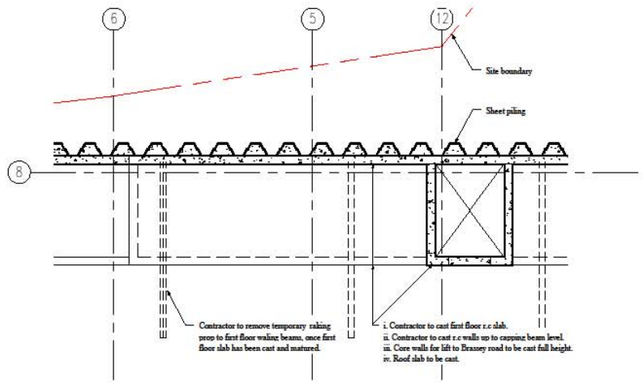

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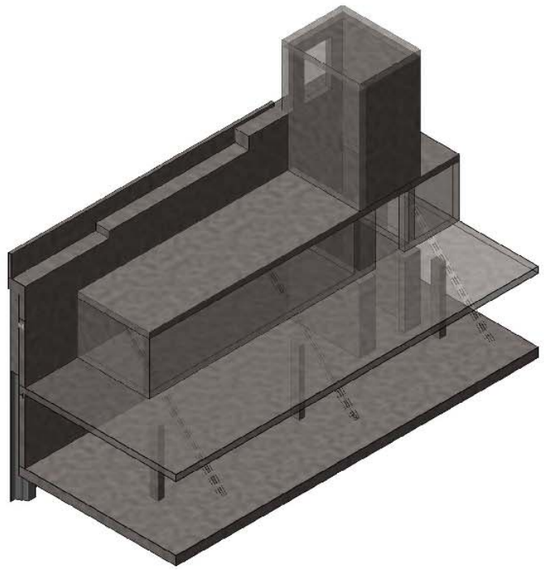

3D View of Phase 7

NOTES:

Rev	Date	Drwn	Amendment

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REGAL HOMES LTD

65 MAYGROVE ROAD, LONDON
NW6 2EH

SEQUENCE OF WORKS TO
BOUNDARY BETWEEN 65 MAYGROVE
ROAD & BRASSEY ROAD SHEET 3 OF 3

Status : PRELIMINARY

Scale : 1 : 100		Date :
Drawn : DA	Engineer : CC	Checked : SP-J
Drawing No. : L994 S5		Revision :

Appendix C

Pringuer-James Consulting Engineers
Basement Impact Assessment

Site Investigation Report
Prepared By: Soil Consultants Ltd.
Report Ref: 9118/JRCB/TSR
Date: 3rd May 2012

SITE INVESTIGATION REPORT

PROPOSED REDEVELOPMENT:

65 MAYGROVE ROAD
LONDON NW6 2EH

Client:	**REGAL HOMES LTD** **4-5 Coleridge Gardens** **London NW6 3QH**
Consulting Engineers:	**PRINGUER-JAMES CONSULTING ENGINEERS LTD** **16 Kew Foot Road, Richmond** **London TW9 2SS**
Report ref:	**9118/JRCB/TSR**
Date:	**3rd May 2012 [Rev 1]**

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SITE INVESTIGATION REPORT

PROPOSED REDEVELOPMENT:

65 MAYGROVE ROAD
LONDON NW6 2EH

DOCUMENT ISSUE STATUS:

Issue	Date	Description	Author	Checked/approved
Rev 0	30 January 2012	First issue	John Bartley	Terry Rickeard
Rev 1	3 May 2012	BH 3 incorporated	John Bartley	Terry Rickeard

TABLE OF CONTENTS

9118/JRCB/TSR Site Investigation Report – 65 Maygrove Road, London NW6 2EH
Client: Regal Homes Ltd Consulting Engineers: Pringuer-James

APPENDICES

APPENDIX A

Fieldwork, in-situ testing and monitoring
- Borehole records
- Standard Penetration Test results
- Ground-water and gas monitoring results

Laboratory testing
- Index property testing
- Plasticity chart
- Unconsolidated undrained triaxial test results [QUT]

Contamination testing
- General soil suite
- WAC test results
- Soluble sulphate/pH testing

Ground profiles
- Plot of SPT 'N' value and undrained cohesion versus elevation
- Cross section through boreholes

Plans & drawings
- Development plans
- Site photographs
- Site Plan
- Location Plan

APPENDIX B

GroundSure historical maps [Ref HMD-233510]

GroundSure EnviroInsight Report [Ref HMD-233511]

GroundSure GeoInsight Report [Ref HMD-233512]

3rd May 2012 [Rev 1] Soil Consultants Ltd

1.0 INTRODUCTION

Consideration is being given to the re-development of this site, involving the demolition of the existing buildings and construction of two new 5-storey residential buildings which will incorporate a single level basement.

In connection with the proposed works, we were commissioned to carry out a Desk Study and Geo-Environmental investigation of the site, to include the following elements:

- assessment of the historical site development
- identification of past and present potential contaminative uses
- contamination analysis/appraisal and identification of potential environmental liabilities
- identification of the ground sequence, determination of geotechnical parameters and provision of foundation design recommendations

The initial phase of investigation was carried out in December 2011 with an additional borehole being completed in February 2012. This report includes the findings of the Desk Study, describes the investigation undertaken, gives a summary of the ground conditions encountered and then provides foundation design recommendations. A site specific contamination appraisal/risk assessment is also included.

This report has been prepared for the benefit of the Client and associated parties directly involved with the design and construction of the project under direction of the Client. No reliance can be assumed by others without the written agreement of Soil Consultants Ltd.

2.0 SITE DESCRIPTION

The site is located within a mixed residential and commercial area in West Hampstead, north-west London. The overall dimensions of the site are approximately 45m x 85m [max] and its centre lies at NGR 524925E 184795N. The site lies between Maygrove Road, which forms the southern boundary, and Brassey Road to the north; Maygrove Peace Park lies to the north-east.

The overall ground surface in this area slopes up to the north with a level difference of approximately 5m between Maygrove Road and Brassey Road. A 2-3 storey office building occupies much of the site, measuring approximately 25m x 45m in plan. The ground floor of this building is at the level of Maygrove Road, ie approximately +46.5mOD. The building extends northwards into the slope forming a semi-basement with a higher-lying open area adjacent to Brassey Road, partially used for car-parking, lying at approximately +52mOD. Access to this northern area is via a sliding gate on Brassey Road. A further open car-park area forms the eastern part of the site, lying at about +50.5mOD to +52mOD.

Numerous trees and bushes are present along the northern Brassey Road boundary and some landscaped planting beds are present along the southern boundary fronting onto Maygrove Road. A cluster of mature deciduous trees is present immediately to the south-eastern corner of the site, along the Maygrove Road frontage.

The current site features are shown on the Site Plan which is included in Appendix A together with a series of site photographs.

3.0 SITE HISTORY AND GEOLOGICAL/ENVIRONMENTAL INFORMATION

3.1 GroundSure reports and historical maps

An historical map and environmental/geological database search was commissioned from GroundSure to ascertain the site history/usage and surrounding land usage. The following information was obtained:

- GroundSure MapInsight [Ref HMD-233510, dated 12th January 2012]
- GroundSure EnviroInsight [Ref HMD-233511, dated 12th January 2012]
- GroundSure GeoInsight [Ref HMD-233512, dated 12th January 2012]

An indication of the gradual development of the site over the years can be gained by a study of the historical maps. The following table contains a summary of the site development obtained from the 1:1,056 to 1:25,000 source maps provided in the GroundSure reports.

Map date	The site	Significant development/features in surrounding area
1865-66	• The site lies within an open undeveloped area • A slope face profile is identified within the site, very probably associated with rail lines to the north	• Railway sidings are present about 40m to the north with the main 'Midland Railway' lines just beyond • A railway cutting is present about 200m to the south
1871	• No significant changes apparent within the site	• A small pond is shown approximately 200m to the west-north-west
1896	• No significant changes apparent within the site	• The railway sidings [identified as 'West End Sidings'] now extend up to the northern site boundary with one track cutting across the northern extreme of the site • Maygrove Road is identified along the southern boundary in its present day position • The whole of the surrounding area to the south and west has been developed with numerous houses shown • The area immediately to the west is still undeveloped whilst isolated unidentified buildings are present immediately to the east
1915	• Some slope re-profiling is apparent within the site • Two small buildings are present along the northern boundary	• Some development has occurred immediately to the west, identified as 'Mission Hall'
1935	• An L-shaped, unidentified building is present in the north-western part of the site	• New buildings are present between Mission Hall and the western boundary
1940	• Two unidentified circular features are shown in the north-western corner in the location of the L-shaped buildings	• No significant changes apparent
1953-55	• A large building now occupies much of the site, identified as a 'Wood Turning Works'	• The building to the west is identified as a garage • A builder's yard is present immediately to the east with a coal depot and garage just beyond
1958	• No significant changes apparent	• No significant changes apparent
1968	• No significant changes apparent	• No significant changes apparent
1974	• The building, identified as 'works', has extended to the east • An electrical sub-station is present in the south-eastern corner	• The garage is still present immediately to the west • A 'Button Factory' is present to the east
1981-91	• No significant changes apparent	• The railway sidings are no longer present to the north and residential redevelopment is taking place • Brassey Road is shown in its present day position
1995 to present day	• No significant changes apparent	• The open area known as Maygrove Peace Park is shown to the north-east

The relevant historical maps are included in Appendix B of this report.

The desk study takes into account information included in a database of local activities; this database encompasses a range of subjects related to land use, pollution, and geological/hydrological conditions.

A summary of the relevant contaminative uses and other environmental issues identified by the GroundSure reports is presented below.

ENVIRONMENTAL PERMITS, INCIDENTS AND REGISTERS

Type	Map ID	Distance/ direction	Description
Industrial Sites Holding Licences and/or Authorisations			
Records of historic IPC Authorisations	-	<500m	No record
Records of Part A(1) and IPPC Authorised Activities	-	<500m	No record
Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	-	<500m	No record
Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	-	<500m	No record
Records of List 1 Dangerous Substances Inventory Sites	-	<500m	No record
Records of List 2 Dangerous Substances Inventory Sites	-	<500m	No record
Records of Part A(2) and Part B Activities and Enforcements	2 3-6	198m S >250m	Vehicle re-spraying – current permit Petrol station, dry cleaners, oil burning processes
Records of Category 3 or 4 Radioactive Substance Licences	-	<500m	No record
Records of Licensed Discharge Consents	-	<500m	No record
Records of Planning Hazardous Substance Consents and Enforcements	-	<500m	No record
Dangerous or Hazardous Sites			
Records of COMAH & NIHHS sites	-	>500m	No data found
Environment Agency Recorded Pollution Incidents			
Records of National Incidents Recording System, List 2	1	169m S	Household waste – Category 3 'Minor Impact' [land] and Category 4 'No Impact' [water]
Records of National Incidents Recording System, List 1	-	<250m	No data
Sites determined as Contaminated Land under Part IIA EPA 1990			
Sites Determined as Contaminated Land under Section 78R of the Environmental Protection Act 1990	-	<500m	No data found

LANDFILL AND OTHER WASTE SITES

Type	Map ID	Distance/ direction	Description
Landfill Sites			
Records from Environment Agency landfill data	-	<1000m	No data
Records of operational landfill sites	-	<1000m	No data
Records of Environment Agency historical landfill sites	-	<1500m	Canfield Place landfill [>1000m E]
Records of non-operational landfill sites	-	<1000m	No data
Records of BGS/DoE non-operational landfill sites	-	<1500m	No data
Records of Local Authority Landfill sites	-	<1500m	No data
Other Waste Sites			
Records of operational or non-operational waste treatment, transfer or disposal sites	-	<500m	No data
Records of non-operational waste treatment, transfer or disposal	1	219m E	Scrapyard – licence lapsed
Records of Environment Agency licensed waste sites	-	<1500m	No data

CURRENT LAND USE

Type	Map ID	Distance/ direction	Description
Current Industrial Data			
Records of potentially contaminative industrial sites	1A 2 3A 4-28	On site On site 8m S >100m	Electricity sub-station Works Industrial products [electronic equipment] Various, including vehicle testing, stone quarrying and preparation and general construction supplies
Petrol and Fuel Sites			
Petrol and Fuel Sites	29	>250m	Nearest is 311m SW - open
Underground High Pressure Oil and Gas Pipelines			
Records of high pressure underground pipelines	-	<500m	No data

GEOLOGY, GROUND WORKINGS, MINING, CAVITIES, BOREHOLE RECORDS AND SOIL CHEMISTRY			
Type	**Map ID**	**Distance / Direction**	**Description**
Artificial Ground			
Artificial/Made Ground	-	<500m	No data
Permeability of Artificial Ground	-	Site	No data relating to artificial ground within the site
Superficial Deposits and Landslips			
Superficial Deposits/Drift Geology	-	<500m	No data
Permeability of Superficial Ground	-	Site	No data relating to superficial ground within the site
Landslip and Landslip Permeability	- -	<500m	No data
Bedrock, Solid Geology and Faults			
Bedrock/Solid Geology	1	Site	London Clay Formation
Permeability of Bedrock Ground	-	Site	Very low to moderate
Faults	-	<500m	No data
Radon Affected Areas and Radon Protection	-	Site	The site is not in a Radon Affected Area [<1% properties above action level]; no radon protective measures necessary
Ground Workings			
Historical surface ground working features	1-4 5A-9	Site <50m	Unspecified pit and ground workings – 1866 to 1940 Unspecified ground workings and cuttings
Historical underground working features	-	<1000m	No data
Current ground workings	-	<1000m	No data
Mining, Extraction & Natural Cavities			
Historical mining	-	<1000m	No data
Coal mining	-	<1000m	No data
Johnson Poole and Bloomer	-	<1000m	No data
Non coal mining	-	<1000m	No data
Non coal mining cavities	-	<1000m	No data
Natural cavities, brine extraction, gypsum extraction, tin mining, clay mining	-	<1000m	No data
Natural Ground Subsidence			
Shrink/swell clays	1 2	Site 9m E	Hazard rating: Moderate Hazard rating: Moderate
Landslides	1 2	Site 9m E	Hazard rating: Very low Hazard rating: Very low

GEOLOGY, GROUND WORKINGS, MINING, CAVITIES, BOREHOLE RECORDS AND SOIL CHEMISTRY			
Type	**Map ID**	**Distance / Direction**	**Description**
Ground dissolution of soluble rocks	-	Site	Hazard rating: Null/negligible
Compressible deposits	1-2	Site 9m E	Hazard rating: Negligible Hazard rating: Negligible
Collapsible deposits	1-2	Site 9m E	Hazard rating: Very Low Hazard rating: Very Low
Running sands	1	Site 9m E	Hazard rating: Negligible Hazard rating: Negligible
Borehole Records			
BGS records	1-2	<250m	Records available: 178m SW and 191m NW
Estimated Background Soil Chemistry			
Estimated soil chemistry	-	Site 9m E	No data No data

HYDROGEOLOGY AND HYDROLOGY			
Type	**Map ID**	**Distance / Direction**	**Description**
Aquifer within Superficial Deposits	-	<250m	No superficial deposits
Aquifer within Bedrock Deposits	2 3 4 5	Site 9m E 174m N 179m N	'Unproductive' 'Unproductive' 'Unproductive' 'Unproductive'
Groundwater Abstraction Licences	-	<1000m	No data
Surface Water Abstraction Licences	-	<1000m	No data
Potable Water Abstraction Licences	-	<2000m	No data
Source Protection Zones	-	<500m	No data
River Quality	-	<1500m	No data
Detailed River Network	-	<500m	No data
Surface Water Features	-	<250m	No data

FLOODING			
Type	**Map ID**	**Distance / Direction**	**Description**
Zone 2 Flooding	1	<250m	No data
Zone 3 Flooding	2	<250m	No data

FLOODING			
Type	**Map ID**	**Distance / Direction**	**Description**
Flood Defences	-	<250m	No data
Areas benefitting from Flood Defences	-	<250m	No data
Areas used for Flood Storage	-	<250m	No data
Groundwater Flooding Susceptibility Areas [BGS]	-	<50m	No data – negligible susceptibility
Groundwater Flooding Confidence Areas	-	Site	Not applicable

DESIGNATED ENVIRONMENTALLY SENSITIVE SITES			
Type	**Map ID**	**Distance / Direction**	**Description**
Presence of Designated Environmentally Sensitive Sites	-	<500m	No data
Records of Sites of Special Scientific Interest [SSSI]	-	<500m	No data
Records of National Nature Reserves [NNR]	-	<500m	No data
Records of Special Areas of Conservation [SAC]	-	<500m	No data
Records of Special Protection Areas [SPA]	-	<500m	No data
Records of Ramsar Sites	-	<500m	No data
Records of Local Nature Reserves [LNR]	-	<500m	No data
Records of World Heritage Site	-	<500m	No data
Records of Environmentally Sensitive Areas	-	<500m	No data
Records of Areas of Outstanding Natural Beauty [AONB]	-	<500m	No data
Records of National Parks [NP]	-	<500m	No data
Records of Nitrate Sensitive Areas	-	<500m	No data
Records of Nitrate Vulnerable Zones	1, 2	<500m	No data

The GroundSure reports and historical maps are included as Appendix B.

3.2 Walk-over survey

A walkover survey of the site was undertaken on 13th December 2011. In general the building and grounds were in a clean and tidy state and there were no obvious signs of any significant fuel/oil contamination. An electrical sub-station was present incorporated into the site buildings in the south-western corner.

A large skip was present in the car park north of the building which appeared to be used for waste associated with refurbishment works. Trade and commercial waste bins were also stored on the northern edge of the car park. No exterior tanks or fuel stores were observed but it should be noted that full access inside the building was not available; there may be clearly be relevant features which were not observed.

Building/re-development works were being conducted on an area of land immediately west of the site. Historical maps and recent road-level photography indicate that a car garage was formerly present in this area to the west.

The surrounding land use comprised predominantly residential housing although some other commercial properties are present to the east of the site, on the opposite side of Maygrove Peace Park.

Representative photographs showing the main site features discussed below are included in Appendix A.

3.3 Summary of desk study and walk-over

The historical maps and records indicate that the site was undeveloped during the 19th century and the first part of the 20th century. The historical maps clearly show that some [probable] artificial slopes were present during this time. Between 1915 and 1935 the first recorded buildings were constructed and these were gradually extended during the remainder of the 20th century. No specific usage is shown, with the various structures being identified as 'works'. On the small scale 1940 map [1:10,560] two unidentified circular features as identified in the north-western corner of the site. An electrical sub-station is identified on the 1974 map and remains to the present day.

Railway sidings are shown to the north of the site from the earliest map onwards, cutting into the northern part of the site by the end of the 19th century. In the latter half of the 20th century, a garage is identified immediately to the west of the site, with a coal depot, garage and button factory to the east. Other nearby potential contaminative uses include industrial products [electronic equipment], vehicle testing/servicing, stone quarrying and preparation and general construction supplies – we do not consider these to be high risk activities.

No significant potential contaminative uses were identified during our walk-over survey with the exception of the sub-station in the south eastern part of the site.

There are no superficial deposits identified and the site is shown to be underlain by the London Clay formation, an 'unproductive' stratum. There are no licenced ground/surface water abstraction points within 1000m of the site and no Source Protection Zones within 500m.

4.0 EXPLORATORY WORK

Access was relatively limited due to the presence of the existing building over much of the site. Our investigation comprised the following elements.

Cable percussive boreholes

Three boreholes [BH Nos 1 to 3] were carried out at positions agreed with the Consulting Engineers and taken to a depth of up to 25m. BH Nos 1 and 2 were completed in December 2011, with BH No 3 being carried out in February 2012. In-situ Standard Penetration Tests [SPT] and sampling were carried out at appropriate intervals and a monitoring pipe was installed in BH No 2.

Ground-water and gas monitoring

Ground-water and ground-gas monitoring within the borehole observation pipe [BH No 2] was carried out on two occasions in December 2011 following the initial phase of investigation. The gas monitoring was carried out using a GA2000 instrument – atmospheric conditions are included on the monitoring records.

Geotechnical laboratory testing

The following geotechnical laboratory testing was completed:

- natural moisture content
- index properties [Atterberg Limits]
- unconsolidated undrained triaxial compression tests [102mm diameter sample]

Contamination testing

The environmental soil and ground-water samples were delivered to a specialist laboratory and the following testing was carried out:

General soil suite	-	6no
Waste Acceptance Criteria [WAC]	-	2no
Soluble sulphate/pH analyses	-	11no
PCB [7 congeners]	-	1no

The engineering logs of the exploratory holes, the monitoring results and the laboratory testing results are included in Appendix A.

5.0 GROUND CONDITIONS

The desk study has identified unspecified pit and ground workings within the site. These are almost certainly related to filling operations to create a level area for the railway sidings which were formerly present just within and immediately to the north of the site. The presence of significant thicknesses of made ground over part of the site was confirmed by our investigation, with the underlying natural geological sequence comprising the London Clay formation. A cross section through the boreholes showing the ground sequence is included in Appendix A.

5.1 Made ground

In the high-lying, northern and eastern parts of the site, BH Nos 2 and 3 encountered a significant thickness of non-engineered made ground, extending to depths of between 2.95m and 5.50m. The fill comprised a variable sequence of grey/brown and brown/orange sandy clay, dark brown clayey or silty sand, highly plastic clay [derived from London Clay] and a basal layer of soft black/dark grey slightly organic clay. Variable proportions of brick, ash, clinker and flint/chalk gravel were present within the fill. SPT 'N' values of between 5 and 10 were recorded indicating a generally soft or firm consistency and/or loose state of compaction.

In BH No 1 which was located at Maygrove Road level in the south-eastern part of the site, a 1.1m thickness of soft to firm grey/brown silty clay fill was present beneath a reinforced concrete slab.

No obvious visual/olfactory evidence of contamination was noted.

5.2 London Clay

The London Clay was encountered beneath the made ground at an elevation of between +45.55mOD and 48.4mOD [ie 1.1m to 5.5m below ground level]. The formation generally comprised an upper weathered layer of firm to stiff brown fissured clay with scattered selenite crystals which extended to between +38.35mOD and +40.75mOD. Typical stiff becoming very stiff grey fissured clay was then present and this extended to maximum depth investigated [+21.65mOD]. Below about +31mOD to +33mOD the was locally silty and sandy with scattered silt/sand partings.

The clay generally classifies as a high to very high plasticity material [CH to CV], as shown on the appended plasticity chart. A plot of the laboratory undrained cohesions and SPT 'N' values is included in Appendix A.

5.3 Ground-water

Ground-water was not observed during the drilling works with both boreholes remaining dry. A monitoring pipe was installed in BH No 2 with a highest standing water level at 4.22m depth [+47.91mOD] recorded on 30th January 2012. It should be noted that water levels can undergo significant seasonal variation.

6.0 GEOTECHNICAL ASSESSMENT

The proposed redevelopment comprises the demolition of the existing building within the site and construction of two new 5-storey residential buildings. These will incorporate a single level basement beneath the whole of the building footprint, with a proposed excavation depth to about +43mOD. The basement of the main western building will extend beyond the proposed building footprint to the north and east. The current development plans and sections are included in Appendix A.

Our investigation has indicated that a significant thickness of made ground is present in the northern high-lying part of the site, probably associated with ground-works for former railway sidings. In the lower-lying area fronting onto Maygrove Road, only small thicknesses of made ground were present. Where the proposed buildings cuts into the slope there will be a maximum vertical retained height of about 7m [measured to basement level], with the new ground profile then stepping or sloping up to Brassey Road. We understand that current proposals envisage the installation of an embedded retaining wall [either bored sheet pile] to permit the basement excavation. We agree that this probably represents the optimum solution for the proposed development. The main internal structural loads are to be supported by piles.

6.1 Basement construction and retaining wall design

The excavation for the proposed basement is expected to encounter variable made ground and then the London Clay. Ground-water was not encountered during construction of our boreholes but subsequent monitoring in BH No 2 measured a water level at +47.92mOD, is about 5m above the proposed basement excavation level. It is unlikely that this ground-water is an indication of a large, readily re-charged body of water; it is more likely associated with perched pockets of water within the made ground which could be controlled by pumping from within the excavation. Notwithstanding this, the presence of ground-water will need to be addressed when determining the type of embedded wall to be used and consideration may need to be given to the use of a water-tight secant bored pile of interlocked sheet pile wall. The advice of a specialist contractor should be sought when determining the most appropriate wall type.

There are a number of properties adjacent to the site boundary which could be affected by the retaining wall installation and subsequent basement excavation. A robust arrangement of temporary internal bracings/props, including support elements near the top of the basement wall, will be required to maintain wall stability and assist in controlling ground movements.

For the design of embedded walls in the temporary, short-term condition it is usually more economical to carry out an undrained [total stress] analysis. Careful selection of the appropriate design parameters is needed, incorporating allowances for factors such as the presence of ground-water and the possibility of soil softening – CIRIA Report C580 provides more detail.

In the permanent case the lateral earth pressures will be supported directly by the retaining wall or by a reinforced concrete lining wall cast within the piles. In either case horizontal support will be provided by the new ground and basement floor slabs.

The following table of coefficients may be used for the design of the basement retaining wall:

Stratum		Bulk density [Mg/m^3]	Effective cohesion, c' [kN/m^2]	Effective friction angle, ϕ' [degrees]
Made ground		1.80	0	22
London Clay:	above +38mOD	2.00	0	23
	below +38mOD	2.00	5	23

The wall designer should use these parameters to derive the active and passive earth pressure coefficients, Ka and Kp. The determination of appropriate earth pressure coefficients, together with factors such as the pattern of earth pressure distribution, will depend upon the type/geometry of the wall and the overall design approach. The piled walls may of course also be used to provide vertical load capacity subject to the necessary allowance being made for interaction effects. We recommend that a specialist contractor is consulted to confirm the most appropriate type of wall and to provide the final wall design.

6.2 Piled foundations

For the ground conditions encountered either CFA piles or conventional rotary augered piles could be considered for this site, with the latter type requiring temporary casing through any made ground. For the proposed basement excavation level at +43mOD the whole of the pile shaft will be supported by the London Clay. The following table of coefficients may be used for their design, based upon the measured strength/depth profile included in the Appendix.

Shaft adhesion

Stratum	Depth/elevation	Undrained cohesion [from design line]	Ultimate unit shaft adhesion 'q_s'
London Clay	Below +42mOD [allow for 1m deep pile cap]	Increases linearly from 100kN/m^2 at a rate of 7.5kN/m^2/m	Increases linearly from 50kN/m^2 at a rate of 3.75kN/m^2/m [incorporates α = 0.50]

Notes:
a] Unit shaft adhesion 'q_s' = α x c_u [where α = 0.50 and c_u is the undrained cohesion from the design line]
b] The α value of 0.5 is based upon 102mm diameter triaxial tests and this should not be varied
c] The average shaft adhesion over the pile length should be limited to 110kN/m^2
d] The maximum value for unit shaft adhesion should be limited to 140kN/m^2

End bearing

Stratum	Depth/elevation	Undrained cohesion [from design line]	Ultimate unit base resistance 'q_b'
London Clay	Below +35mOD	Increases linearly from 152kN/m^2 at a rate of 7.5kN/m^2/m	Increases linearly from 1140kN/m^2 at a rate of 56.25kN/m^2/m [incorporates Nc = 7.5]

Notes:
a] Unit base resistance 'q_b' = Nc x c_u [where Nc = 7.5 and c_u is the equivalent undrained cohesion from the design line]
b] The Nc value of 7.5 is appropriate for pile diameters >600mm. For smaller diameter piles [600mm and less] an Nc of 9.0 may be used and the above base resistance parameters should therefore be multiplied by 1.2

As a guide to the use of the above coefficients, we have calculated the following capacities for various diameter single piles terminating at various depths:

Pile diameter [mm]	Toe level [mOD]	Pile length [Note c] [m]	Ultimate load [kN]	Working load [kN]
450	30	12	1500	580
	25	17	2295	880
	22	20	2830	1090
600	30	12	2125	815
	25	17	3205	1230
	22	20	3935	1515
750	30	12	2680	1030
	25	17	4035	1550
	22	20	4950	1905
900	30	12	3365	1295
	25	17	5020	1930
	22	20	6140	2360

Notes:
a] Working load is calculated using F_{shaft} and F_{base} = 2.6
b] Concrete stress should be considered in the final design
c] Pile length based upon underside of pile cap at +42mOD

An overall Factor of Safety of 2.6 has been used in the above examples, in line with the current guidelines by the London District Surveyors Association [LDSA]. If comprehensive pile testing is undertaken for this redevelopment and a lower factor of safety is likely to be appropriate. Our examples are indicative only and do not constitute a recommendations as to the pile length and diameter to be adopted.

Piles within the heave zone will inevitably be subject to an element of uplift as the clay responds to the excavation unloading, with tensile forces being generated within the shaft. The maximum tensile forces will occur if the piles are installed prior to the excavation [for example single piles with plunge columns], but even if installed following the basement excavation they could still be subjected to some net tension until the axial loads are applied by the new structure. The final pile design should address the potential tensile forces and appropriate reinforcement should be incorporated.

We recommend that a specialist piling contactor is consulted at an early stage to advise on the most appropriate pile type and to ultimately provide the final pile design.

6.3 Basement heave and slab design

The basement excavation will involve the removal of up to 9m of soil in the northern part of the site where the current ground level is approximately +52mOD; this will result in an unloading at basement level of about 180kN/m^2. Where the existing building is present [with assumed ground floor level at about +47mOD], excavation depths of approximately 4m are envisaged. On the basis that the existing buildings apply an equivalent UDL of say 40kN/m^2, we estimate an unloading of approximately 120kN/m^2 could result at proposed basement level.

The stress reduction will result in heave of the London Clay below basement level, the magnitude of which will be determined by a number of factors such as the construction programme duration, the restraining effects of any axially loaded piles, the embedded retaining wall and the basement slab stiffness.

The potential long term effect of this heave in the London Clay as it recovers should be considered during slab design. The slab could be designed as a fully suspended structure, supported on the main foundations, and incorporating an effective void beneath to accommodate future heave movement. Alternatively the slab could be ground bearing and designed to withstand potential heave forces/movements.

We have carried out a preliminary assessment of heave effects in relation to the design of the basement slab and estimate that the maximum total unconstrained heave could be of the order of 60mm at the centre of the excavation. For a typical construction programme, we estimate that about 50% of this total movement would be expected to occur prior to construction of the slab, leaving about 30mm of potential long-term post construction heave. This would be the minimum height void which should be incorporated beneath a fully suspended slab.

If it is [reasonably] assumed that the relationship between heave movement and pressure is linear, the maximum heave pressure for a very stiff rigid slab in contact with the ground could therefore be about 90kN/m^2 [for the fully constrained condition]. However, the heave pressure beneath a more flexible slab will be less [due stress dissipation as the slab deflects] and we anticipate that an 'average' stiffness slab would experience heave pressures of the order of 45kN/m^2, with about 15mm upward heave movement. This estimate does not take account of the restraining effect of any bearing piles supporting the main structure or the embedded retaining wall piles – these will reduce the overall heave movements. However it is useful in that it allows general conclusions to be drawn regarding likely maximum under-slab pressures.

It will be necessary to consider uplift of the slab due to potential hydrostatic pressures and in this respect the guidelines incorporated in BS8102:2009 should be followed. The site observations indicated the presence of ground-water at about +48mOD. The design conditions must take account of potential seasonal fluctuations and/or accidental conditions – in this respect we would recommend that a design water level of at least say +50mOD should be adopted. This would result in a maximum hydrostatic uplift pressure of about 70kN/m^2 on the basement slab which will clearly be more critical than the anticipated soil heave pressures. This theoretical pressure will only apply in the northern part of the site and will reduce significantly progressing southwards. If a design water level on the southern edge of the basement is assumed to be say 1m below ground level, then the resulting hydrostatic pressure would be about 30kN/m^2. Of course these pressures are only theoretical and the development of a full, sustained hydrostatic pressure is considered to be highly unlikely due to the very low permeability/transmissivity of the London Clay. It would be reasonable to assume that only the northern part of the slab would be affected by the transient high water level and design measures to resist the resulting hydrostatic pressure could be limited to, say, the northern quarter of the slab. An alternative approach would be to introduce effective drainage measures behind the wall and beneath the slab to limit the potential build-up of hydrostatic pressure.

It is important to note that the water pressures will not be additional to any soil heave pressures, but will be the minimum uplift pressure for design purposes. We recommend that further ground-water monitoring is carried out

establish the likely seasonal trends with the final slab design adjusted accordingly – the design water level may need to be agreed with the local building control.

Detailed analysis of the potential basement heave and pile tension effects is outside the scope of this interpretative report. These issues should be addressed when the final structural layout and configuration is known and the loading calculations for the existing building have been completed. In our experience with this type of development, analysis using the Boussinesq equations of vertical stress, together with Young's Modulus values based upon the measured soil parameters, has provided realistic results which have been accepted by the various regulatory authorities. We have carried out a large number of such analyses using established in-house techniques and consider such an approach will be suitable for this redevelopment.

6.4 Foundation concrete

Low to moderate levels of soluble sulphates were measured in selected soil samples with near neutral pH values. The results fall into Site Design Classes DS-1 to DS-3 of Table C2 given in BRE Special Digest 1 [2005]. We assess the site as having 'static' ground water conditions and recommend that a minimum of ACEC Site Class AC-2s should be adopted for the design of buried concrete.

7.0 CONTAMINATION APPRAISAL

This appraisal adopts the current UK practice which generally uses the Source-Pathway-Receptor methodology to assess contamination risks. For a site to be designated as contaminated a plausible linkage between any identified sources and receptors must be identified, ie whether significant pollution linkages [SPLs] are present. In considering the potential for contamination to cause a significant effect, the extent and nature of the potential source are assessed and pathways/receptors identified; without an SPL there is theoretically no risk to the receptors from contamination. The assessed risks to the various potential receptors are summarised in the tabulated Conceptual Site model included in Section 7.6 of this report.

7.1 Environmental setting and context

The site is underlain by the London Clay which is classified as 'unproductive strata'. The nearest water abstraction point is >1000m from the site and there are no Source Protection Zones within 500m. We assess the site as being of low environmental sensitivity.

7.2 Potential on-site/off-site contamination sources

The desk study has identified unspecified ground-works within the site area during the 19th century and the first part of the 20th century. We consider that these are almost certainly associated with the railway sidings immediately to the north of the site. The source of the made ground is unknown and this could obviously present a potential contamination source. Other potential sources associated with past usage within the site are as follows:

- a large unidentified 'works'
- two unidentified circular features as identified in the north-western corner of the site
- an electrical sub-station in the south-eastern area [potential PCB contamination]

Potential off-site sources of contamination are as follows:

- a garage identified immediately to the west of the site
- a coal depot, garage and button factory to the east
- various nearby potential sources including industrial products [electronic equipment], vehicle testing/servicing, stone quarrying and preparation and general construction supplies – we do not consider these to be high risk activities

7.3 Contamination testing

In order to identify whether known or unknown sources within [and outside] the site have caused contamination, we have carried out testing on selected soil samples which were recovered during our investigation. The testing comprised the following elements:

- 6no soil samples for a general contaminant suite
- 1no PCB analysis

The results were assessed where relevant against the DEFRA Soil Guideline Values [SGV] and the LQM/CIEH Generic Assessment Criteria [GAC]. There are currently no published SGV's or GAC's for Extractable/Total Petroleum Hydrocarbons and the results were compared with the frequently used EA remedial target of 1,000mg/kg. The contamination testing was carried out specifically for the purpose of providing a general guidance evaluation for the proposed development. Reference should be made to the foreword to the appended contamination test results in order to fully understand the context in which this discussion should be viewed.

The redevelopment will include almost 100% hard cover by the new building and parking, with only very limited landscaped areas along the Maygrove Road frontage. The basement level is to be used for car parking. Notwithstanding this, we have where relevant used the trigger levels for **residential development** to assess the results of the contamination testing - using these criteria all fell below the relevant trigger levels, indicating a generally very low level of contamination in the samples tested. The implications of these results are addressed in the site specific Risk Assessment and Conceptual model below.

7.4 Ground gas monitoring

Monitoring of the installation in BH No 2 was carried out on two occasions following completion of the site works [23rd January and 30th 2011]. No elevated concentrations of methane carbon monoxide or hydrogen sulphide were measured. A very slightly elevated concentration of carbon dioxide was measured [1.5% maximum] with a very slightly depleted corresponding oxygen level of 19.9% [minimum]. No flow was observed and we assess the risk from ground gases to the end user as being low.

7.5 Disposal of excavated soils

Low concentrations of contamination were measured within selected soil samples and we would anticipate either an 'inert' or 'non-hazardous' waste classification for the made ground; an 'inert' waste classification should be applicable to any natural soils. Early consultations with the relevant authority should be carried out to confirm the classification for off-site disposal. It is noted that the samples were recovered from relatively widely spaced boreholes and, whilst representative of the soils encountered, additional testing may be required prior to or during basement excavation to confirm the classification.

7.6 Risk Assessment and Conceptual Model

The proposed redevelopment will incorporate a new basement, the excavation for which should involve the total removal of any made ground beneath the building footprint. Some residual made ground will remain in place to the north and east of the proposed basement. Testing on samples of made ground did not indicate any significant contamination, although it is self-evident that areas of contamination may be present in areas which were not investigated. Assessed risks to potential receptors are summarised in the following tabulated conceptual model:

Source/ hazard	Pathway	Receptor	Provisional Assessed Risk level	Mitigation measures/explanation
Contaminated soil: on-site and off-site sources	Ingestion/ contact	End users	**LOW**	• Generally low levels of contamination measured in soil samples • The proposed redevelopment will involve almost 100% removal of made ground. Significant migration of any contaminants within the made ground into the London Clay is considered unlikely due to its very low permeability • The new building will provide almost 100% hardcover • Minimal landscaping is proposed, this comprising small bedding areas along the Maygrove Road frontage • The risk of migration of off-site contamination through the very low permeability London Clay is considered to be minimal

Source/ hazard	Pathway	Receptor	Provisional Assessed Risk level	Mitigation measures/explanation
Contaminated soil: on-site and off-site sources	Ingestion/ contact	Construction workers	**LOW**	↓ Generally low levels of contamination measured in soil samples ↓ Additional investigation may be prudent when better access is available to confirm contamination levels within the made ground ↓ Appropriate PPE should be worn ↓ A careful watching brief should be kept during construction and if obvious or suspected contamination is encountered this should be dealt with prescriptively
Contaminated soil: on-site sources	Migration of contaminated ground water and/or surface run-off through contaminated fill into aquifer	Aquifer	**LOW**	↓ Generally low levels of contamination measured in soil samples from the site ↓ The proposed redevelopment will involve almost 100% removal of made ground ↓ The bedrock aquifer designation for the London Clay is 'Unproductive Strata' ↓ Migration of contaminants through the very low permeability London Clay id unlikely ↓ No licenced ground/surface water abstraction points are present within 1000m of the site ↓ There are no Source Protection Zones within 500m of the site
Contaminated soil	Disposal in landfill	Waste disposal	**LOW**	↓ General analysis and WAC testing indicate generally low levels of contamination with a probable classification of 'inert' or 'non-hazardous industrial' waste for the made ground. The natural soils should be classified as 'inert' waste ↓ We recommend that early consultations are made with the appropriate waste disposal authority to confirm these classifications
Ground gas: on-site and off-site sources	Migration	End-user and buildings	**LOW**	↓ The proposed redevelopment will involve almost 100% removal of made ground ↓ Whilst slightly organic clay was observed within the made ground, gas monitoring indicated no significantly elevated levels of hazardous ground gases ↓ the site is not in a radon affected area ↓ no gas protection measures are likely to be required by the regulatory authority

In conclusion, based upon the information reviewed and the results of the investigation, our assessment is that the potential for Significant Pollution Linkages at this site should be **LOW**. It is self-evident that there may be zones of contamination within the site which were not encountered in our boreholes and additional investigation may be prudent when the site has been cleared. A careful watching brief should be kept during construction.

APPENDIX A

Fieldwork, in-situ testing and monitoring
- Borehole records
- Standard Penetration Test results
- Ground-water and gas monitoring results

Laboratory testing
- Index property testing
- Plasticity chart
- Unconsolidated undrained triaxial test results [QUT]

Contamination testing
- General soil suite
- WAC test results
- Soluble sulphate/pH testing

Ground profiles
- Plot of SPT 'N' value and undrained cohesion versus elevation
- Cross section through boreholes

Plans & drawings
- Development plans
- Site photographs
- Site Plan
- Location Plan

APPENDIX A

Fieldwork, in-situ testing and monitoring

- Borehole records
- Standard Penetration Test results
- Ground-water and gas monitoring results

FOREWORD FOR CABLE PERCUSSIVE DRILLING - GUIDANCE NOTES

GENERAL
The Borehole Records are compiled from the driller's description of the strata encountered, an examination of the samples by our Geotechnical Engineer and the results of in-situ and laboratory tests. Based on this data, the report presents an opinion on the configuration of strata within the site. However, such reasonable assumptions are given for guidance only and no liability can be accepted for changes in conditions not revealed by the boreholes.

BORING METHODS
The Cable Percussion technique of boring is normally employed and allows the ground conditions to be reasonably well established. However, some disturbance of the ground is inevitable, particularly some "softening" of the upper zone of clay immediately beneath a granular soil. The presence of thin layers of different soils within a stratum may not always be detected.

GROUND WATER
The depth at which ground water was struck is entered on the Borehole Records. However, this observation may not indicate the true water level at that period. Due to the speed of boring and the relatively small diameter of the borehole, natural ground water may be present at a depth slightly higher than the water strike. Moreover, ground water levels are subject to variations caused by changes in the local drainage conditions and by seasonal effects. When a moderate inflow of water does take place, boring is suspended for at least 10 minutes to enable a more accurate short-term water level to be achieved. An estimate of the rate of inflow is also given. This is a relative term and serves only as a guide to the probable flow of water into an excavation.

Further observations of the water level made during the progress of the borehole are shown including end of shift and overnight readings and the depth at which water was sealed off by the borehole casing, if applicable.

Whilst drilling through granular soils, it is usually necessary to introduce water into the borehole to permit their extraction. When additional water has been used a remark is made on the Borehole Record and the implications are discussed in the text.

SAMPLES
Undisturbed samples of the predominantly cohesive soils are obtained using a 100mm diameter open-drive sampler. In granular soils, disturbed bulk samples are taken and placed in polythene bags. Small jar samples are taken at frequent intervals in all soils for subsequent visual examination. Where ground water is encountered in sufficient quantity, a sample of the ground water is also taken.

IN-SITU STANDARD PENETRATION TESTS
This test is performed in accordance with the procedure given in B.S.1377:1990. The individual blow count record for each test is given on a separate table. The 'N' value is normally the number of blows to achieve a penetration of 0.3m following a seating distance of 0.15m and is quoted at the mid-depth of the test zone. However if a change of stratum occurs within the test zone then a revised 'N' value is calculated to assess one layer in particular. In hard strata full penetration may not be obtained. In such cases the suffix + indicates that the result has been extrapolated from the limited penetration achieved. Where ground water has affected the measured values, the resultant 'N' values have been placed in brackets since it is unlikely to represent the true in-situ density of the soil.

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Site	65 Maygrove Road, London NW6 2EH	Borehole No: 1
Location		
Client:	Regal Homes Ltd	Sheet 1 of 3
Engineer:	Pringuer-James Consulting Engineers Ltd	Report No: 9118/JRCB

Comments	Samples Type	Samples Depth(m)	Field Test	Strata Depth(m)		Strata Level(mOD)	Strata Description	Legend
				0.00	D	+ 46.65	Reinforced CONCRETE	0
BH commenced: 15 Dec 2011				0.35		+ 46.30	MADE GROUND: soft to firm grey/brown silty sandy clay with gravel and brick	
	D	0.50						
				1.10	1	+ 45.55	Firm becoming stiff brown fissured CLAY with blue/grey gleying and scattered selenite crystals. Locally silty and slighly sandy	1
Service pit to 1.20m	D	1.20						
BH/casing dia: 150mm								
	S/D	1.80	19					
	D	2.00			2			2
	U	2.50						
	D	3.00			3			3
	S/D	3.80	12					
	D	4.00			4			4
	U	4.50						
	D	5.00			5			5
	S/D	6.30	21		6			6
	D	6.75						
	U	7.50			7			7
	D	8.00			8			8
				8.30		+ 38.35	Stiff becoming very stiff grey fissured CLAY	
	S/D	9.30	24		9			9
	D	9.75						
					10			10

Constructed using cable percussive techniques

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water S = SPT 'N' (split spoon sample) C = SPT 'N' (solid cone) HV = Hand Vane (kPa) PP = Pocket Penetrometer (kg/cm²)

Remarks :- Ground level inferred from survey plan
Borehole backfilled with clean arisings

Borehole No: 1

[* = extrapolated SPT 'N' value]

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SCL Chart Generator Ver_1.4

Site	65 Maygrove Road, London NW6 2EH	Borehole No: 1
Location		
Client:	Regal Homes Ltd	Sheet 2 of 3
Engineer:	Pringuer-James Consulting Engineers Ltd	Report No: 9118/JRCB

Comments	Samples Type	Samples Depth(m)	Field Test	Strata Depth(m)		Strata Level(mOD)	Strata Description	Legend
				10.00	10	+ 36.65	Stiff becoming very stiff grey fissured CLAY	10
	U	10.50						
	D	11.00			11			11
	S/D	12.30	28		12			12
	D	12.75						
					13			13
	U	13.50						
	D	14.00			14			14
	S/D	15.30	32		15			15
	D	15.75		15.50		+ 31.15	Very stiff grey fissured silty slightly sandy CLAY. Locally very silty and sandy with occasional partings of silty fine sand	
					16			16
	U	16.50						
					17			17
	D	17.50						
	S/D	18.30	35		18			18
	D	18.75						
					19			19
	U	19.50						
					20			20

Constructed using cable percussive techniques

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water S = SPT 'N' (split spoon sample) C = SPT 'N' (solid cone) HV = Hand Vane (kPa) PP = Pocket Penetrometer (kg/cm²)

Remarks :-

Borehole No: 1

[* = extrapolated SPT 'N' value]

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SCL Chart Generator Ver_1.4

Site	65 Maygrove Road, London NW6 2EH	Borehole No:	1
Location			
Client:	Regal Homes Ltd	Sheet	3 of 3
Engineer:	Pringuer-James Consulting Engineers Ltd	Report No:	9118/JRCB

Comments	Samples Type	Samples Depth (m)	Field Test	Strata Depth (m)		Strata Level (mOD)	Strata Description	Legend
	D	20.00		20.00	20	+ 26.65	Very stiff grey fissured silty slightly sandy CLAY. Locally very silty and sandy with occasional partings of silty fine sand	20
					21			21
	S/D	21.30	39					
	D	21.75						
					22			22
	U	22.50						
	D	23.00			23			23
					24			24
	S/D	24.30	45					
BH dry	D	25.00		25.00	25	+ 21.65	End of borehole at 25m depth	25
					26			26
					27			27
					28			28
					29			29
					30			30

Constructed using cable percussive excavtiques

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water S = SPT 'N' (split spoon sample) C = SPT 'N' (solid cone) HV = Hand Vane (kPa) PP = Pocket Penetrometer (kg/cm²)

Remarks :-

Borehole No: 1

[* = extrapolated SPT 'N' value]

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Site	65 Maygrove Road, London NW6 2EH	Borehole No:	2
Location			
Client:	Regal Homes Ltd	Sheet	1 of 4
Engineer:	Pringuer-James Consulting Engineers Ltd	Report No:	9118/JRCB

Comments	Samples Type	Samples Depth (m)	Field Test	Strata Depth (m)		Strata Level (mOD)	Strata Description	Legend
				0.00	0	+ 52.15	Asphalt over road-base	0
BH commenced: 14 Dec 2011	D	0.25		0.20		+ 51.95	MADE GROUND: black ash and clinker with brick hardcore and sandy gravel	
	D	0.50						
				0.60		+ 51.55	MADE GROUND: grey/brown and orange/brown friable silty sandy clay/dayey sand with brick, flint and chalk gravel	
	D	1.00			1			1
Service pit to 1.20m BH/casing dia: 150mm								
	S/D	1.80	6	1.80		+ 50.35	MADE GROUND: soft and firm brown and grey clay with scattered brick fragments and occasional fine gravel	
	D	2.00			2			2
	S/D	2.80	8					
	D	3.00			3			3
	S/D	3.80	8					
	D	4.00			4			4
				4.40		+ 47.75	MADE GROUND: soft black and dark grey silty clay, locally slightly organic	
	S/D	4.80	5					
	D	5.00			5			5
	U	5.50		5.50		+ 46.65	Firm becoming stiff brown fissured CLAY with blue/grey gleying and scattered selenite crystals. Locally silty and slightly sandy	
	D	6.00			6			6
	S/D	7.30	19		7			7
	D	7.75						
					8			8
	U	8.50						
	D	9.00			9			9
					10			10

Constructed using cable percussive excavtiques

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water S = SPT 'N' (split spoon sample) C = SPT 'N' (solid cone) HV = Hand Vane (kPa) PP = Pocket Penetrometer (kg/cm²)

Remarks :-

Borehole No: 2

[* = extrapolated SPT 'N' value]

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SCL Chart Generator Ver_1.4

Site	65 Maygrove Road, London NW6 2EH	Borehole No:	2
Location			
Client:	Regal Homes Ltd	Sheet	2 of 4
Engineer:	Pringuer-James Consulting Engineers Ltd	Report No:	9118/JRCB

Comments	Samples Type	Samples Depth (m)	Field Test	Strata Depth (m)	Strata Level (mOD)	Strata Description	Legend
				10.00	+42.15	Stiff brown fissured CLAY with scattered selenite crystals	
	S/D	10.30	24				
	D	10.75					
	D	11.40					
	U	11.50		11.40	+40.75	Stiff becoming very stiff grey fissured CLAY	
	D	12.00					
	S/D	13.30	30				
	D	13.75					
	U	14.50					
	D	15.00					
	S/D	16.30	31				
	D	16.75					
	U	17.50					
	D	18.00					
	S/D	19.30	38	19.00	+33.15	Very stiff grey fissured silty slightly sandy CLAY. Locally very silty and sandy with occasional partings of silty fine sand	
	D	19.75					

Constructed using cable percussive techniques

Key: U = Undisturred B = Bulk D = Small disturred W = Water S = SPT 'N' (split spoon sample) C = SPT 'N' (solid cone) HV = Hand Vane (kPa) PP = Pocket Penetrometer (kg/cm²)

Remarks :-

Borehole No: 2

(* = extrapolated SPT 'N' value)

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SCL Chart Generator Ver_1_8

Site	65 Maygrove Road, London NW6 2EH	Borehole No:	2
Location			
Client:	Regal Homes Ltd	Sheet	3 of 4
Engineer:	Pringuer-James Consulting Engineers Ltd	Report No:	9118/JRCB

Comments	Samples Type	Samples Depth (m)	Field Test	Strata Depth (m)	Strata Level (mOD)	Strata Description	Legend
				20.00	+32.15	Very stiff grey fissured silty slightly sandy CLAY. Locally very silty and sandy with occasional partings of silty fine sand	
	U	20.50					
	D	21.00					
	S/D	22.30	44				
	D	22.75					
	U	23.50					
	D	24.00					
	S/D	25.30	50				
BH dry				25.50	+26.65	End of borehole at 25.5m depth	

Constructed using cable percussive techniques

Key: U = Undisturred B = Bulk D = Small disturred W = Water S = SPT 'N' (split spoon sample) C = SPT 'N' (solid cone) HV = Hand Vane (kPa) PP = Pocket Penetrometer (kg/cm²)

Remarks :-

Borehole No: 2

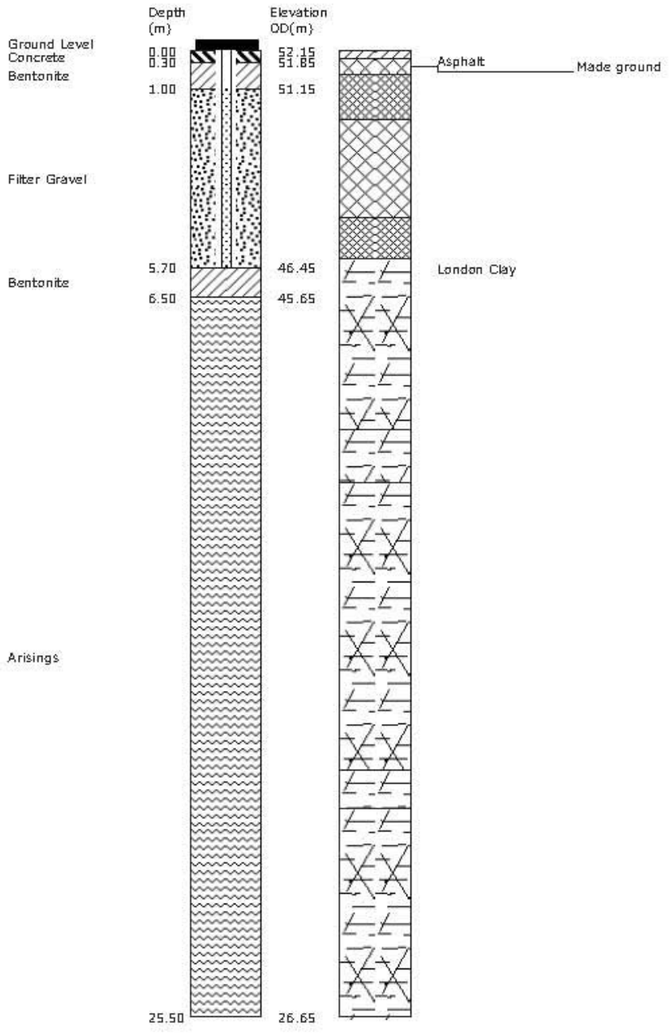
(* = extrapolated SPT 'N' value)

Soil Consultants Ltd

SCL Chart Generator Ver_1_8

Site	65 Maygrove Road, London NW6 2EH	Borehole No:	2
Location			
Client:	Regal Homes Ltd	Sheet	4 of 4
Engineer:	Pringuer-James Consulting Engineers Ltd	Report No:	9118/JRCB

Borehole Installation and Backfill Details



Constructed using cable percussive techniques

Remarks :- [i] Pipe diameter: 35mm
[ii] Tip at 5.7m depth [46.45m OD approx]
[iii] Gas tap fitted

Borehole No: 2

Soil Consultants Ltd

SCL Chart Generator Ver 1.42

Site	65 Maygrove Road, London NW6 2EH	Borehole No:	3
Location			
Client:	Regal Homes Ltd	Sheet	1 of 3
Engineer:	Pringuer-James Consulting Engineers Ltd	Report No:	9118/JRCB

Comments	Samples Type	Samples Depth(m)	Field Test	Strata Depth(m)	Strata	Strata Level(mOD)	Strata Description	Legend
				0.00	0	+51.35	MADE GROUND: compact brick and gravel	0
BH commenced: 13 Feb 2012				0.20		+51.15	MADE GROUND: dark brown silty ashy sand with gravel, brick and clinker	
	D	0.50						
					1			1
Service pit to 1.20m	S/D	1.30	6					
BH/casing dia: 150mm	D	1.50						
					2			2
	S/D	2.30	10	2.30		+49.05	MADE GROUND: firm dark grey/brown friable silty sandy gravelly clay with brick, ash and clinker. Occasional chalk fragments	
	D	2.50						
				2.95		+48.40	Firm becoming stiff brown fissured CLAY with blue/grey gleying and scattered selenite crystals. Locally silty and slightly sandy with occasional silt partings	
					3			3
	S/D	3.30	16					
	D	3.50						
	U	4.00			4			4
	D	4.35						
BH cased to 4.50m								
	S/D	5.00			5			5
	S/D	5.30	14					
	D	5.75						
					6			6
	U	6.50						
	D	7.00			7			7
					8			8
	S/D	8.30	21					
	D	8.75						
					9			9
	U	9.50						
					10			10

Constructed using cable percussive techniques

Key: U – Undisturbed B – Bulk D – Small disturbed W – Water S – SPT 'N' (split spoon sampler) C – SPT 'N' (solid cone) HV – Hand Vane (kPa) PP – Pocket Penetrometer (kg/cm²)

Remarks :-

Borehole No: 3

[* = extrapolated SPT 'N' value]

Soil Consultants Ltd

SCL Chart Generator Ver 1.42

Site	65 Maygrove Road, London NW6 2EH	Borehole No:	3
Location			
Client:	Regal Homes Ltd	Sheet	2 of 3
Engineer:	Pringuer-James Consulting Engineers Ltd	Report No:	9118/JRCB

Comments	Samples Type	Samples Depth(m)	Field Test	Strata Depth(m)		Strata level(mOD)	Strata Description	Legend
	D	10.00		10.00	10	+ 41.35	Stiff brown fissured CLAY with blue/grey gleying and scattered selenite crystals. Locally silty and slightly sandy with occasional silt partings	10
	S/D	11.30	24		11			11
	D	11.75						
					12			12
				12.30		+ 39.05	Stiff becoming very stiff grey fissured CLAY. Locally silty with occasional silt partings	
	U	12.50						
	D	13.00			13			13
					14			14
	S/D	14.30	28					
	D	14.75						
					15			15
	U	15.50						
	D	16.00			16			16
	S/D	17.30	36		17			17
	D	17.70						
					18			18
	U	18.50						
	D	19.00			19			19
					20			20

Constructed using cable percussive techniques

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water S = SPT 'N' (split spoon sample) C = SPT 'N' (solid cone) HV = Hand Vane (kPa) PP = Pocket Penetrometer (kg/cm²)

Remarks :-

Borehole No: 3

(* = extrapolated SPT 'N' value)

Soil Consultants Ltd

SCLChartGeneratorVer_1_42

Site	65 Maygrove Road, London NW6 2EH	Borehole No:	3
Location			
Client:	Regal Homes Ltd	Sheet	3 of 3
Engineer:	Pringuer-James Consulting Engineers Ltd	Report No:	9118/JRCB

Comments	Samples Type	Samples Depth(m)	Field Test	Strata Depth(m)		Strata level(mOD)	Strata Description	Legend
				20.00	20	+ 31.35	Very stiff grey fissured CLAY. Locally silty with occasional silt partings	20
BH dry	S/D	20.30	48					
				20.45		+ 30.90	End of borehole	
					21			21
					22			22
					23			23
					24			24
					25			25
					26			26
					27			27
					28			28
					29			29
					30			30

Constructed using cable percussive techniques

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water S = SPT 'N' (split spoon sample) C = SPT 'N' (solid cone) HV = Hand Vane (kPa) PP = Pocket Penetrometer (kg/cm²)

Remarks :-

Borehole No: 3

(* = extrapolated SPT 'N' value)

Soil Consultants Ltd

SCLChartGeneratorVer_1_42

Site Location	65 Maygrove Road, London NW6 2EH	Report No:	9118/JRCB

IN-SITU STANDARD PENETRATION TEST RESULTS

Borehole No:	Start depth [m]	Test Type	Blow counts per 75 mm						SPT (N)	Remarks
1	1.50	S	1	2	2	4	5	8	19	
1	3.50	S	1	2	2	3	3	4	12	
1	6.00	S	3	4	5	5	5	6	21	
1	9.00	S	4	5	5	6	6	7	24	
1	12.00	S	5	6	6	7	7	8	28	
1	15.00	S	6	7	7	8	8	9	32	
1	18.00	S	5	8	8	8	9	10	35	
1	21.00	S	6	8	9	9	10	11	39	
1	24.00	S	7	9	9	10	12	14	45	
2	1.50	S	2	1	1	2	2	1	6	
2	2.50	S	1	1	2	2	2	2	8	
2	3.50	S	1	3	1	2	2	3	8	
2	4.50	S	1	1	2	1	1	1	5	
2	7.00	S	3	3	4	4	5	6	19	
2	10.00	S	4	5	5	6	6	7	24	
2	13.00	S	4	6	6	7	8	9	30	
2	16.00	S	5	6	7	7	7	10	31	
2	19.00	S	6	8	8	9	11	10	38	
2	22.00	S	7	9	9	11	11	13	44	
2	25.00	S	8	9	10	11	13	16	50	
3	1.00	S	1	2	2	1	1	2	6	
3	2.00	S	2	1	4	2	2	2	10	
3	3.00	S	3	3	4	4	4	4	16	
3	5.00	S	1	2	2	3	4	5	14	
3	8.00	S	3	4	5	5	5	6	21	
3	11.00	S	4	4	5	6	6	7	24	
3	14.00	S	4	6	6	7	7	8	28	
3	17.00	S	5	6	8	8	9	11	36	
3	20.00	S	7	9	10	11	13	14	48	

Soil Consultants Ltd

[SPT Sheet 1 of 1]

Site Location	65 Maygrove Road, London NW6 2EH	Ref:	9118/JRCB

Results of gas/water monitoring

Date: **23 Jan 12**
Time: **08:08**
Recorded by: **JW**

Surface ground conditions: **Dry**
Weather conditions: **Sunny intervals**
Ambient air temp [°C]: **9**

Barometric pressure:
a] Trend [24hrs]: **Rising**
b] At start [mB]: **1017**
c] At end [mB]: **1017**

Monitoring equipment:
Instrument: **GA2000 Plus MC08/0126/00**
Calibration check details: **Within monitor tolerance**
Annual calibration date: **30 Oct 11**

Ground-water monitoring

Ref	Ground-water depth from surface [m]	Ground-water depth from top of pipe [m]	Depth of monitoring pipe from surface [m]	Comments
BH2	4.23		5.91	

Gas monitoring

Ref	CH_4 [%]		CO_2 [%]		O_2 [%]		Highest [ppm]		Emission rate	Comments
	Max	Steady	Max	Steady	Min	Steady	CO	H_2S	[l/hr]	
BH1	0.0	0.0	0.1	0.1	20.9	21.0	0.0	0.0	0.0	Relative pressure: -0.07

Notes:
1] Barometric pressure trend and ambient air temperature is recorded from BBC weather website on the day of the monitoring
2] Calibration check is performed on site against ambient air and also with a 5% CH_4, 5% CO_2 and 6% O_2 gas mixture
3] CH_4 = methane; CO_2 = carbon dioxide; C_O = carbon monoxide; O_2 = oxygen; H_2S = hydrogen sulphide

Soil Consultants Ltd

Site Location	65 Maygrove Road, London NW6 2EH	Ref:	9118/JRCB

Results of gas/water monitoring

Date:	**30 Jan 12**	Surface ground conditions:	**Dry**
Time:	**08:30**	Weather conditions:	**Overcast**
Recorded by:	**JW**	Ambient air temp [°C]:	**3**
Barometric pressure:		Monitoring equipment:	
a] Trend [24hrs]:	**Falling**	Instrument:	**GA2000 Plus MC08/0126/00**
b] At start [mB]:	**1027**	Calibration check details:	**Within monitor tolerance**
c] At end [mB]:	**1027**	Annual calibration date:	**30 Oct 11**

Ground-water monitoring

Ref	Ground-water depth from surface [m]	Ground-water depth from top of pipe [m]	Depth of monitoring pipe from surface [m]	Comments
BH2	4.22		5.91	

Gas monitoring

Ref	CH_4 [%]		CO_2 [%]		O_2 [%]		Highest [ppm]		Emission rate	Comments
	Max	Steady	Max	Steady	Min	Steady	CO	H_2S	[l/hr]	
BH1	0.0	0.0	1.5	1.1	19.9	20.3	0.0	0.0	0.0	

Notes:

1] Barometric pressure trend and ambient air temperature is recorded from BBC weather website on the day of the monitoring

2] Calibration check is performed on site against ambient air and also with a 5% CH_4, 5% CO_2 and 6% O_2 gas mixture

3] CH_4 = methane; CO_2 = carbon dioxide; C_O = carbon monoxide; O_2 = oxygen; H_2S = hydrogen sulphide

APPENDIX A

Laboratory testing

- Index property testing
- Plasticity chart
- Unconsolidated undrained triaxial test results [QUT]

Pringuer-James Consulting Engineers Ltd
16 Kew Foot Road, Richmond, TW9 2SS Phone : 020 8940 4159 Email : mail@pjce.com

PJCE

Site Location	65 Maygrove Road, London NW6 2EH	Report No:	9118/JRCB

INDEX PROPERTY TEST RESULTS

Sample Location	Depth [m]	Sample Description	Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	Percent Passing 425µm	Remarks
BH1	10.50	Grey CLAY	29	81	33	48	>95	
BH1	22.50	Grey CLAY	23	68	31	37	>95	
BH2	5.00	MADE GROUND: black and dark grey silty clay	31					Loss on ignition=4.7%
BH2	11.50	Grey CLAY	28	81	35	46	>95	
BH2	23.50	Grey CLAY	24	71	29	42	>95	
BH3	9.50	Brown CLAY with blue/grey gleying	29	74	30	44	>95	
BH3	18.50	Grey CLAY	26	76	34	42	>95	

Notes:

- Moisture content test: BS 1377:Part 2 [1990] Clause 3.2 [value in brackets = calculated matrix moisture content for comparison with LL and PL]
- Liquid and Plastic Limit: BS 1377:Part 2 [1990] Clauses 4.4, 5.2, 5.3, 5.4 is carried out on fine grained soil matrix
- Percent passing 425 micron sieve is by estimation, by hand* or by wet sieving**
- LOI = Loss on Ignition

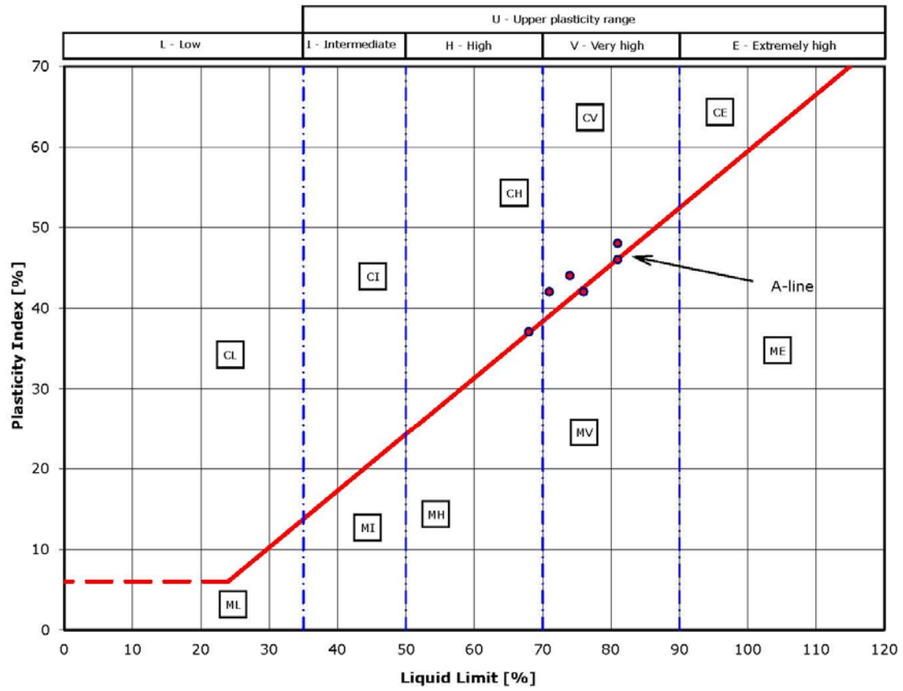
Sample examined by JRCB (Engineer)

Results checked by JRCB (Engineer) Certificate date : ######

Soil Consultants Ltd

Site Location	65 Maygrove Road, London NW6 2EH	Report No.	9118/JRCB

PLASTICITY CHART - BS5930 classification



M - Silt [M-soil] plots below the A-line
C - Clay plots above the A-line
} M and C may be combined as F, FINE SOIL

Note: Classification based upon BS5930:1999 'Code of practice for site investigations'

Soil Consultants Ltd

Site Location	65 Maygrove Road, London NW6 2EH	Report No:	9118/JRCB

TRIAXIAL COMPRESSION TEST RESULTS

Key : 38, 102 = dia in mm, U=Undrained, M= Multistage, MC = Moisture Content, QD = Quick Drained Test

Borehole No:	Depth [m]	Test Type	Cell Pressure [kN/m2]	Comp Strength [kN/m2]	Bulk Density [Mg/m3]	Moisture Content [%]	Cohesion [kN/m2]	Angle of Friction [deg]	Remarks
1	2.50	102U	90	163	1.90	34	82	0	
1	4.50	102U	100	202	1.93	31	101	0	
1	7.50	102U	150	231	1.96	28	115	0	
1	10.50	102U	220	168	1.96	29	84	0	
1	13.50	102U	280	243	1.96	28	121	0	
1	16.50	102U	340	371	1.97	24	185	0	
1	19.50	102U	400	371	1.97	27	185	0	
1	22.50	102U	460	606	1.84	23	303	0	
2	5.50	102U	110	128	1.91	30	64	0	
2	8.50	102U	180	202	1.94	31	101	0	
2	11.50	102U	240	326	1.97	28	163	0	
2	14.50	102U	240	333	1.97	27	167	0	
2	17.50	102U	360	352	1.97	28	176	0	
2	20.50	102U	410	268	1.94	28	134	0	
2	23.50	102U	470	604	1.97	24	302	0	
3	4.00	102U	100	245	1.75	29	123		
3	6.50	102U	140	87	1.95	31	43		Claystone in sample
3	9.50	102U	200	180	1.95	29	90		
3	12.50	102U	260	240	1.98	29	120		
3	15.50	102U	320	396	1.98	28	198		
3	18.50	102U	380	398	1.97	26	199		

[Triaxial Sheet 1 of 1]

Soil Consultants Ltd

APPENDIX A

Contamination testing

- General soil suite
- WAC test results
- Soluble sulphate/pH testing

Soil Consultants Ltd

Ground Investigation - Geotechnical Analysis – Contamination Assessment

FOREWORD TO CONTAMINATION TESTING AND ASSESSMENT

The following statements are designed to inform and guide the Client and other potential parties intending to rely upon this report, with the express intent of protecting them from misunderstanding as to the extent and thus the potential associated risks that may result from proceeding without further evaluations or guidance.

1] Unless otherwise stated in this report, the testing of soils and waters is based on a range of commonly occurring potential contaminants for the specific purpose of providing a general guidance evaluation for the proposed form of development. Thus, the range of potential contaminants is neither exhaustive nor specifically targeted to any previous known uses or influences upon the site.

2] The amount and scope of the testing should not be assumed to be exhaustive but has been selected, at this stage, to provide a reasonable, general view of the site ground conditions. In many cases this situation is quite sufficient for the site to be characterised for the purposes of development and related Health and Safety matters for persons involved in or directly affected by the site development works. It must be understood, however, that in certain circumstances aspects or areas of the site may require further investigation and testing in order to fully clarify and characterise contamination issues, both for regulatory compliance and for commercial reasons.

3] The scope of the contamination testing must not automatically be regarded as being sufficient to fully formulate a remediation scheme. For such a scheme it may be necessary to consider further testing to verify the effectiveness of the remedial work after the site has been treated. It must be understood that a remediation scheme which brings a site into a sufficient state for the proposed development ("fit for purpose") under current legislation and published guidance, may result in some contamination being left in-situ. It is possible that forthcoming legislation may result in a site being classified by the Local Authority and assigned a "Degree of Risk" related to previous use or known contamination.

4] The scope of the environmental investigation and contamination testing must not be automatically regarded as sufficient to satisfy the requirements in the wider environmental setting. The risks to adjacent properties and to the water environment are assessed by the regulatory authorities and there may be a requirement to carry out further exploration, testing and, possibly monitoring in the short or long term. It is not possible to sensibly predict the nature and extent of such additional requirements as these are the direct result of submissions to and liaison with the regulatory authorities. It is imperative, therefore, that such submissions and contacts are made as soon as possible, especially if there are perceived to be critical features of the site and proposed scheme, in this context.

5] New testing criteria have been implemented by the Environment Agency to enable a waste disposal classification to be made. The date of implementation of this Waste Acceptance Criteria [WAC] was July 2005. It is this testing that will be used by the waste regulatory authorities, including waste disposal sites, to designate soils for disposal in landfill sites. In certain circumstances, to satisfy the waste regulations, there may be the necessity to carry out additional testing to clarify and confirm the nature of any contamination that may be present. If commercial requirements are significant then this process may also necessitate further field operations to clarify the extent of certain features. Thus, the waste classification must be obtained from the waste regulation authorities or a licensed waste disposal site and we strongly recommend that this classification is obtained as soon as possible and certainly prior to establishing any costings or procedures for this or related aspects of the scheme.

December 2008

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UKAS TESTING 4480
mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME 4480

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Lenham Heath
Kent
ME17 2JN
t: 01622 851105
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 8288

Site Reference: Maygrove Road

Project / Job Ref: 9118/JRCB

Order No: None Supplied

Sample Receipt Date: 05/01/2012

Sample Scheduled Date: 05/01/2012

Report Issue Number: 1

Reporting Date: 11/01/2012

Authorised by:

Russell Jarvis
Director
On behalf of QTS Environmental Ltd

Authorised by:

Kevin Old
Director
On behalf of QTS Environmental Ltd

QTS Environmental Ltd
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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 851105

4480 4480

Soil Analysis Certificate							
QTS Environmental Report No: 8288	Date Sampled	15/12/11	15/12/11	15/12/11	15/12/11	15/12/11
Soil Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Maygrove Road	TP / BH No	BH1	BH1	BH2	BH2	BH2
Project / Job Ref: 9118/JRCB	Additional Refs	D	D	D	D	D
Order No: None Supplied	Depth (m)	0.50	2.00	0.50	1.00	3.00
Reporting Date: 11/01/2012	QTSE Sample No	37982	37983	37984	37985	37986

Determinand	Unit	MDL	Accreditation					
Stone Content	%	<0.1	NONE	<0.1	<0.1	<0.1	<0.1	<0.1

General Inorganics	Unit	MDL	Accreditation					
pH	pH Units	+ / - 0.1	MCERTS	10.5	8.5	7.9	7.9	7.9
Electrical Conductivity	µS/cm	<5	NONE	246	218	260	402	295
Total Cyanide	mg/kg	<2	NONE	<2	<2	<2	<2	<2
Total Sulphate as SO_4	mg/kg	<200	NONE	1615	312	1384	915	358
W/S Sulphate as SO_4 (2:1)	g/l	<0.01	NONE	0.09	0.04	0.09	0.10	0.05
Total Sulphur	mg/kg	<200	NONE	562	<200	478	319	<200
Organic Matter	%	<0.1	NONE	2.2	1	3.2	0.9	2
Total Phenols (monohydric)	mg/kg	<2	NONE	<2	<2	<2	<2	<2

Metals	Unit	MDL	Accreditation					
Arsenic (As)	mg/kg	<2	MCERTS	6	8	12	7	4
W/S Boron	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Cadmium (Cd)	mg/kg	<0.5	MCERTS	<0.5	<0.5	0.5	<0.5	<0.5
Chromium (Cr)	mg/kg	<2	MCERTS	16	29	8	8	23
Copper (Cu)	mg/kg	<4	MCERTS	24	25	260	34	19
Lead (Pb)	mg/kg	<3	MCERTS	138	18	291	32	12
Mercury (Hg)	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Nickel (Ni)	mg/kg	<3	MCERTS	14	44	17	15	27
Selenium (Se)	mg/kg	<3	NONE	<3	<3	<3	<3	<3
Zinc (Zn)	mg/kg	<3	MCERTS	104	57	138	50	53

Basic Hydrocarbons	Unit	MDL	Accreditation					
EPH (C10 - C40)	mg/kg	<6	MCERTS	17	<6	70	<6	<6

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C
Analysis carried out on the dried sample is corrected for the stone content
Stone content is classified as material greater than 10mm in diameter

QTS Environmental Ltd
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Tel : 01622 851105

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Soil Analysis Certificate							
QTS Environmental Report No: 8288	Date Sampled	15/12/11				
Soil Consultants Ltd	Time Sampled	None Supplied				
Site Reference: Maygrove Road	TP / BH No	BH2				
Project / Job Ref: 9118/JRCB	Additional Refs	D				
Order No: None Supplied	Depth (m)	5.00				
Reporting Date: 11/01/2012	QTSE Sample No	37987				

Determinand	Unit	MDL	Accreditation					
Stone Content	%	<0.1	NONE	<0.1				

General Inorganics	Unit	MDL	Accreditation					
pH	pH Units	+ / - 0.1	MCERTS	7.5				
Electrical Conductivity	µS/cm	<5	NONE	818				
Total Cyanide	mg/kg	<2	NONE	<2				
Total Sulphate as SO_4	mg/kg	<200	NONE	1166				
W/S Sulphate as SO_4 (2:1)	g/l	<0.01	NONE	0.40				
Total Sulphur	mg/kg	<200	NONE	606				
Organic Matter	%	<0.1	NONE	1.5				
Total Phenols (monohydric)	mg/kg	<2	NONE	<2				

Metals	Unit	MDL	Accreditation					
Arsenic (As)	mg/kg	<2	MCERTS	5				
W/S Boron	mg/kg	<1	NONE	<1				
Cadmium (Cd)	mg/kg	<0.5	MCERTS	<0.5				
Chromium (Cr)	mg/kg	<2	MCERTS	26				
Copper (Cu)	mg/kg	<4	MCERTS	8				
Lead (Pb)	mg/kg	<3	MCERTS	12				
Mercury (Hg)	mg/kg	<1	NONE	<1				
Nickel (Ni)	mg/kg	<3	MCERTS	10				
Selenium (Se)	mg/kg	<3	NONE	<3				
Zinc (Zn)	mg/kg	<3	MCERTS	36				

Basic Hydrocarbons	Unit	MDL	Accreditation					
EPH (C10 - C40)	mg/kg	<6	MCERTS	<6				

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C
Analysis carried out on the dried sample is corrected for the stone content
Stone content is classified as material greater than 10mm in diameter

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Rose Lane
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Maidstone
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Tel : 01622 851105

4480 4480

Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 8288	Date Sampled	15/12/11	15/12/11	15/12/11	15/12/11	15/12/11
Soil Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Maygrove Road	TP / BH No	BH1	BH1	BH2	BH2	BH2
Project / Job Ref: 9118/JRCB	Additional Refs	D	D	D	D	D
Order No: None Supplied	Depth (m)	0.50	2.00	0.50	1.00	3.00
Reporting Date: 11/01/2012	QTSE Sample No	37982	37983	37984	37985	37986

Determinand	Unit	MDL	Accreditation					
Naphthalene	mg/kg	<0.1	MCERTS	<0.1	<0.1	0.30	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	MCERTS	0.31	<0.1	0.56	<0.1	<0.1
Anthracene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	MCERTS	0.40	<0.1	0.72	<0.1	<0.1
Pyrene	mg/kg	<0.1	MCERTS	0.34	<0.1	0.65	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	MCERTS	0.12	<0.1	0.31	<0.1	<0.1
Chrysene	mg/kg	<0.1	MCERTS	0.14	<0.1	0.39	<0.1	<0.1
Benzo(b)fluoranthene	mg/kg	<0.1	MCERTS	0.14	<0.1	0.42	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	<0.1	MCERTS	<0.1	<0.1	0.16	<0.1	<0.1
Benzo(a)pyrene	mg/kg	<0.1	MCERTS	<0.1	<0.1	0.22	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	<0.1	MCERTS	<0.1	<0.1	0.13	<0.1	<0.1
Dibenz(a,h)anthracene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Total EPA-16 PAHs	mg/kg	<1.6	MCERTS	<1.6	<1.6	3.85	<1.6	<1.6

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C

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4480 4480

Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 8288	Date Sampled	15/12/11					
Soil Consultants Ltd	Time Sampled	None Supplied					
Site Reference: Maygrove Road	TP / BH No	BH2					
Project / Job Ref: 9118/JRCB	Additional Refs	D					
Order No: None Supplied	Depth (m)	5.00					
Reporting Date: 11/01/2012	QTSE Sample No	37987					

Determinand	Unit	MDL	Accreditation					
Naphthalene	mg/kg	<0.1	MCERTS	<0.1				
Acenaphthylene	mg/kg	<0.1	MCERTS	<0.1				
Acenaphthene	mg/kg	<0.1	MCERTS	<0.1				
Fluorene	mg/kg	<0.1	MCERTS	<0.1				
Phenanthrene	mg/kg	<0.1	MCERTS	<0.1				
Anthracene	mg/kg	<0.1	MCERTS	<0.1				
Fluoranthene	mg/kg	<0.1	MCERTS	<0.1				
Pyrene	mg/kg	<0.1	MCERTS	<0.1				
Benzo(a)anthracene	mg/kg	<0.1	MCERTS	<0.1				
Chrysene	mg/kg	<0.1	MCERTS	<0.1				
Benzo(b)fluoranthene	mg/kg	<0.1	MCERTS	<0.1				
Benzo(k)fluoranthene	mg/kg	<0.1	MCERTS	<0.1				
Benzo(a)pyrene	mg/kg	<0.1	MCERTS	<0.1				
Indeno(1,2,3-cd)pyrene	mg/kg	<0.1	MCERTS	<0.1				
Dibenz(a,h)anthracene	mg/kg	<0.1	MCERTS	<0.1				
Benzo(ghi)perylene	mg/kg	<0.1	MCERTS	<0.1				
Total EPA-16 PAHs	mg/kg	<1.6	MCERTS	<1.6				

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C