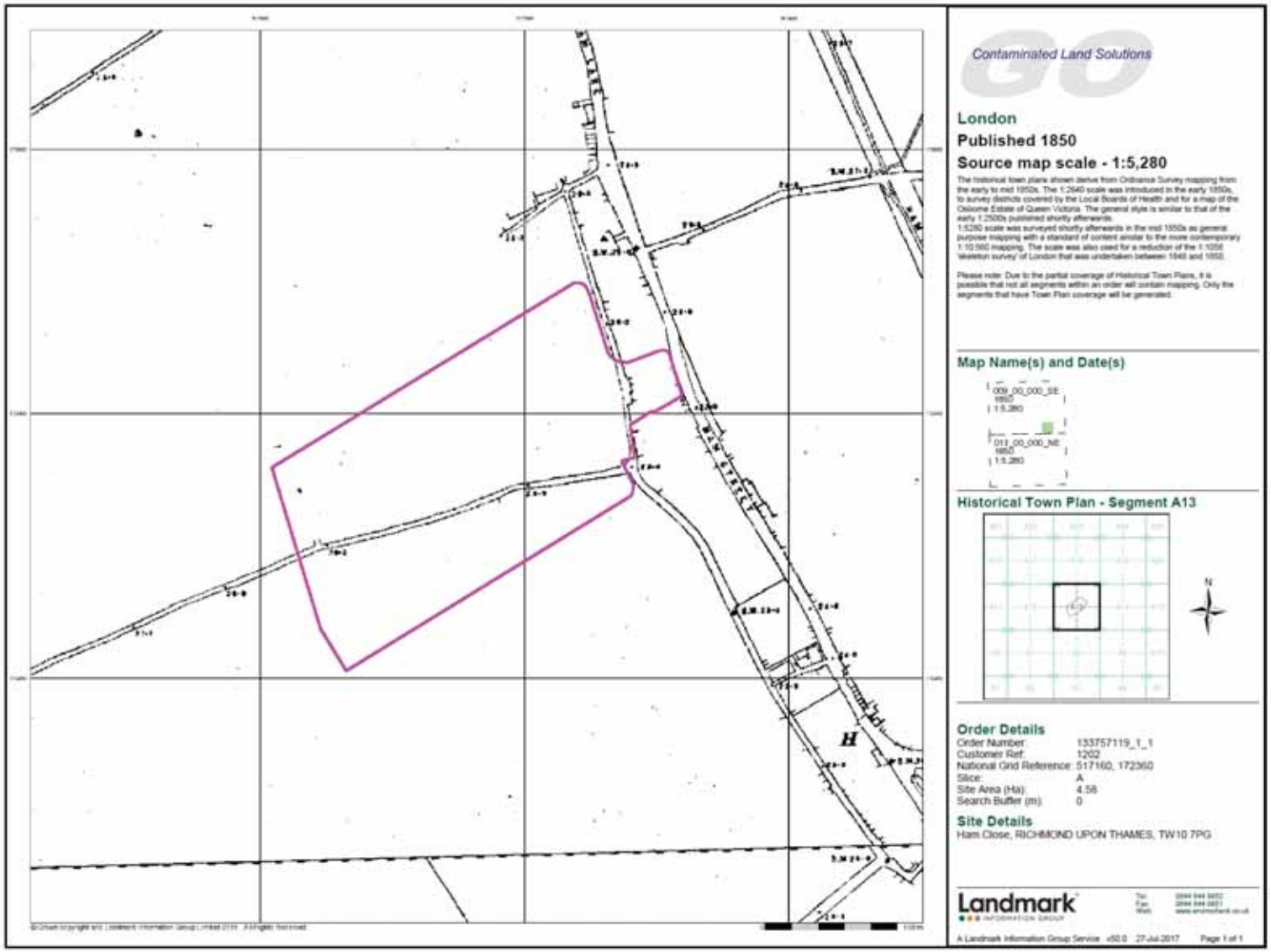
Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
138	**Points of Interest - Public Infrastructure** Name: Teddington Weir Location: TW11 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	826	7	517021 171381
139	**Points of Interest - Public Infrastructure** Name: Cemetery Location: TW10 Category: Infrastructure and Facilities Class Code: Cemeteries and Crematoria Positional Accuracy: Positioned to an adjacent address or location	A9NE (SE)	867	7	517983 171831
139	**Points of Interest - Public Infrastructure** Name: Cemetery Location: Not Supplied Category: Infrastructure and Facilities Class Code: Cemeteries and Crematoria Positional Accuracy: Positioned to an adjacent address or location	A9NE (SE)	871	7	517988 171832
140	**Points of Interest - Public Infrastructure** Name: Hamcross Self Serve Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
140	**Points of Interest - Public Infrastructure** Name: Ham Cross Service Station Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
140	**Points of Interest - Public Infrastructure** Name: Ham Cross Service Station Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
140	**Points of Interest - Public Infrastructure** Name: Ham Cross Service Station Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
140	**Points of Interest - Public Infrastructure** Name: Texaco Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A9SW (SE)	936	7	517745 171526
141	**Points of Interest - Recreational and Environmental** Name: Playground Location: Not Supplied Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A18SW (N)	323	7	517035 172754
141	**Points of Interest - Recreational and Environmental** Name: Playground Location: Riverside Drive, TW10 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A18SW (N)	323	7	517035 172754
142	**Points of Interest - Recreational and Environmental** Name: Playground Location: Not Supplied Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	650	7	517049 171556
142	**Points of Interest - Recreational and Environmental** Name: Playground Location: Fisherman Close, TW10 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	650	7	517049 171556

Sensitive Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
145	**Local Nature Reserves** Name: Ham Lands Multiple Area: Y Area (m2): 600138.24 Source: Natural England Designation Date: 1st January 1992	A12SE (SW)	290	8	516809 172060
146	**Local Nature Reserves** Name: Ham Common, Richmond, London Multiple Area: N Area (m2): 402691.94 Source: Natural England Designation Date: 1st January 2001	A14SE (E)	671	8	517897 172074

Appendix D – Historical Maps



Contaminated Land Solutions

London

Published 1850

Source map scale - 1:5,280

The historical town plans shown derive from Ordnance Survey mapping from the early to mid 1950s. The 1:2640 scale was introduced in the early 1850s to survey districts covered by the Local Boards of Health and for a map of the Osborne Estate of Queen Victoria. The general style is similar to that of the early 1:2500s published shortly afterwards.
1:528 scale was surveyed shortly afterwards in the mid 1850s as general purpose mapping with a standard of content similar to the more contemporary 1:10,560 mapping. The scale was also used for a reduction of the 1:1056 'skeleton survey' of London that was undertaken between 1840 and 1850.

Please note: Due to the partial coverage of Historical Town Plans, it is possible that not all segments within an order will contain mapping. Only the segments that have Town Plan coverage will be generated.

Map Name(s) and Date(s)

009_00_000_SE
1850
1:5,280

013_00_000_NE
1850
1:5,280

Historical Town Plan - Segment A13

Order Details

Order Number:	133757119_1_1
Customer Ref:	1202
National Grid Reference:	517160, 172360
Slice:	A
Site Area (Ha):	4.58
Search Buffer (m):	0

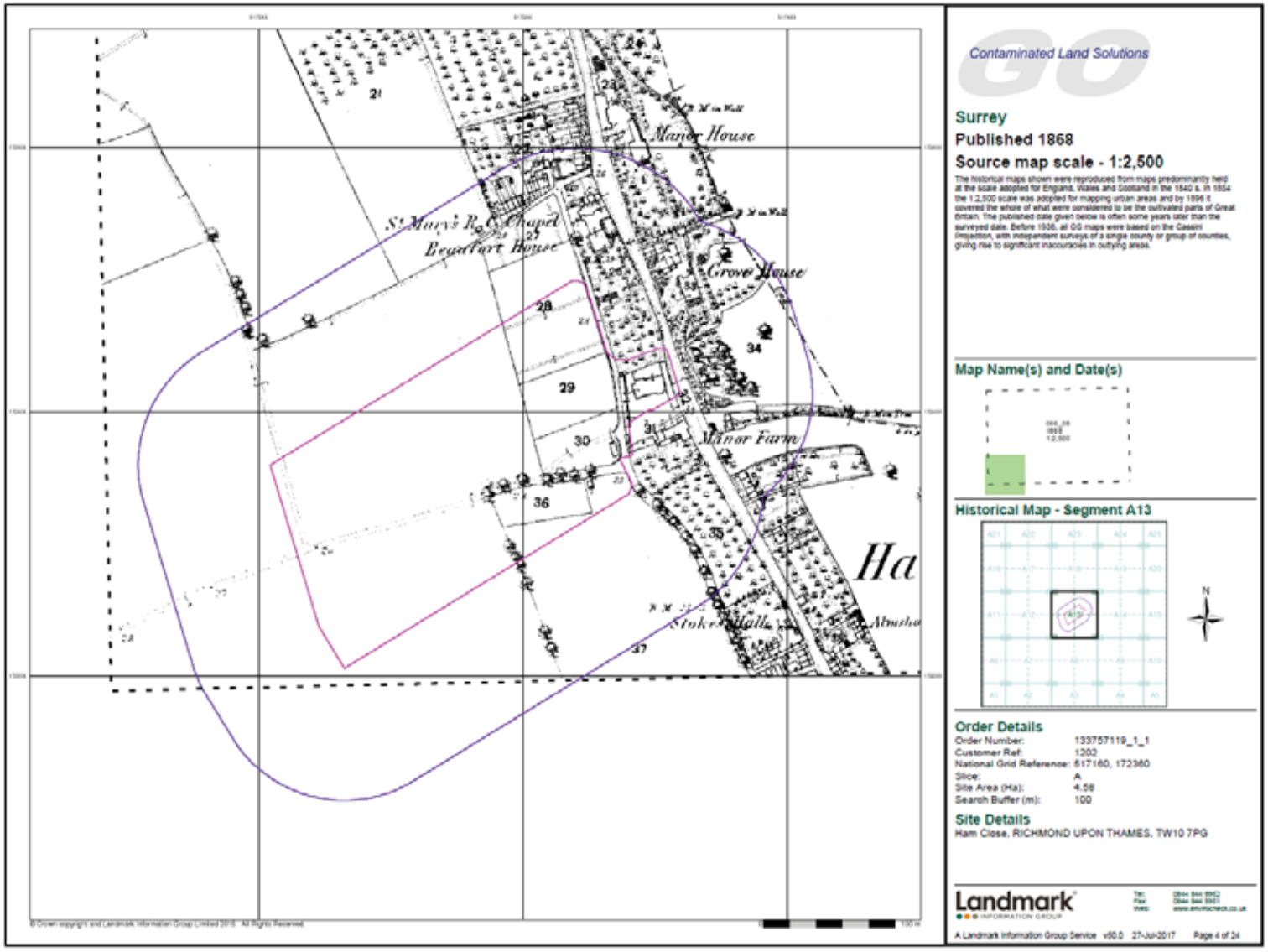
Site Details

Ham Close, RICHMOND UPON THAMES, TW10 7PG

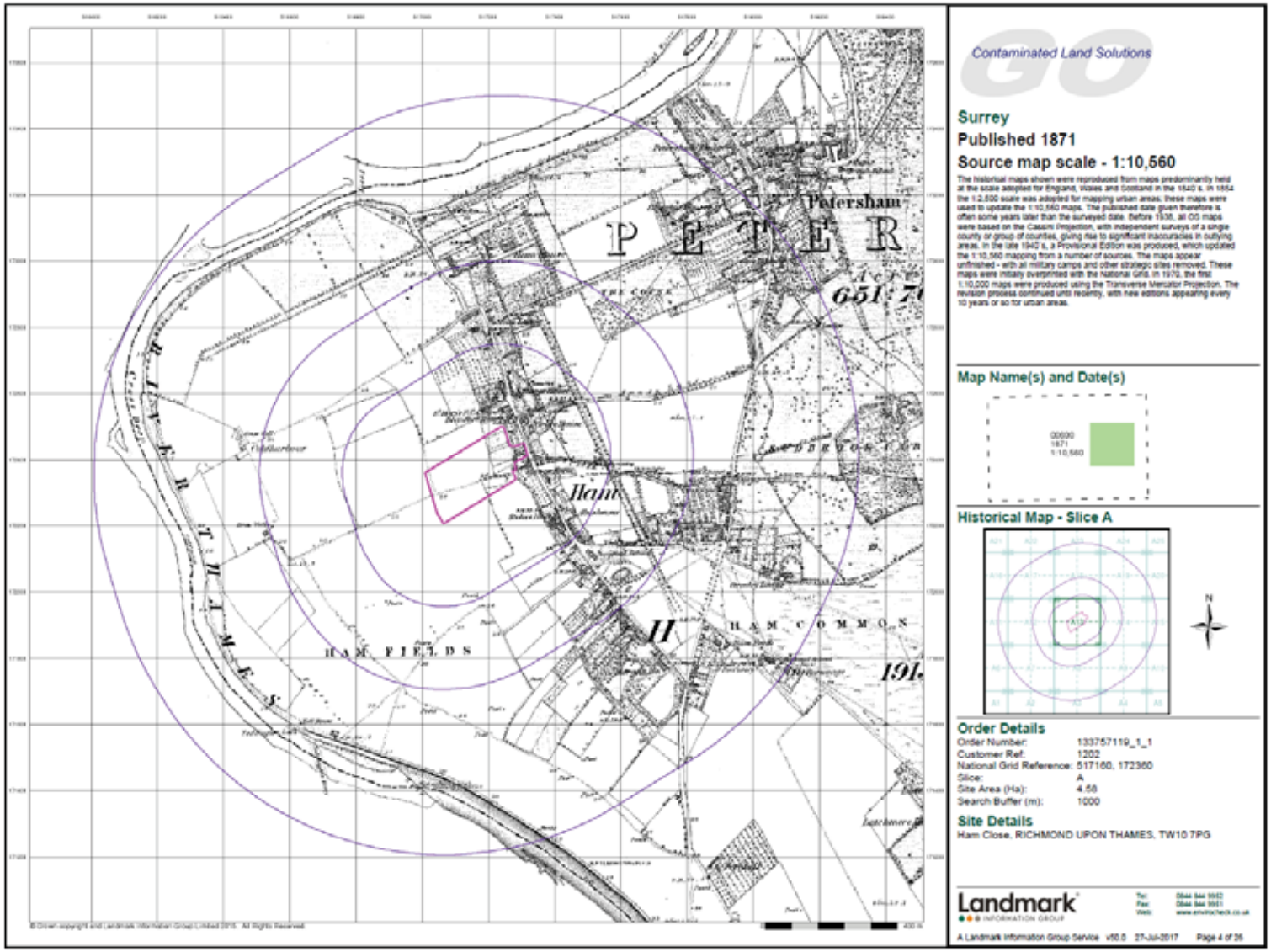
Landmark INFORMATION GROUP

A Landmark Information Group Service v50.0 27-Jul-2017 Page 1 of 1

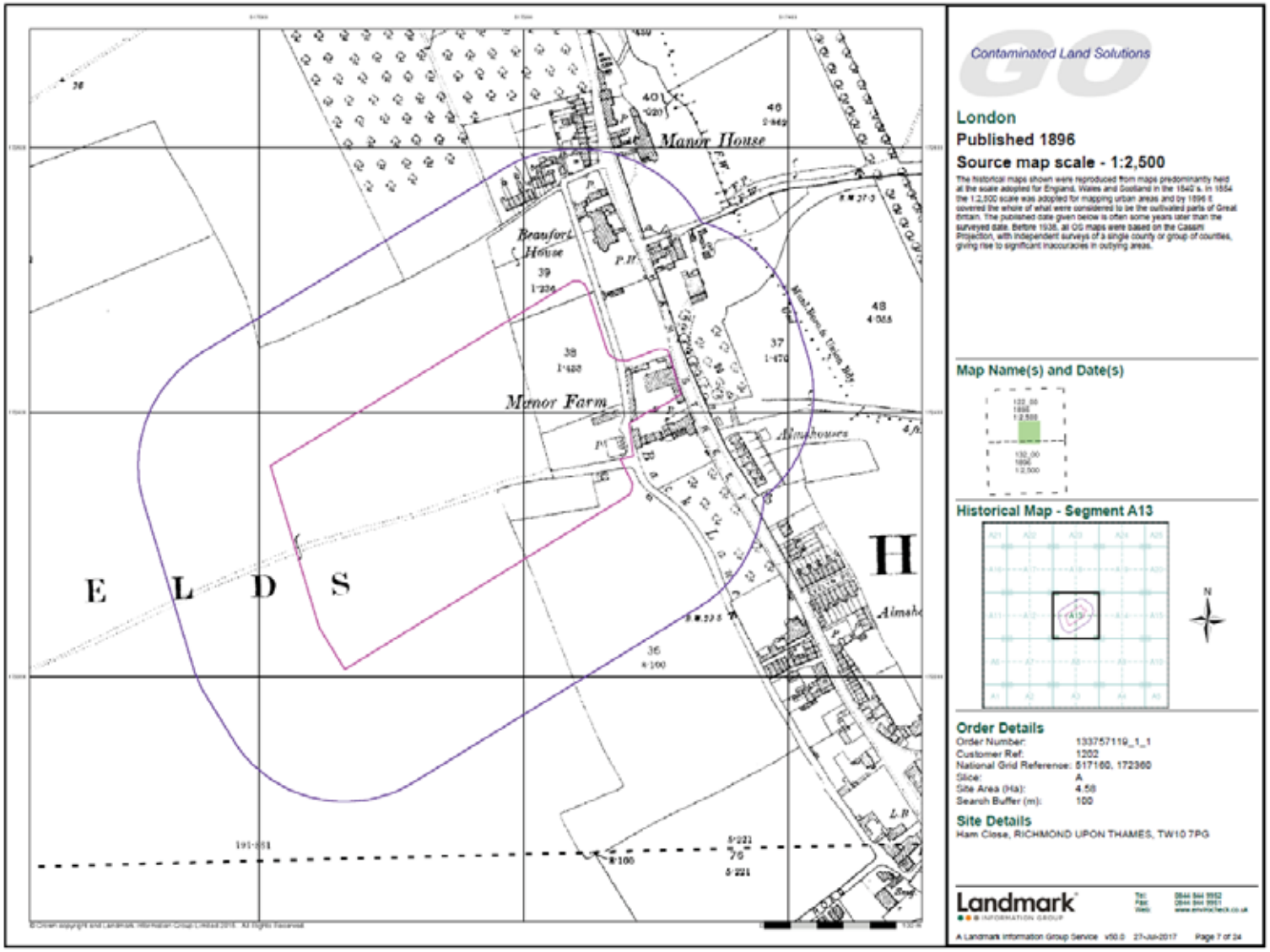
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



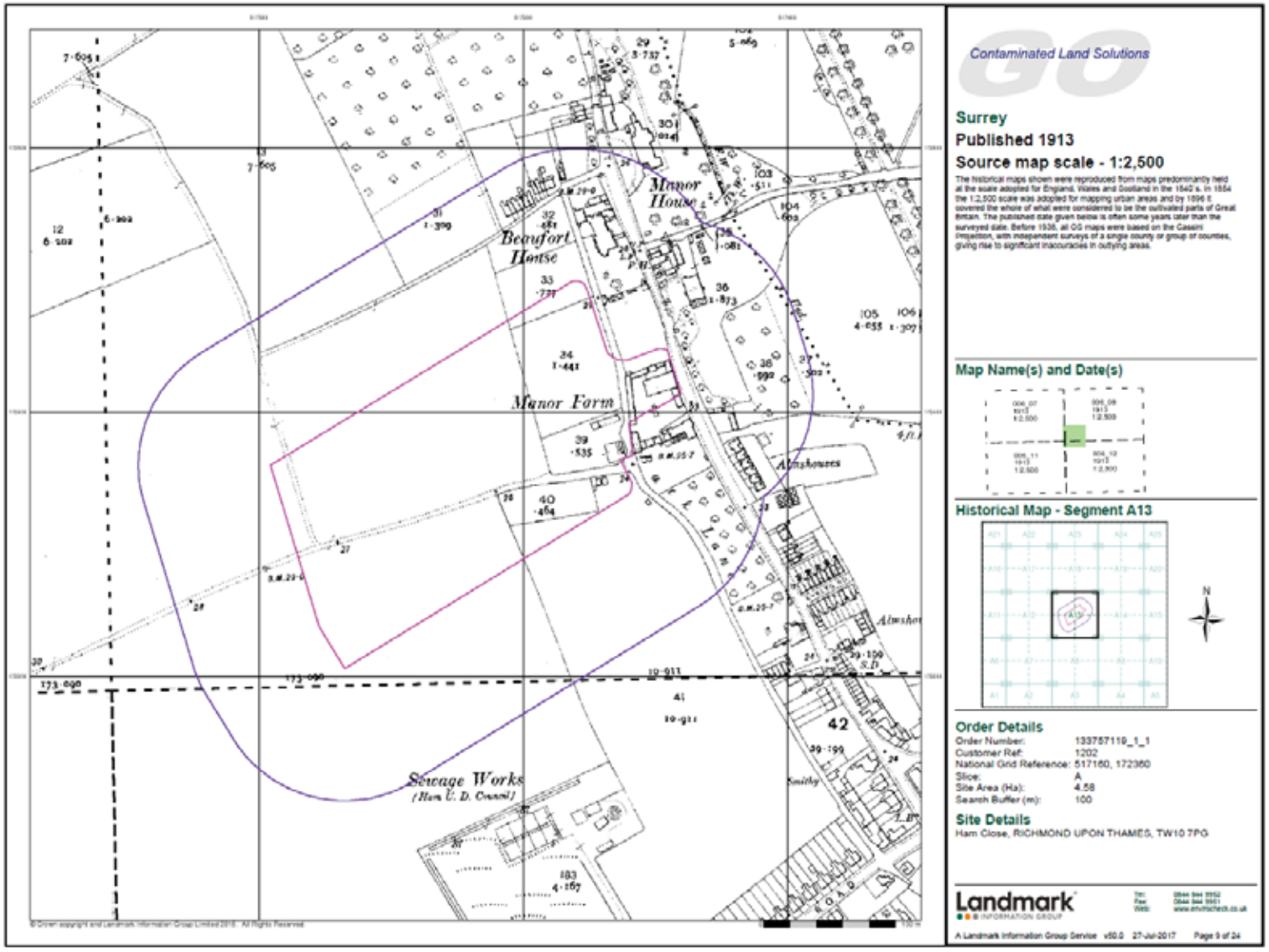
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



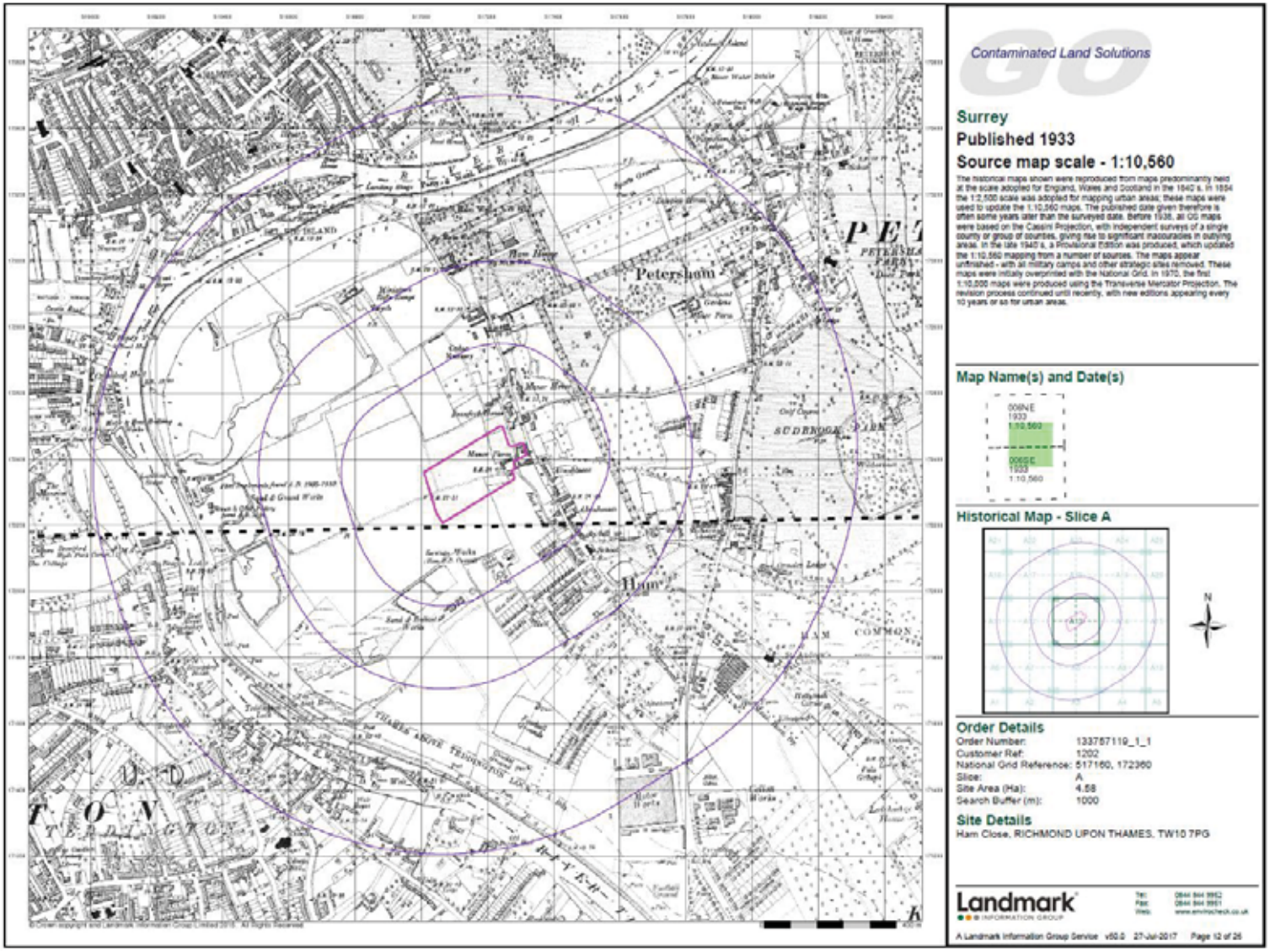
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



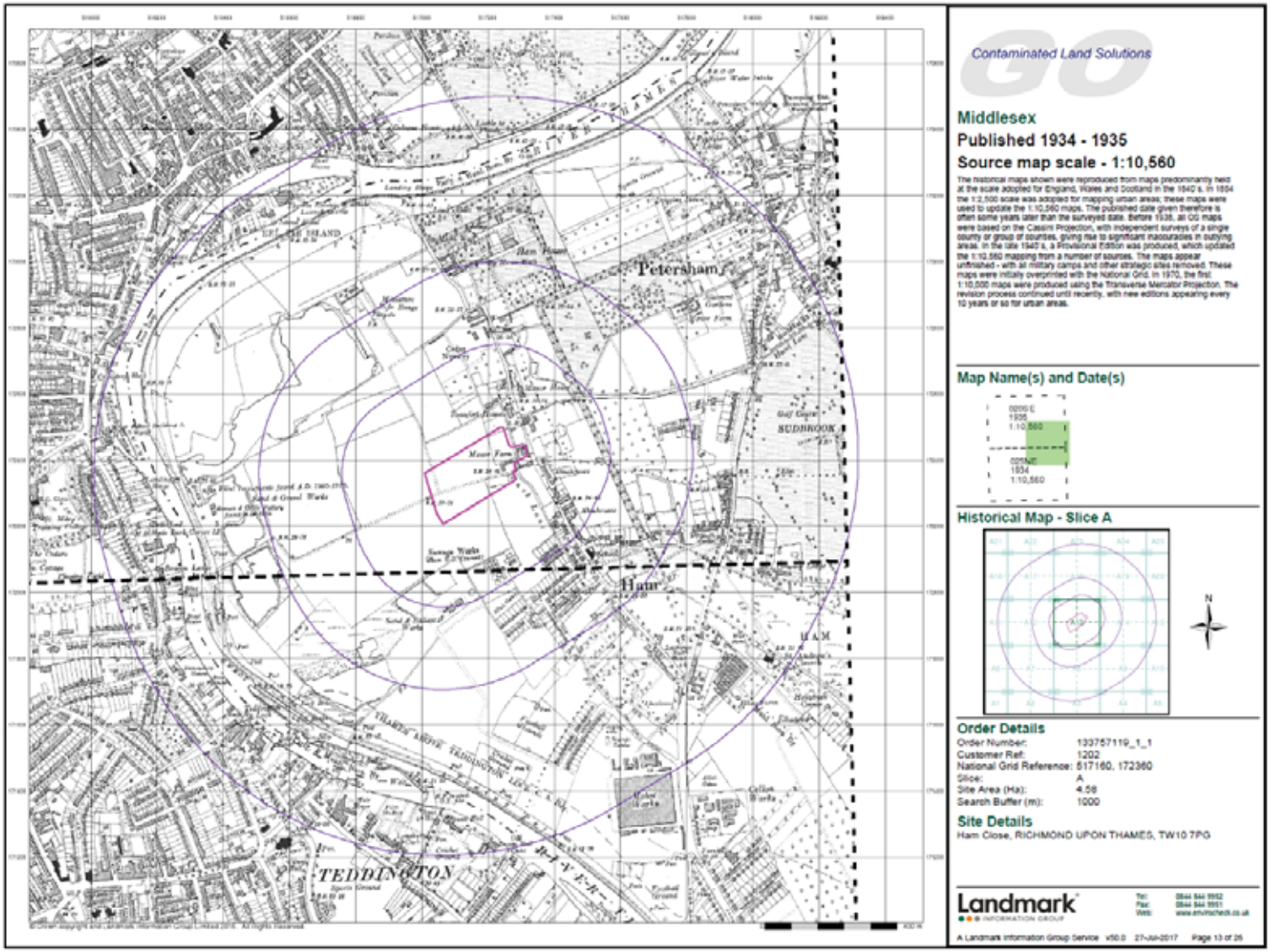
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



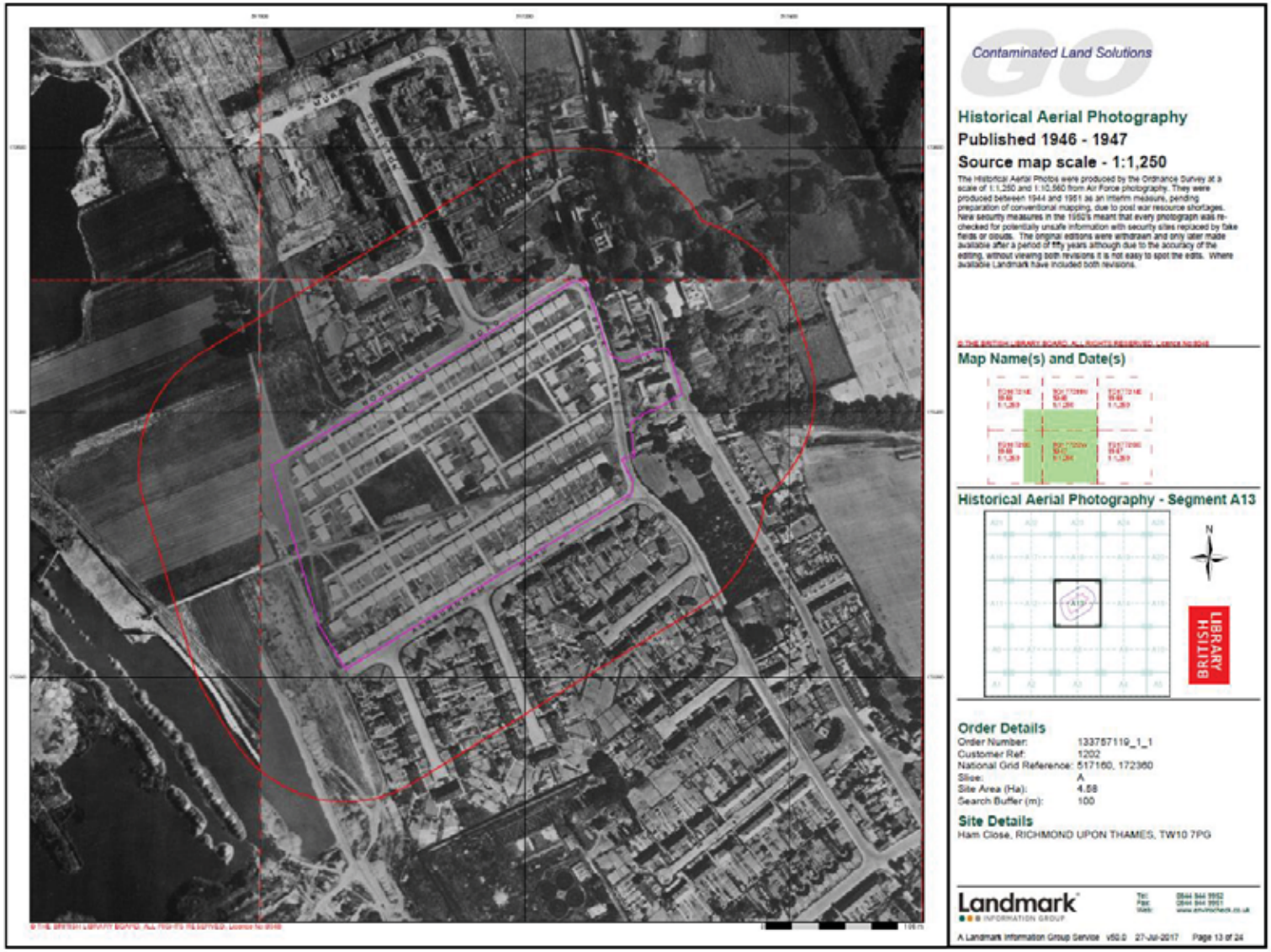
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



Contaminated Land Solutions

Historical Aerial Photography

Published 1946 - 1947

Source map scale - 1:1,250

The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

Map Name(s) and Date(s)

Historical Aerial Photography - Segment A13

Order Details

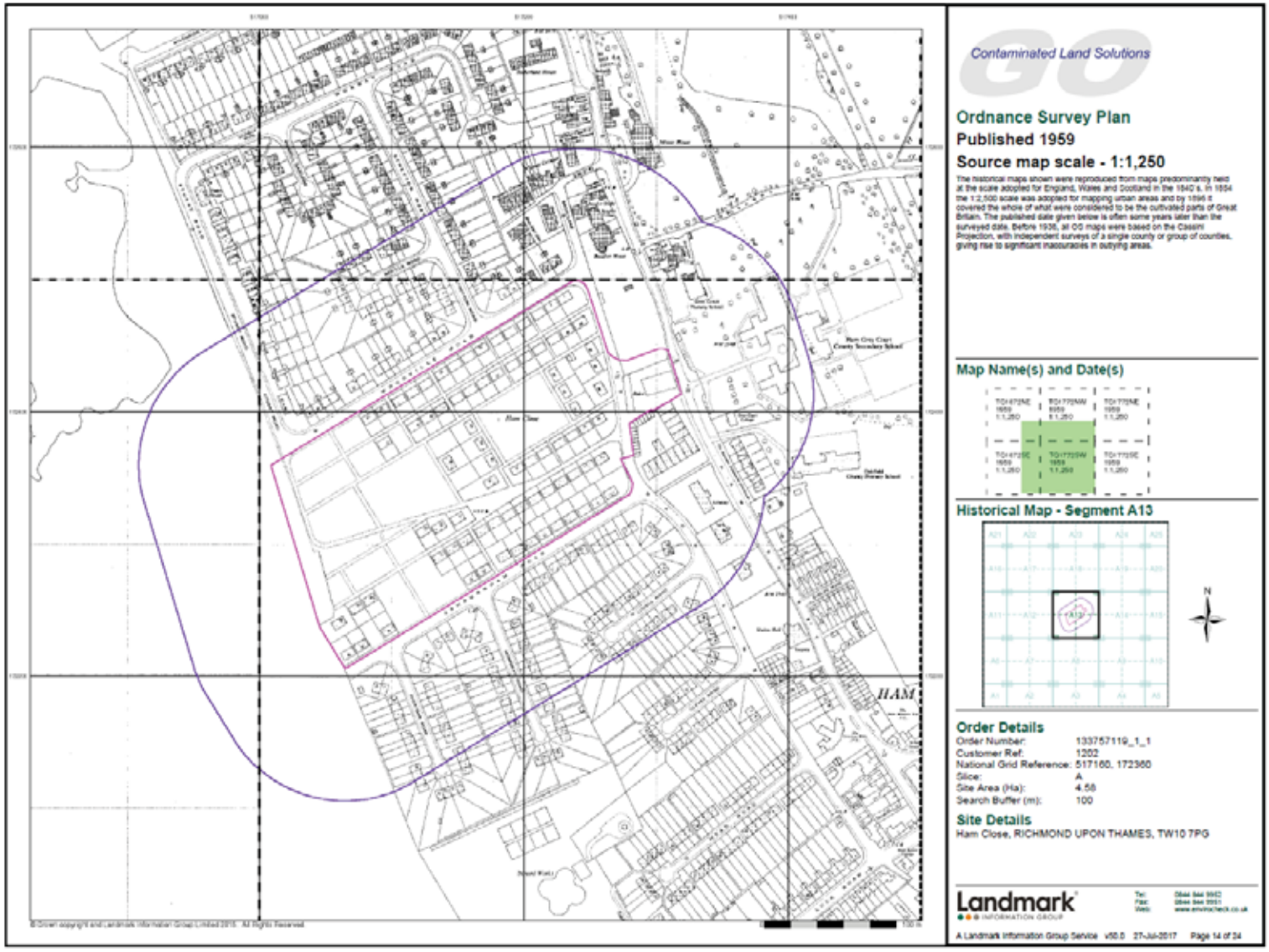
Order Number:	133757119_1_1
Customer Ref:	1202
National Grid Reference:	517160, 172360
Slice:	A
Site Area (Ha):	4.58
Search Buffer (m):	100

Site Details

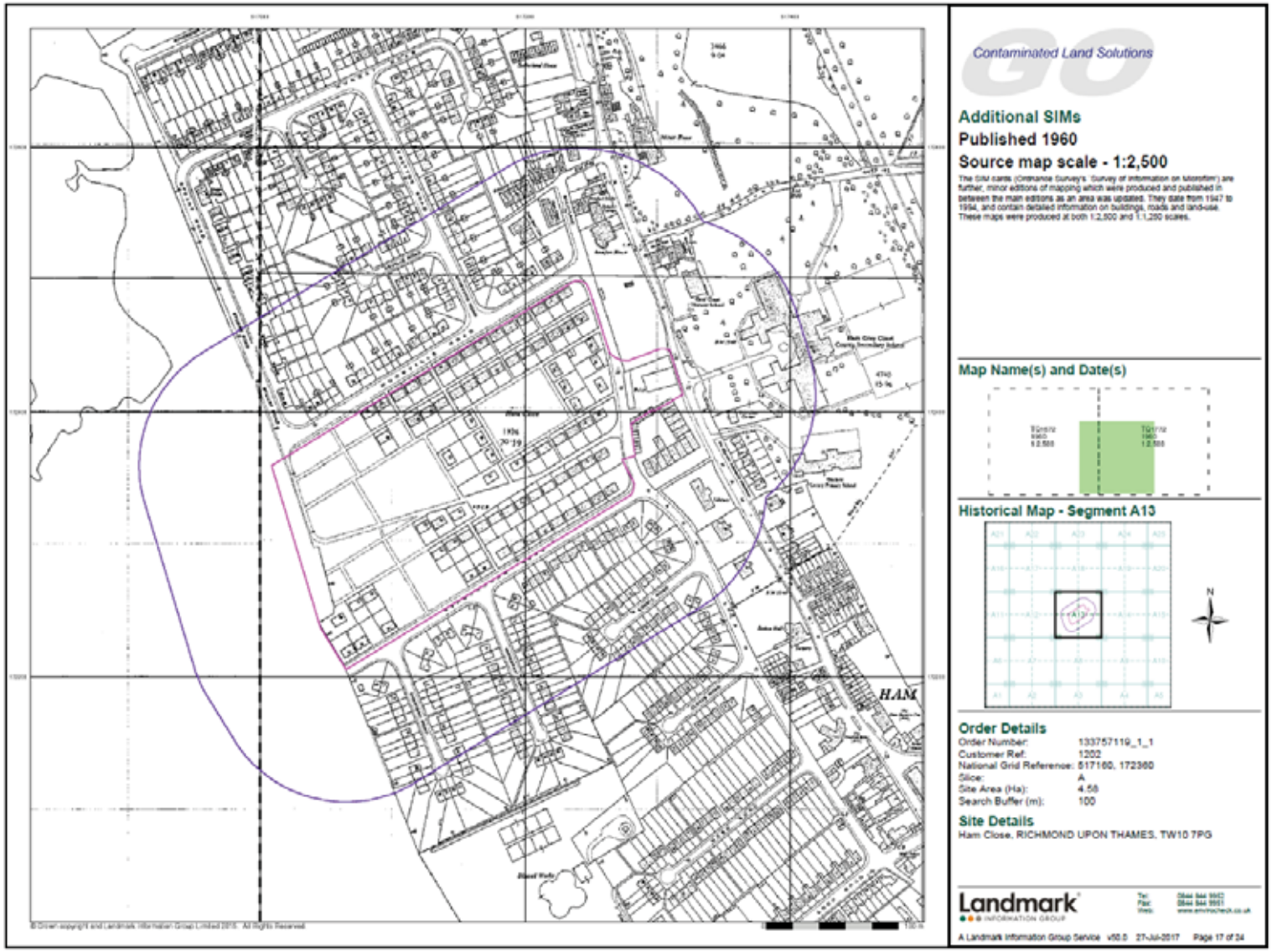
Ham Close, RICHMOND UPON THAMES, TW10 7PG

Landmark INFORMATION GROUP

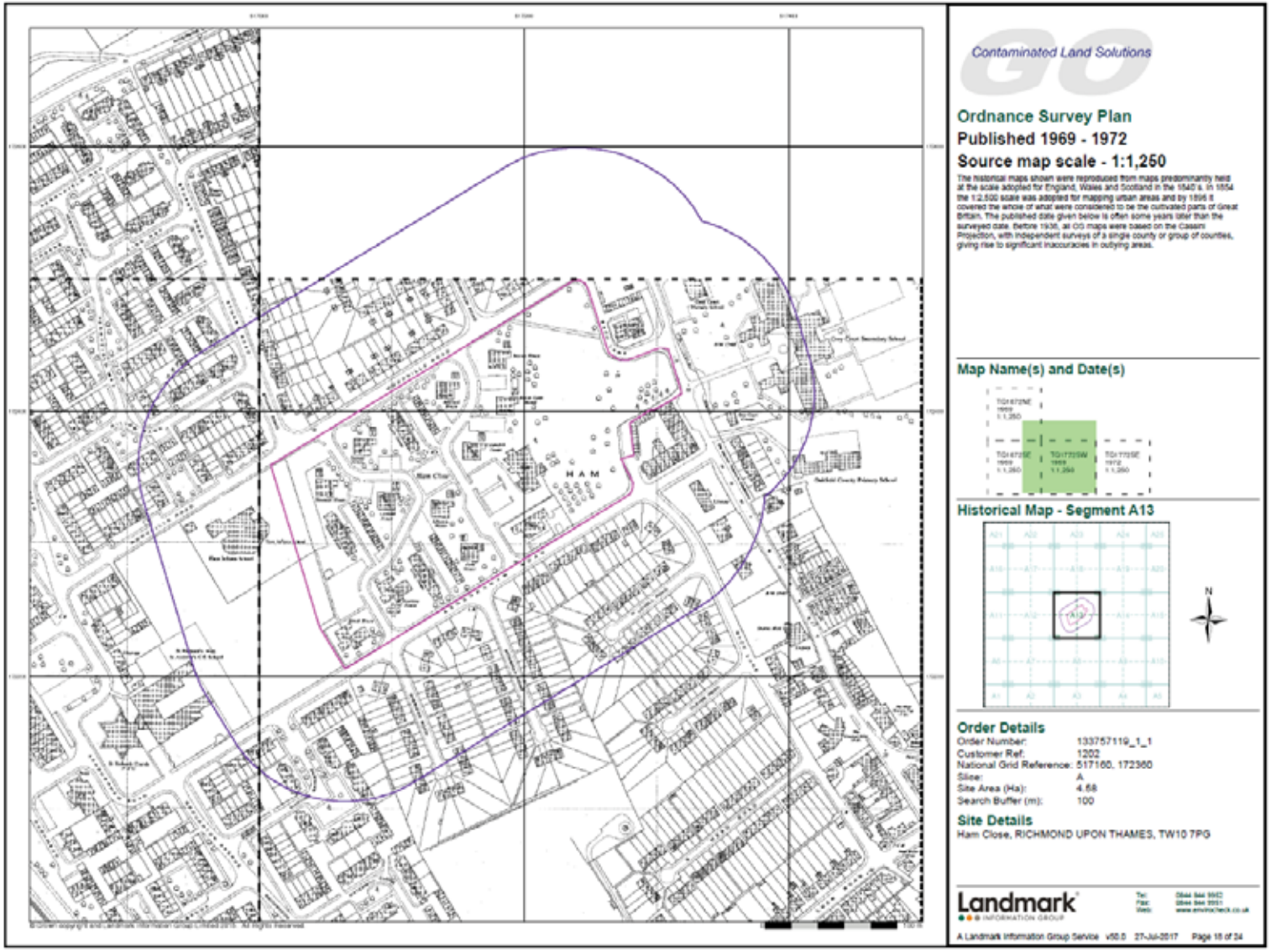
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



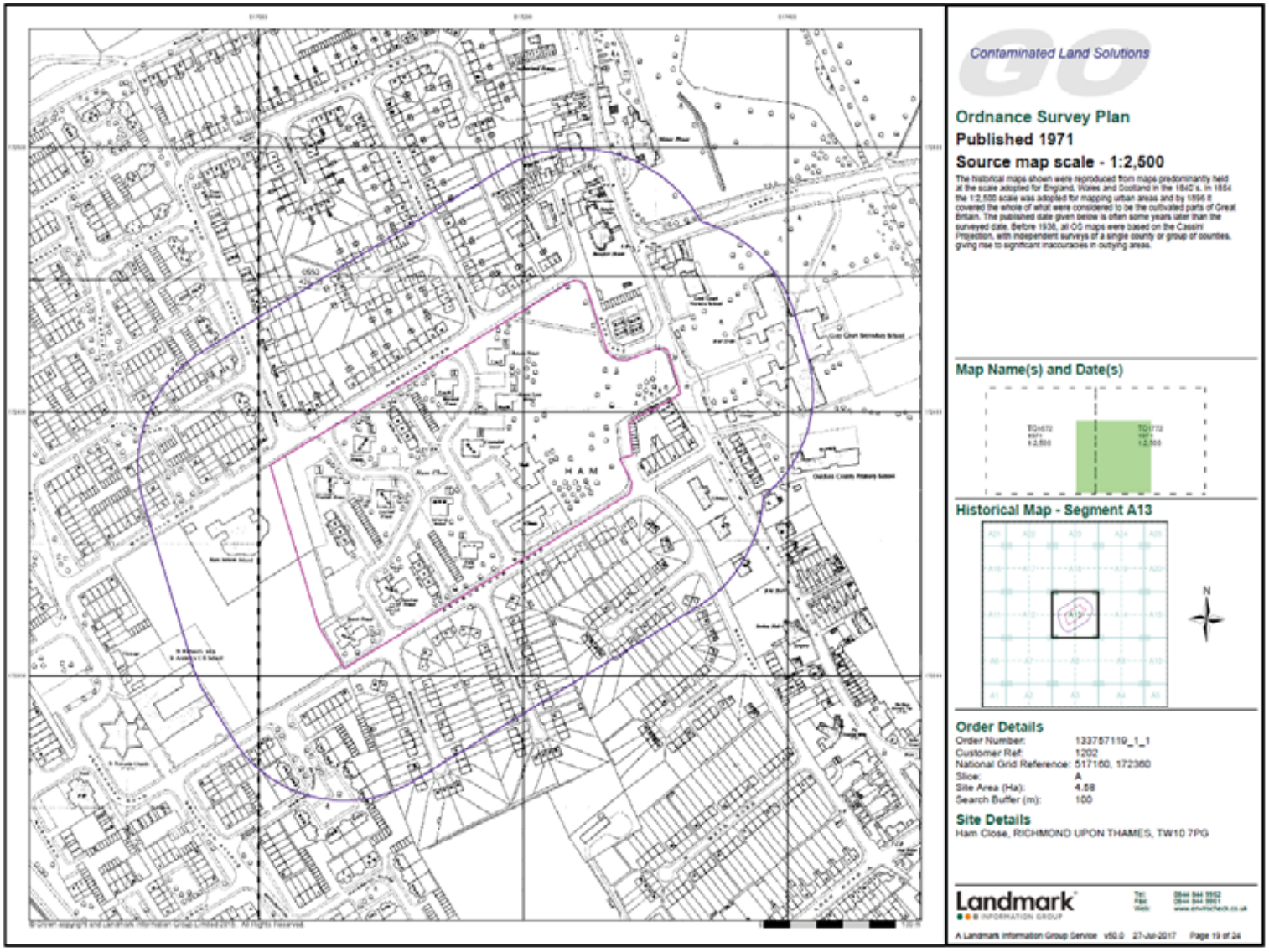
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



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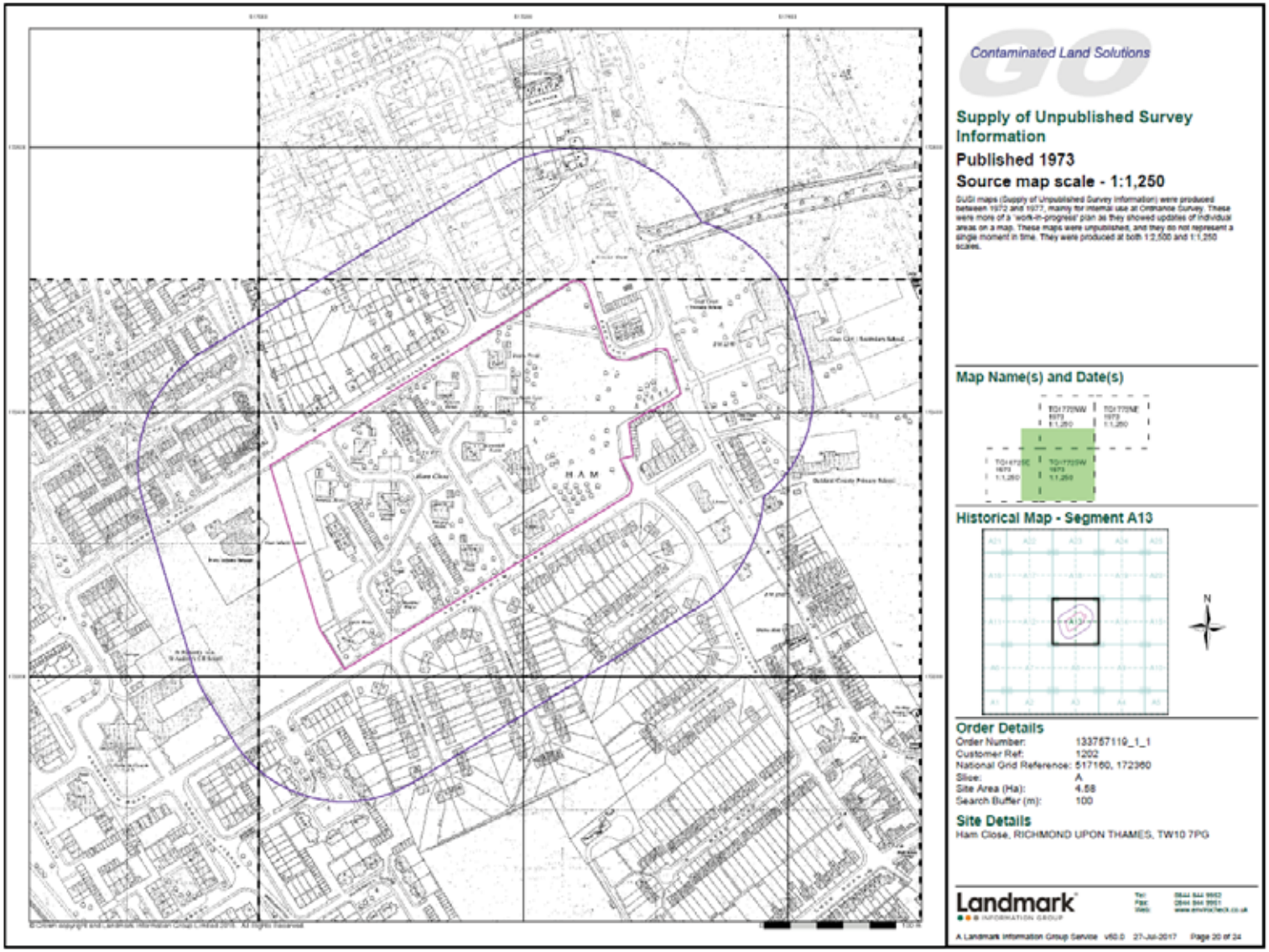
Richmond Housing Partnership



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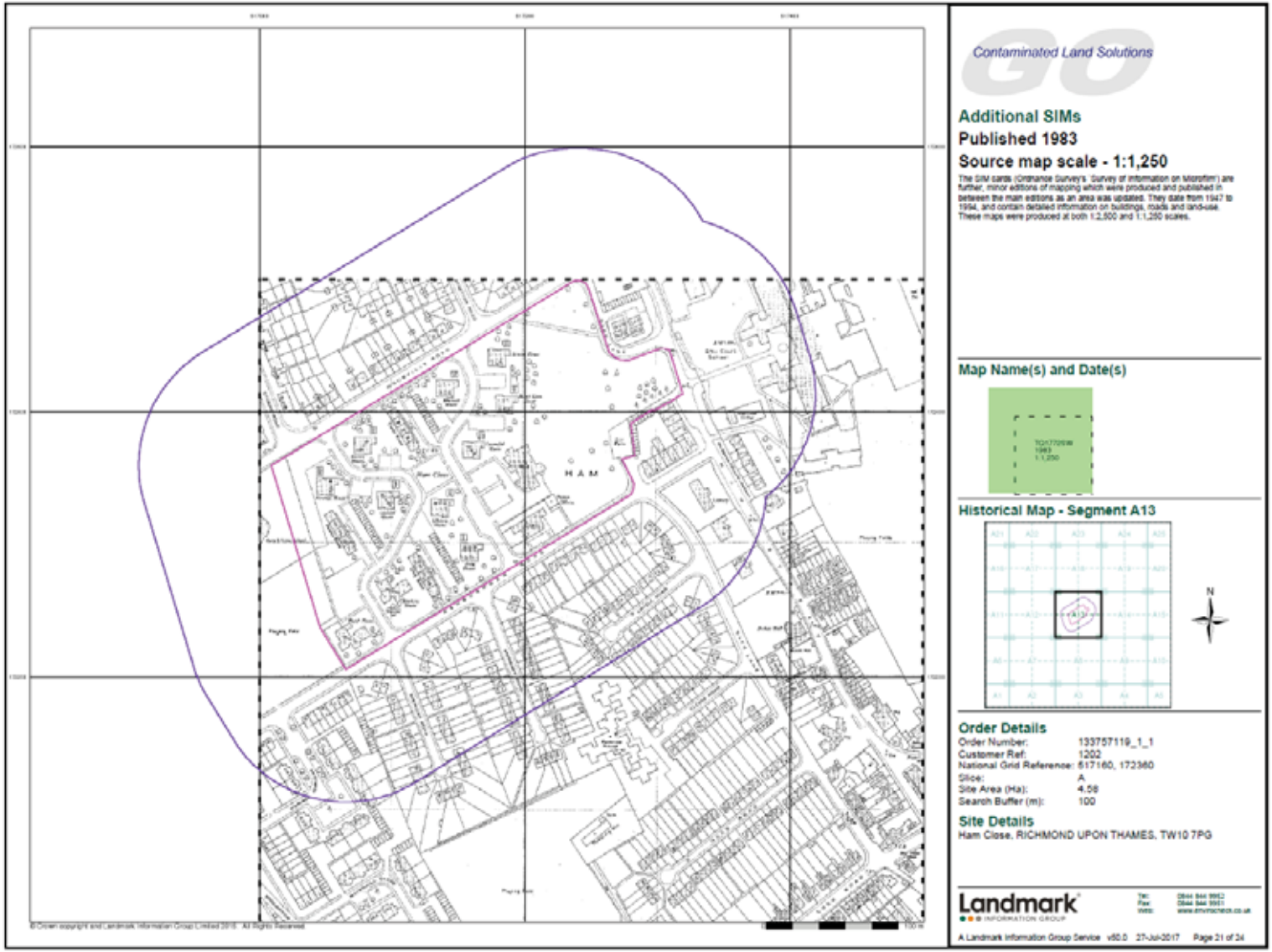
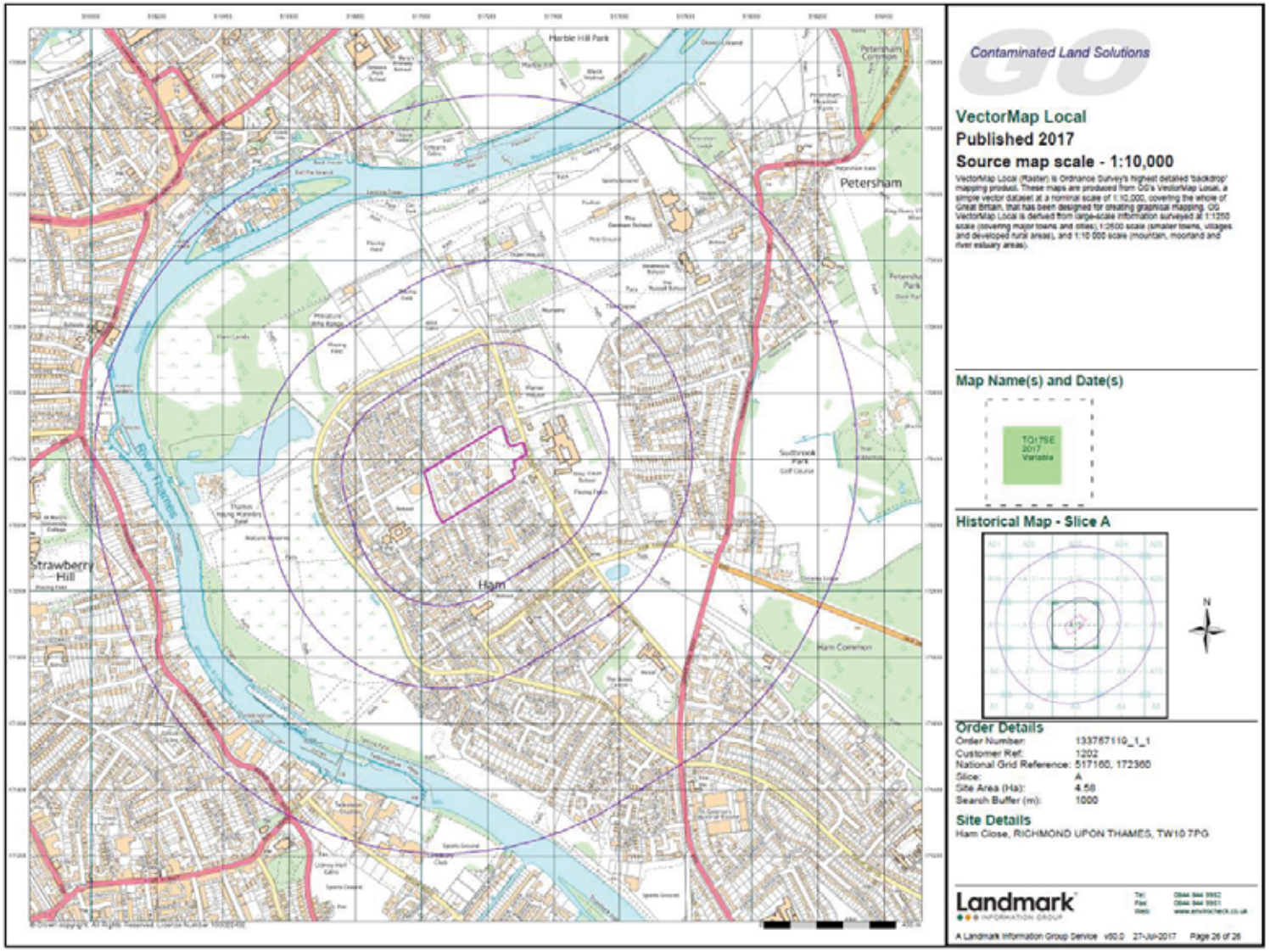
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership

Appendix E – Owner's Questionnaire

Questionnaire, for completion by current or previous owner or manager, please enter Not Known where you are unable to provide an answer.

Ham Close, Richmond upon Thames, TW10 7PG

I have owned/managed* the above site from .2000..... to .....current.....
*(*delete as appropriate)*

Existing site & property details:

Site use:	Mainly residential Youth club/ clinic/ dentist
Number of Buildings:	14 residential blocks
Building 'A', Nature of Use: (insert lines as required)	residential
Date of Construction	1960's
Land Area (ha):	
Current Tenants:	192 units
Any asbestos containing materials?	Likely due to age of construction
Asbestos Survey available?	no
Any archaeological, geotechnical or environmental reports?	no

Current site utilities:

Commercial/Household Waste Disposal	
Sewage Discharge and Disposal	*to main drainage, yes/no, if other please specify*
Surface Water Drainage	*to main drainage/soakaway, if other please specify*
Source of heating and cooling	*Individual mains gas/electric*
Wells?	no
Septic System?	no

Historical site activities (if answered 'yes', please provide details):

Are you aware of any other past use of the site?	no
Are you aware of any other past use of adjacent areas?	Not to our knowledge
Has anything been buried on or within 250m of the site?	Not to our knowledge
Have any chemicals been stored on or within 250m of the site?	Not to our knowledge
Have any potentially contaminating processes been undertaken either on or within 250m of the site?	Not to our knowledge
Has there been any oil or fuel storage on or within 250m of the site?	Not to our knowledge
Has any fill material been deposited on or within 250m of the site?	Not to our knowledge
Have any animals been kept on site?	Maybe, as originally farmland (approx. 100 years ago)

Signed..... Date.....01 Aug 2017.....

Name...Tracey Elliott.....

Company....RHP.....

Appendix F – Contacts

Local Authority	Environmental Health London Borough of Richmond upon Thames 4 Waldegrave Road, Teddington, Middlesex, TW11 8EN	www.richmond.gov.uk Simon.makoni@richmond.gov.uk
Environment Agency	National Customer Contact Centre PO Box 544 Rotherham S60 1BY	08708 506 506 enquiries@environment-agency.gov.uk
Coal Authority	Mining Reports Office 200 Lichfield Lane Berry Hill, Mansfield Notts, HG18 4RG	www.coalminingreports.co.uk
Health Protection Agency, Radiation Protection Division	Chilton Didcot Oxon, OX11 0RQ	01235 822622 radon@hpa.org.uk www.hpa.org.uk/radiation

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b) Save for the client no duty is undertaken or warranty or representation made to any party in respect of the opinions, advice, recommendations or conclusions herein set out.
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