SITE INVESTIGATION REPORT

PROPOSED CONSTRUCTION AT:

129 Blenheim Crescent, LONDON W11 2EQ

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1.0 INTRODUCTION

Consideration is being given to constructing a single-storey basement extension beneath the rear section and rear garden of 129 Blenheim Crescent, London. In connection with the proposed works, Soil Consultants Ltd [SCL] were commissioned to carry out a ground investigation to include the following elements:

- Desk Study to identify site history and potential contaminative uses
- Intrusive work to identify the ground sequence and geotechnical parameters
- Provision of recommendations for foundation design and basement construction
- Basement impact assessment [screening / scoping]
- Contamination appraisal, risk assessment and conceptual model

This report reviews the desk study information, describes the investigation undertaken, gives a summary of the ground conditions encountered and then provides foundation design recommendations together with a basement impact assessment, an outline contamination assessment and conceptual model.

2.0 SITE DESCRIPTION

The site is located in a residential area of Notting Hill, in the Royal Borough of Kensington & Chelsea in west London, at approximate NGR 524250E 180910N, as shown on the Location Maps in Appendix A, forming a rectangular shape with overall dimensions of approximately 6m x 32m. The property comprises a four-storey [including semi-basement] terraced residential house with a fully paved front drive and rear garden mostly comprising pavement/concrete with vegetated borders [flowerbeds and shrubs] and an area of decking above a single-storey rear extension which extends into the garden. The garden rises towards the SE by about 1.1m via a series of steps [see Site Plan in Appendix A for details].

The property has similar residential properties on either side. The adjoining property to the north-east is understood to contain a basement level beneath the rear garden. Beyond the rear garden [to the south-east] is a communal garden/park and a large [about 25m high] Ash[?] tree is present some 6.0m from the rear site boundary.

The site is located on a flank of a hill with ground levels rising gently [gradient of about 1:100] towards the south and east. Information on Ordnance Survey mapping indicates a level of +9.7m OD at the junction of Clarendon Road and Blenheim Crescent [to the west of the site].

The proposals [see appended Site Plan] are to construct a basement level below the rear part of the house and the majority of the rear garden, with depths of up to about 3.5m to 4.5m envisaged [the deeper excavation beneath the rear (higher) section of the garden].

3.0 SITE HISTORY AND GEOLOGICAL/ENVIRONMENTAL INFORMATION

3.1 Groundsure historical map pack and reports

An historical map and environmental database search was commissioned from Groundsure to ascertain the site history/usage and surrounding land usage. An indication of the gradual development of the site over the years can be gained by a study of the historical maps [shown in Appendix B]. The following table contains a summary of the site development obtained from the source maps provided in the Groundsure historical maps package.

Historical development of site and surrounding area		
Map date	**The site**	**Significant development / features in surrounding area [generally within 250m]**
1863 - 74	The site is established with the existing house and gardens shown	The current road network and surrounding housing are already largely present in their current configuration Kensington Park Brewery is located about 90m SW Brick Field indicated from about 230m SW [from 1871 map] Hammersmith & City Railway about 350m NW
1893 - 96	No significant changes	Continued residential expansion mainly N/NE of the site Iron works about 300m NW Brick Field SW of site developed by 1893
1916	No significant changes	No significant changes
1953 - 66	No significant changes	Several ruins shown [resulting from WW2 bombing] – nearest located about 30m W; some new blocks of flats constructed replacing previous housing possibly damaged during WW2 Tank located about 50m NW Engineering works located about 130m W and a bakery about 200m W, builders yard about 240m WSW and a Corporation Yard about 220m SW; electricity substation about 230m NW
1971 to present	No significant changes	Tank NW of site shown as a playground Works and bakery W of site cleared [1971] and redeveloped into a Kensington Sports Centre Small electricity substation 230m W [1971] Corporation Depot about 300m NW [redeveloped into probable housing by early 1980s]

The GroundSure Report includes information from a database of local activities encompassing a range of subjects related to land use, pollution, and geological/hydrological conditions. A summary of contaminative uses and other environmental issues covered by the desk study within the site and its immediate surroundings [generally within 250m] is presented below.

Environmental Permits, Incidents and Registers

- Records of Part A[2] and Part B Activities and Enforcements – 1no entry [relating to dry cleaners] 463m NE of site
- Records of National Incidents Recording System, List 2 within 500m of the study site: 421m NW [oils and fuels, 2002] and 439m N [inert materials and wastes, 2003] – no impact

Landfill and other Waste Sites

- No entries within 500m buffer; nearest entry for waste transfer station located 910m SW – licence surrendered 2004

Current Land Use

- Records of potentially contaminative industrial sites within 250m of the study site – distributors and haulage 84m W; 6no electricity substations 89m to 247m distance
- Records of petrol or fuel sites – 350m NW [Gulf Service Station] – open

Geology

- Artificial /Made Ground: 176m SW [worked ground – void]
- Superficial Deposits and Landslips: 148m SW [Langley Silt Member – clay & silt]
- Bedrock/Solid Geology: London Clay Formation [clay, silt and sand] identified on site by BGS; moderate to very low permeability
- Landslips and faults: none within 500m
- Radon: The property is not in a Radon Affected Area [<1% of properties are above action level] - no protective measures necessary
- Historical Surface Ground Workings: brick field identified 198m W of site [west of Avondale Park Road]
- Historical Underground Workings: none within 1000m
- No current ground workings recorded within 1000m
- Historical Mining: none within 1000m
- Coal Mining / Non Coal Mining / Cavities: none identified within 1000m
- Extraction & Natural Cavities: none recorded within 1000m
- Shrink – Swell Clays: moderate hazard on site
- Other Natural Ground Subsidence: very low to null-negligible risks for all categories where identified
- BGS Borehole Records Map: nearest record 42m SW
- Estimated Background Soil Chemistry: no data

Railways and Tunnels

- No records within 250m buffer

Hydrogeology and Hydrology

- Aquifer within superficial deposits: recorded 148m SW
- Aquifer within bedrock deposits: 'Unproductive' aquifer on site
- Groundwater/surface water/potable water abstraction: nearest record [point abstraction for cooling] 490m SE
- Source Protection Zones: none within 500m
- Groundwater Vulnerability and Soil Leaching Potential – no data within 500m
- No river, biological or chemical quality, detailed river network or surface water features within 250m

Flooding

- No flood zones identified within 250m
- No flood defences/flood storage areas within 250m
- Groundwater Flooding Susceptibility Areas within 50m of site: none [not prone]

Designated Environmentally Sensitive Sites

- Wormwood Scrubs [Natural England] – 1404m NW

3.2 Walk-over survey

Our site walkover survey was undertaken in conjunction with the fieldwork on 22 July 2014. The site was in a tidy/very good state of repair with no particular features of concern noted at the site or the neighbouring areas [where visual access was available]. No fuel oil or other tanks/containers were observed.

Overall we have not identified any particular features [such as fuel tanks], materials [such as chemical containers, asbestos/cement sheeting] or land use within the site or in its immediate vicinity which are likely to give rise to significant contamination risks and we thus have no particular concerns in this regard.

4.0 EXPLORATORY WORK

The fieldwork was carried out on 22 July 2014 and comprised the following elements:

Window sample borehole

Two boreholes [WS1 & WS2] were constructed in the garden area east of the house to provide information on the near surface geology and ground/groundwater conditions, and to facilitate sampling

and standpipe installation. The boreholes reached a maximum depth of 5.5m, both terminating within the natural London Clay Formation. A 35mm ID standpipe was installed in WS1 to 5.5m depth.

Trial pitting

Two trial pits [TP1 & TP2] were completed at locations requested by the engineer to expose party wall foundations. These were completed using a breaker [where necessary] and hand digging.

Groundwater monitoring

The standpipe installed in WS1 was monitored by SCL both during [and at one occasion following] the fieldwork to help establish at-rest groundwater levels.

Geotechnical laboratory testing

The following geotechnical laboratory testing was completed:

- moisture content and Atterberg Limit determination
- soluble sulphate/pH analyses [tested externally by QTS Environmental Ltd]

Contamination testing

Selected soil samples were delivered to a specialist laboratory [QTS Environmental Ltd] and the following testing was carried out in agreement with the engineer:

- General soil suite - 2no samples
- Waste Acceptance Criteria [WAC] testing – 1no sample

The engineering logs of the exploratory boreholes and the laboratory testing results are included in Appendix A. A site plan is also provided showing the exploratory locations.

5.0 GROUND CONDITIONS

The 1:50,000 scale British Geological Survey map of the area indicates that the site should be directly underlain by the London Clay Formation [typically stiff grey, weathering brown clay with variable silt/sand content], which typically attains a thickness of around 50m in this part of London.

Our investigation encountered the anticipated London Clay sequence beneath a covering of made ground as summarised as follows:

Stratum	Depth to base	Thickness
Made ground	0.15m to >0.85m [TP1]	0.15m to >0.85m
London Clay Formation	Proven to 5.5m	4.85m proven

5.1 Made Ground

Made ground was met in all exploratory locations, beneath reinforced concrete surfacing [WS1, TP1] or topsoil [TP2], followed by clay, sand and/or gravel, depending on the location. The greatest thickness was in TP1 [base not proved] which exposed the disturbed ground to the rear of the adjacent property's basement wall.

5.2 London Clay Formation

The London Clay was encountered beneath the made ground in both boreholes, comprising brown mottled grey and occasionally orange [weathered] clay with rare orange silt/fine sand patches and selenite crystals. With depth the stratum became darker brown with occasional grey gleying and fissuring. Occasional fine roots were observed in WS1 & WS2 to depths ranging between 1.7 & 1.5m respectively.

Shear strength testing [using hand shear vane] was undertaken at close intervals. The results are shown in Appendix A and indicate a general increase in strength with increasing depth [typical of the London Clay] with initial medium strength, below about 1.5m depth becoming high strength. Similar results are indicated from the pocket penetrometer testing. The strength profile from the two boreholes show a close similarity below about 1m depth; at shallower depths the strengths recorded in WS2 were significantly lower than in WS1, which is attributed to disturbance of the shallow soils in the flower bed.

Atterberg Limit tests classify the London Clay as very high plasticity clay with a high volume change potential [NHBC Chapter 4.2 'Building near trees' classification], which are typical of this stratum.

5.3 Groundwater

Groundwater was not present in either borehole during the investigation, although water inflow was observed in TP1 with water standing at 0.3m depth bgl. A 35mm ID standpipe installed to the base of WS1 was dry following installation. Monitoring undertaken on 08 August 2014 showed at-rest water depth at 3.59m bgl. We noted that an adjacent trench, excavated by the contractor along the party wall as a continuation to TP1 [following our investigation] had standing water at 0.7m depth on 08 August. The source of this shallow water is assessed to be shallow leakage in the neighbouring garden rather than 'natural' groundwater. Seasonal variations should be anticipated, however, and longer term monitoring of the standpipe is recommended to help establish these variations.

5.4 Environmental observations

No visual or olfactory signs of gross contamination were observed in any of the strata.

5.5 Existing foundations

Two trial pits [TP1 & TP2] were excavated to provide details of the existing foundations at locations determined by the structural engineer. The findings from the trial pit are appended and briefly summarised below:

Trial pit	Foundation base	Projection from face of adjacent wall	Comments
TP1	Not possible to determine due to reinforced concrete and water inflow; likely to be >3.0m [depth of adjacent basement structure]	0.07m	Uneven concrete stepping out at 0.37m depth
TP2	0.30m	0.05m	Masonry construction

6.0 GEOTECHNICAL ASSESSMENT

The proposed scheme is to construct a new single-level basement extension beneath the rear section of the existing property and the rear garden, which will be up to about 4.5m deep [below existing levels] and measure approximately 6m x 14m in plan.

Based on our boreholes, the excavation for the proposed basement is expected to encounter a sequence of made ground, followed by the natural London Clay Formation, which is expected to extend to a significant depth below basement excavation. From our monitoring in early August 2014, steady-state groundwater levels are expected to be some 3.6m below the lowest part of the garden, which is understood to be approximately equal to the maximum depth of the proposed excavation, however water ingress through the clay will be via fissuring and thin sand bands and is thus expected to be in the form of seepages rather than more significant inflows. Further monitoring of the installed standpipe is recommended prior to construction to verify the range of water levels, particularly during/following wet periods. We note possible leakage from the adjacent property which resulted in standing water at 0.7m in a trench excavated adjacent to WS1 and whilst this water does not appear to have significantly affected groundwater levels at depth, future potential adverse effects should be taken into consideration.

6.1 Basement excavation and retaining wall

The single-level basement excavation should encounter variable made ground followed by London Clay soils. Groundwater lies at approximately 3.6m depth below the lowest part of the garden [July 2014].

The basement may be formed using mini contiguous piled wall with reinforced concrete box inboard and reinforced concrete underpinning below the existing house wall. This form of construction is considered viable at this site although some groundwater control measures may be needed to prevent water seepage into the excavation which can result in softening of the clay.

Alternatively, given the low permeability of the London Clay, it should be possible to construct the basement walls using conventional underpinning. Narrow pins should be specified with appropriate sequencing and an experienced contractor should be used. The key to limiting ground movements will be to adopt a robust arrangement of temporary internal bracings/props, both during underpinning and basement excavation. Any deep made ground pockets or soft clay [present near-surface] may be relatively unstable, and trial excavations by the groundworks contractor in advance of the main works would be advisable to confirm that this construction method will be acceptable. Such trial excavations would also indicate whether any old foundations/obstructions or deeper areas of made ground are present.

The design of basement support in the temporary and permanent conditions needs to take account of the necessity to maintain the stability of the surrounding structures and the possible requirement to control groundwater seepages. The new basement wall will comprise an RC box structure which will be supported horizontally in the permanent condition by the ground floor 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	23
London Clay:			
<5m below basement level	2.00	0	21
>5m below basement level	2.00	5	21

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. Piled walls may of course also be used to provide vertical load capacity if required subject to the necessary allowance being made for interaction effects.

We recommend that a specialist contractor or structural engineer is consulted to confirm the most appropriate type of wall and to provide the final wall design.

6.2 Spread/raft foundations

The new basement is likely to be up to about 4.5m deep and spread foundations should encounter the natural London Clay Formation. Any spread foundations will probably comprise either discrete pads/strips or, more likely, reinforced thickenings within the basement slab. Moderate sized strip or pad foundations [say up to 2.5m width], may be designed at an allowable bearing pressure of 175kN/m^2, at which pressure the Factor of Safety against bearing capacity failure should be >3 and settlements should remain within tolerable limits. If the layout and configuration of the new loads permit, a reinforced concrete basement raft could also be considered.

It should be noted that the structure is envisaged to be relatively light-weight and thus consideration should be given to the net unloading in relation to the applied pressure. If the net unloading is greater than the magnitude of new load, then potential heave could affect the foundations.

The London Clay soils have a high volume change potential and fine roots were observed in our boreholes to depths of up to 1.7m bgl. The clay soils in WS2 are considered to be desiccated to about 0.4m depth, likely to be due to the proximity to the adjacent hedge/shrubbery rather than the one significant tree present within influencing distance of the basement [a c.25m high possible Ash tree located some 6m from the rear end of the garden and some 8m from the nearest point of the proposed basement as shown on the Site Plan]. Based on our boreholes this tree has not caused clay desiccation at the borehole locations, however, it would be prudent to incorporate a proprietary heave material behind the retaining wall [if traditional underpinning is used] or ensure that the wall is sufficiently robust to

withstand potential future soil swell pressures in the zone of root influence around the tree, in full compliance with NHBC Chapter 4.2 'Building near trees'.

Whilst no special precautions are likely to be required with respect to tree root growth and desiccation at basement floor level [as this is highly likely to be below the likely depth of root influence], in accordance with good construction practice careful inspection of the formation [and excavation sides] should be carried out and if any root-infested clay soils are encountered at formation level, these should be removed and replaced with compacted granular fill and heave material installed as described above. Arboricultural advice should be obtained to confirm the extent of likely root penetration and precautionary measures that may need to be adopted.

6.3 Basement slab [non raft]

Basement excavation will cause an unloading of the strata at basement level [about 90kN/m^2 for a 4.5m deep excavation]. This stress reduction will theoretically result in an element of heave in the London Clay which underlies the site, with factors such as the length of the construction programme, the restraining effects of the remaining gravel and the basement slab stiffness determining the amount of heave which will occur.

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. We have carried out a preliminary analysis and this indicates that a total unrestrained heave of approximately 20mm could occur as a result of the unloading. Approximately 50% of this heave movement is likely to occur during a typical construction programme, leaving a maximum possible post-construction heave of up to about 10mm to be accommodated.

Alternatively, the slab could be ground-bearing and designed to withstand potential heave forces/ movements. If it is [reasonably] assumed that the relationship between heave movement and pressure is linear, the maximum heave pressure for an infinitely stiff slab could therefore be about 45kN/m^2 for the fully constrained condition. However, this will not occur in reality and the heave pressure beneath a more flexible slab will clearly be less [due stress dissipation as the slab deflects]; we anticipate that an 'average' stiffness slab would experience heave pressures of <25kN/m^2, with ≤10mm upward heave movement.

It will also 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 slab design will need to take account of potential seasonal fluctuations and/or accidental and flood conditions. We recommend that a design water level at say 2m above basement floor level is adopted [subject to further monitoring] and this would result in a theoretical hydrostatic uplift pressure of about 20kN/m^2 on the basement slab; this design water level may need to be agreed with the local building control. 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 a specialist contractor is consulted to confirm the most appropriate type of retaining wall and to provide the final wall design.

6.4 Foundation Concrete

Concentrations of soluble sulphates and pH values were measured on a number of soil samples; the results are given in Appendix A. Overall, a Design Sulphate Class DS-4 [Table C1 given in BRE Special Digest 1:2005, 3rd Edition, 'Concrete in aggressive ground'] is considered to be applicable for the site. We assess the site to have static groundwater conditions. Our recommendation is therefore that buried concrete should be designed in accordance with ACEC Site Class AC-3s.

7.0 BASEMENT IMPACT ASSESSMENT – LAND STABILITY

This section of the report assesses the potential impact relating to the proposed subterranean development in terms of 'Land Stability' as required by The Royal Borough of Kensington and Chelsea planning guidance 'Subterranean Development, Supplementary Planning Document – Adopted May 2009, Local Development Framework' Section and by PPG 14 [1990].

The hydrological/hydrogeological aspects of the basement impact assessment [screening and scoping report Ref. 2014-003-005-001, dated August 2014] was undertaken by a specialist hydrogeologist [Stephen Buss – Environmental Consulting Ltd] and is presented as Appendix C.

7.1 Stage 1 - Screening

The proposed development involves excavating to a depth of about 4.5m below ground level, to construct a basement with an area of approximately 85m^2 below the rear section of the property and the majority of the rear garden. The ground investigation reported above provides site-specific information on the ground and groundwater conditions at this site to allow this assessment to be made.

RBKC guidance 'Subterranean Development, Supplementary Planning Document – Adopted May 2009, Local Development Framework' Section 6 details the requirements of RBKC in terms of construction method statements [CMS]. The following section addresses the key geological/land stability issues upon which the CMS [reported separately by the Engineer] needs to be based. This 'Land Stability' screening provided below is generally based on the comprehensive guidance of the London Borough of Camden for basement impact assessments [Arup 2010, Camden Borough Council, 2011 – CPG4]. Key hydrological and hydrogeological issues have been addressed in a separate report [see Appendix C] which should be read in conjunction with this report.

The purpose of the screening stage is to determine whether a full Basement Impact Assessment is required and CPG4 provides flowcharts for each of the three disciplines [Groundwater Flow, Land Stability and Surface Flow/Flooding] for this purpose, identifying a series of questions. An answer of 'Yes' or 'Unknown' will require progression to Stage 2 of the CPG4 categories. Answers of 'No' indicate that no further investigation is generally required - these answers require written justification. The purpose of this section is to present the screening stage for the Land Stability discipline.

7.2 Land Stability

The screening stage for slope stability has been considered as set out in Figure 2 of CPG4 Camden Council, 2010 [Slope stability screening flowchart] and the results have been tabulated in Table 1 below.

Table 1: Impact of proposed basement works on Land Stability

Impact question	Answer	Justification	Reference
1] Does the existing site include slopes, natural or man-made greater than 7° [approximately 1 in 8]?	Yes	The rear garden steps up by about 1.1m [in part] between the area adjacent to the rear of the property and the rear end of the garden	• SCL site observations
2] Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7°?	No	There are no plans to significantly alter the site levels [garden to be reinstated following construction of basement]	• Proposed development plans • Discussions with architect/engineer
3] Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	No	Available survey information shows no other slopes greater than 7° within a relevant distance	• OS Maps • SCL observations
4] Is the site within a wider hillside setting in which the general slope is greater than 7°?	No	No significant slope indicated by OS mapping [about 1:100 or less in the vicinity of the site] and our observations within relevant distance around the site	• OS mapping
5] Is the London Clay the shallowest stratum at the site?	Yes	London Clay was proven in both boreholes beneath a nominal thickness of made ground	• SCL Site Investigation Report ref. 9631/OT/SCW
6] Will any trees be felled as part of the proposed development and/or any works proposed within any tree protection zones where trees are to be retained?	No	Trees are not present on the site; no information received at this stage regarding tree protection zones for trees outside the site boundary	• SCL site visit
7] Is there a history of seasonal shrinkage/swelling subsidence to the local area, and or evidence of such effects at the site?	Not as far as known	The London Clay is classified as a soil with a high volume change potential. However, our boreholes did not detect deep clay desiccation that may be associated with tree growth [outside the site boundary]	• SCL Site Investigation Report ref. 9631/OT/SCW
8] Is the site within 100m of a watercourse or a potential spring line?	No	None identified in the Phase 1 report	SCL Site Investigation Report ref. 9631/OT/SCW
9] Is the site within an area of previously worked ground?	Not as far as known	None identified in the Phase 1 report	• SCL Site Investigation Report ref. 9631/OT/SCW

Impact question	Answer	Justification	Reference
10] Is the site within an aquifer? If so; will the proposed basement extend beneath the water table such that dewatering may be required during construction?	No	The London Clay is classified as an unproductive aquifer A standpipe installed during the SCL investigation was monitored in early August 2014 [WS1, located in the lowest part of the garden] with water recorded at 3.59m bgl. Some groundwater control measures may be required during basement construction [depending on final excavation depths and water levels at the time of construction]. Seasonal variations should also be expected Significant dewatering highly unlikely to be necessary	• SCL Site Investigation Report ref. 9631/OT/SCW
11] Is the site within 50m of any Ponds?	No	No records within 250m	SCL Site Investigation Report ref. 9631/OT/SCW
12] Is the site within 5m of a highway or pedestrian right of way?	No	The proposed basement is in the rear part of the plot	• Proposed development plans/information from the engineers
13] Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Yes	Basement retaining walls will extend below founding levels of the property to the south, however the property/rear garden to the north is thought to already contain a basement - the new basement would have a similar depth Carefully-designed and constructed underpinning or other form of retaining structure will be essential to ensure that no adverse effects occur due to the construction The movement expected from a properly constructed and supported wall should be relatively small	• Proposed development plans/information from the engineers
14] Is the site over [or within] the exclusion zone of any tunnels, e.g. railway lines?	No	None known to exist within relevant distance of the site	• None identified in the Phase 1 report • Internet mapping

Responses of note are as follows:

- Question 1 [Does the existing site include slopes, natural or man-made greater than 7° (approximately 1 in 8)?] is answered 'yes' as the rear garden is rises up by about 1.1m [to the SE]; the change in elevation is retained by a series of steps. This and the majority of the rear garden will be largely excavated as part of the construction.

- Question 7 [Shrink/swell] is answered 'Unknown'. The London Clay is the shallowest strata present, beneath the made ground; the absence of any trees on-site and our boreholes [which did not detect deep clay desiccation that may be associated with tree growth outside the site boundary] would suggest that related shrink/swell concerns should not be a major issue and the answer would likely be 'No'.

- Question 13 [Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?] is answered 'Yes' - carefully-designed and constructed underpinning / retaining structure will be essential to ensure that no adverse effects occur due to the construction; the movement expected from a properly constructed and supported wall should be relatively small.

7.3 Stage 2 - Scoping

The purpose of Stage 2 is to assess the potential impacts of the proposed scheme that Stage 1 has indicated require further consideration.

These are addressed below for each of the relevant disciplines.

7.4 Land Stability

As identified in Table 1 the slopes within influential distance of the site are all shallow [<7 °] and no significant impact is anticipated on sloping ground in terms of land stability provided that the design and construction of the scheme ensure that temporary or permanent slopes within the site are supported or battered back to ensure that instability is avoided and ground movements are kept to an absolute minimum.

Soil volume change [Question 7] is unlikely to be a significant issue as there are no nearby trees and the new founding depth for the proposed basement will be about 3.5m to 4.5m below ground level [hence well below the influence of any current vegetation].

The differential depth of the proposed foundations in relation to neighbouring properties [Question 13] is such that underpinning of party wall foundations [to the south of the site] will be required whilst the presence of a basement to the north means that this part of the excavation is unlikely to require underpinning.

7.5 Conclusions

From the available information we consider that the risk to ground stability from this development should be LOW. This is on the condition that the works are undertaken by reputable experienced specialists and the temporary and permanent works are adequately designed, with due consideration to the geology and hydrogeology of the site and surrounding areas.

8.0 ENVIRONMENTAL APPRAISAL

This appraisal adopts the current UK practice which 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, i.e. 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 which forms Section 8.6 of this report.

8.1 Environmental setting and context

The Site is underlain by an unproductive bedrock aquifer, it is not located in a source protection zone or a flood zone or environmentally-sensitive area. There are no water abstractions or surface water features nearby. Overall, the site is assessed as being of **Low Environmental Sensitivity.**

8.2 Potential contamination sources [on-site and off-site]

The Phase 1 [Desk Study] has not indicated any manufacturing/industrial usage at the site or in close proximity with the vast majority of use appearing to be residential/community buildings. Kensington Park Brewery was historically located about 90m distance, an unspecified historical tank some 50m distance and a 'Brick Field' some 230m distance; all have since been redeveloped.

From our walkover survey of the site no significant sources of potential contamination have been noted within the site or its immediate surroundings.

Overall, based on the available information, we consider there to be a **Low** risk potential with regard to contaminative sources which could affect the site.

8.3 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 2no soil samples from the made ground which were recovered during our investigation. The results were assessed where relevant against the DEFRA Soil Guideline Values [SGV] and the LQM/CIEH Generic Assessment Criteria [GAC] for Human Health Risk Assessment in which LQM/CIEH have derived additional SGVs from the current CLEA Model [2nd Edition, 2009]. 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 SGV for lead contamination was withdrawn as of 2008. No further guidance has since been published and therefore the previous relevant SGV has been retained for this assessment. 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.

We have used, where relevant, the trigger levels for **residential development** [generally the most stringent] to assess the results of the contamination testing. Using these criteria all contaminant concentrations were found to be below guidance values and no contaminated soil has been detected on site.

It should be noted that as our investigation provided limited coverage of the site, there may of course be areas of undetected contamination. Construction workers would be at exposure risk during construction and the use of appropriate PPE and hygiene precautions should provide sufficient protection in this regard.

8.4 Ground gas

Ground gas monitoring has not been undertaken and from our findings, we assess that the site has a low risk of ground gas generation and gas protection measures are unlikely to be necessary. The desk study indicates that protection from radon gas is also not necessary.

8.5 Disposal of excavated soils

Our investigation has indicated that the made ground is uncontaminated and a Waste Acceptance Criteria [WAC] test on one made ground sample indicate generally inert classification with the exception of a slightly elevated TDS concentration. A rigorous hazard assessment of the results was not within the scope of our investigation, but our preliminary conclusion is that the made ground will probably classify as either 'inert' or 'non-hazardous' industrial waste, with an 'inert' classification for natural soils. Early consultations should be made with appropriate waste facilities or regulators to confirm the classification for off-site disposal.

8.6 Risk Assessment and Conceptual Model

Taking into account the above discussion, the assessed risks to potential receptors are summarised as follows:

Source/ hazard	Pathway	Receptor	Mitigation measures/explanation	Assessed Risk level
Contaminated soil: on-site and off-site sources - [made ground]	Ingestion/ contact	End user and construction workers	▪ No visual/olfactory evidence of soil contamination and all contaminant were below threshold levels for residential end use ▪ The basement construction will fully remove the made ground [the main potential contaminant source] beneath the basement area [including the vast majority of the rear garden] decreasing likelihood of end user contact with the soil ▪ any residual risks to construction workers will be controlled by the use of appropriate PPE ▪ A careful watching brief should be kept during construction and if obvious or suspected contamination is encountered this should be dealt with prescriptively	**LOW**
Contaminated soil: on-site sources	Migration of contaminated ground water and/or surface run-off through contaminated fill into aquifer	Aquifer and surface water	▪ No visual/olfactory evidence of soil contamination and all contaminant were below threshold levels for residential end use ▪ The site is considered to be in a low environmental sensitivity setting ▪ The site is underlain by very low permeability London clay stratum which protects the main chalk aquifer present at depth ▪ All made ground beneath the structure will be fully removed as part of the construction and the construction will reduce the amount of potential water infiltration into the underlying soils	**LOW**

Source/ hazard	Pathway	Receptor	Mitigation measures/explanation	Assessed Risk level
Ground gas: on-site and off-site sources	Migration	End-user and buildings	• Gas monitoring has not been undertaken, but a very low risk is considered applicable at this site • No radon protection measures are necessary based on the Groundsure information	**VERY LOW**

In conclusion, based upon the information reviewed and the results of the investigation, our assessment is that the risks to potential receptors should be **LOW**. It is self-evident that there may be zones of contamination within the site which were not encountered in our boreholes. A careful watching brief should be kept during construction to ensure that any potentially contaminated soil encountered is disposed of in a safe and controlled manner. Site workers should observe normal hygiene precautions when handling soils.

If material suspected of being contaminated is identified during construction, this material should be set aside under protective cover and further tests undertaken to verify the nature and levels of contamination present.

GENERAL INFORMATION, LIMITATIONS AND EXCEPTIONS

Unless otherwise stated, our Report should be construed as being a Ground Investigation Report [GIR] as defined in BS EN1997-2. Our Report is not intended to be and should not be viewed or treated as a Geotechnical Design Report [GDR] as defined in EN1997-2. Any 'design' recommendations which are provided are for guidance only and are intended to allow the designer to assess the results and implications of our investigation/testing and to permit preliminary design of relevant elements of the proposed scheme.

The methods of investigation used have been chosen taking into account the constraints of the site including but not limited to access and space limitations. Where it has not been possible to reasonably use an EC7 compliant investigation technique we have adopted a practical technique to obtain indicative soil parameters and any interpretation is based upon our engineering experience and relevant published information.

The Report is issued on the condition that Soil Consultants Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the exploratory points which differ from those identified during our investigation. In addition Soil Consultants Ltd will not be liable for any loss arising directly or indirectly from any opinion given on the possible configuration of strata both between the exploratory points and/or below the maximum depth of the investigation; such opinions, where given, are for guidance only and no liability can be accepted as to their accuracy. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in using this Report.

Comments made relating to ground-water or ground-gas are based upon observations made during our investigation unless otherwise stated. Ground-water and ground-gas conditions may vary with time from those reported due to factors such as seasonal effects, atmospheric effects and and/or tidal conditions. We recommend that if monitoring installations have been included as part of our investigation, continued monitoring should be carried out to maximise the information gained.

Specific geotechnical features/hazards such as [but not limited to] areas of root-related desiccation and dissolution features in chalk/soluble rock can exist in discrete localised areas - there can be no certainty that any or all of such features/hazards have been located, sampled or identified. Where a risk is identified the designer should provide appropriate contingencies to mitigate the risk through additional exploratory work and/or an engineered solution.

Where a specific risk of ground dissolution features has been identified in our Report [anything above a 'low' risk rating], reference should be made to the local building control to establish whether there are any specific local requirements for foundation design and appropriate allowances should be incorporated into the design. If such a risk assessment was not within the scope of our investigation and where it is deemed that the ground sequence may give rise to such a risk [for example near-surface chalk strata] it is recommended that an appropriate assessment should be undertaken prior to design of foundations.

Where spread foundations are used, we recommend that all excavations are inspected and approved by suitably experienced personnel; appropriate inspection records should be kept. This should also apply to any structures which are in direct contact with the soil where the soil could have a detrimental effect on performance or integrity of the structure.

Ground contamination often exists in small discrete areas - there can be no certainty that any or all such areas have been located, sampled or identified.

The findings and opinions conveyed in this Report may be based on information from a variety of sources such as previous desk studies, investigations or chemical analyses. Soil Consultants Limited cannot and does not provide any guarantee as to the authenticity, accuracy or reliability of such information from third parties; such information has not been independently verified unless stated in our Report.

Our Report is written in the context of an agreed scope of work between Soil Consultants Ltd and the Client and should not be used in any different context. In light of additional information becoming available, improved practices and changes in legislation, amendment or re-interpretation of the assessment or the Report in part or in whole may be necessary after its original publication.

Unless otherwise stated our investigation does not include an arboricultural survey, asbestos survey, ecological survey or flood risk assessment and these should be deemed to be outside the scope of our investigation.

APPENDIX A

Fieldwork, in-situ testing and monitoring

- Window sample borehole records
- Hand vane profile vs depth
- Hand penetrometer profile vs depth

Laboratory testing and monitoring

- Natural moisture content and index property testing
- Plasticity Charts
- Groundwater monitoring results

Contamination and sulphate/pH testing [QTS Environmental]

- General soil suite [including soluble sulphate/pH results]

Plans, drawings & photographs

- Site Plan
- Location Map

Site & Location:	**129 Blenheim Crescent** **London W11 2EQ**	Borehole No:	**WS1**
Client:	**Fiona Murphy & Anatole Kaletsky**	Coords (E/N): 524254.00 - 180910.00	Sheet 1 of 2
Engineer:	**Fluid Structures Ltd**	Ground Level (m):	Report No: 9631/OT

Progress & Observations	Samples & Tests Type	Depth (m)	Field Test Results	Strata Depth (m)	Strata Level (m)	Legend	Strata Description	Backfill / Installation
				0.15			MADE GROUND: reinforced concrete [100mm] over subangular gravel [50mm]	
WS commenced: 22/07/2014	HV	0.20	37				Soft to firm locally fissured brown mottled grey CLAY with occasional grey gleying and selenite crystals. Rare orange silt/ sand lenses	
	D	0.20						
	PP	0.20	0.1					
	HV	0.40	64					
	PP	0.40	1.9					
	D	0.50						
	HV	0.60	64					
	PP	0.60	1.9					
	HV	0.80	64					
	D	0.80						
	PP	0.80	1.9					
	HV	1.00	80					1
	PP	1.00	1.9					
	D	1.10						
	HV	1.20	72					
	PP	1.20	2.2					
	D	1.40						
	PP	1.40	2.5				*...becoming stiff below about 1.4m*	
	HV	1.40	78				*....rare fine roots [live] observed to maximum depth of 1.7m*	
	PP	1.60	2.4					
	HV	1.60	75					
	D	1.70						
	HV	1.80	91					
	PP	1.80	2.8					
	PP	2.00	2.8					2
	HV	2.00	90					
	D	2.00						
	PP	2.20	2.4					
	HV	2.20	90					
	D	2.30					*....becoming dark brown with rare gleying >2.50m*	
	PP	2.40	2.4					
	HV	2.40	111					
	HV	2.60	116					
	D	2.60						
	PP	2.60	3.2					
	PP	2.80	3.2					
	HV	2.80	107					
	D	2.90						
	PP	3.00	3.4					3
	HV	3.00	120					
	D	3.20						
	PP	3.20	3.1					
	HV	3.20						
	HV	3.40	100					
	PP	3.40	2.8					
	D	3.50						
	HV	3.60	125					
	PP	3.60	2.9					
	D	3.80						
	PP	3.80	3.2					
	HV	3.80	104					
	HV	4.00	116					4
	PP	4.00	3.9					
	D	4.20						
	HV	4.20						
	PP	4.20	4.2					
	PP	4.40	4.3					
	HV	4.40						
	HV	4.60						
	D	4.60						
	PP	4.60	4.3					
	HV	4.80	118					
	PP	4.80	3.2					
	D	5.00		5.00				5
							Continued on next sheet	

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water E = glass jar & plastic tub SPT/S = split spoon SPT/C = solid cone HV = Hand Vane [kPa]

PP = Pocket Penetrometer [kg/cm2] PID = Photo Ionisation Detector [ppmv] | Borehole type: Window Sampler

Remarks :- Coordinates shown approximate only; ground levels unavailable

Borehole No: **WS1**

[* = full SPT penetration not achieved - see summary sheet]

Site & Location:	**129 Blenheim Crescent** **London W11 2EQ**	Borehole No:	**WS1**
Client:	**Fiona Murphy & Anatole Kaletsky**	Coords (E/N): 524254.00 - 180910.00	Sheet 2 of 2
Engineer:	**Fluid Structures Ltd**	Ground Level (m):	Report No: 9631/OT

Progress & Observations	Samples & Tests Type	Samples & Tests Depth (m)	Field Test Results	Strata Depth (m)	Strata Level (m)	Legend	Strata Description	Backfill / Installation
WS complete: 22/07/2014 WS depth: 5.50m Water depth: Dry	PP	5.00	3.5				Stiff dark brown CLAY with rare grey gleying	
	HV	5.00	122					
	PP	5.20	4.1					
	HV	5.20	120					
	HV	5.40	114					
	PP	5.40	3.8	5.50			End of borehole at 5.50 m	

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water E = glass jar & plastic tub SPT/S = split spoon SPT/C = solid cone HV = Hand Vane [kPa]

PP = Pocket Penetrometer [kg/cm2] PID = Photo Ionisation Detector [ppmv]

Borehole type: Window Sampler

Remarks :- Coordinates shown approximate only; ground levels unavailable

Borehole No: **WS1**

[* = full SPT penetration not achieved - see summary sheet]

Soil Consultants

Site & Location:	**129 Blenheim Crescent** **London W11 2EQ**	Borehole No:	**WS2**
Client:	**Fiona Murphy & Anatole Kaletsky**	Coords (E/N): 524260.00 - 180900.00	Sheet 1 of 1
Engineer:	**Fluid Structures Ltd**	Ground Level (m):	Report No: 9631/OT

Progress & Observations	Samples & Tests Type	Samples & Tests Depth (m)	Field Test Results	Strata Depth (m)	Strata Level (m)	Legend	Strata Description	Backfill / Installation
	D	0.10					MADE GROUND: topsoil with occasional brick and chalk gravel	
WS commenced: 22/07/2014				0.20			Soft to firm brown CLAY with grey patches, occasional orange mottling, selenite crystals and small grey or orange sand lenses. Desiccated to approx. 0.4m	
	PP	0.30	3.6					
	D	0.30						
	HV	0.30						
	HV	0.50	40					
	PP	0.50	1.1					
	D	0.60						
	HV	0.70	38					
	PP	0.70	1.1					
	HV	0.90	46					
	PP	0.90	1.2					
	D	0.90						
	HV	1.10	61					
	PP	1.10	1.2					
	D	1.20						
	PP	1.30	1.9					
	HV	1.30	70				*....rare fine roots - up to about 2mm diameter [live] observed to maximum depth of 1.5m*	
	PP	1.50	2.5				*...becoming stiff below about 1.5m*	
	HV	1.50	80					
	D	1.50						
	HV	1.70	81					
	PP	1.70	1.8					
	D	1.80						
	PP	1.90	2.5					
	HV	1.90	84					
	D	2.10						
	PP	2.10	2.2					
	HV	2.10	76					
	PP	2.30	2.7					
	HV	2.30	75					
	D	2.40						
	HV	2.50	114					
	PP	2.50	3.0					
	D	2.70						
WS complete: 22/07/2014 WS depth: 3.00m Water depth: Dry	PP	2.70	2.9					
	HV	2.70	110					
	PP	2.90	3.8					
	HV	2.90	128					
	D	3.00		3.00			End of borehole at 3.00 m	

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water E = glass jar & plastic tub SPT/S = split spoon SPT/C = solid cone HV = Hand Vane [kPa]

PP = Pocket Penetrometer [kg/cm2] PID = Photo Ionisation Detector [ppmv] | Borehole type: Window Sampler

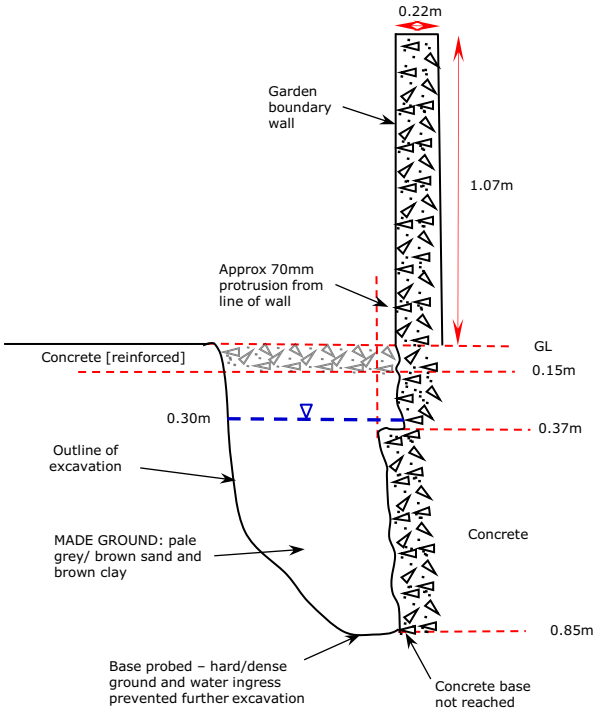
Remarks :- Coordinates shown approximate only; ground levels unavailable | Borehole No: **WS2**

[* = full SPT penetration not achieved - see summary sheet]

Soil Consultants

Site Location	**129 Blenheim Crescent, London W11 2EQ**	Trial Pit No: **TP1**
Client:	**Fiona Murphy & Anatole Kaletsky**	Report No: **9631/OT**
Engineer:	**Fluid Structures**	

CROSS SECTION A-A:



PHOTOGRAPHS OF TRIAL PIT

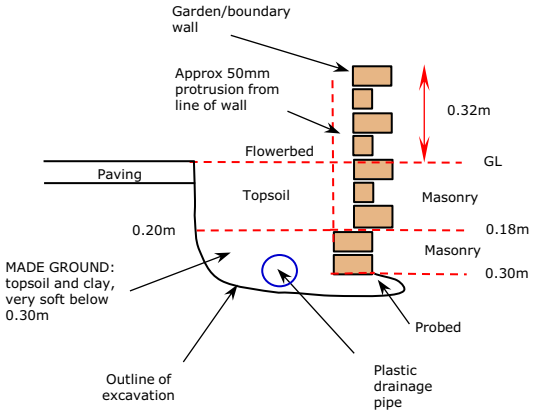
D = small disturbed sample, B = bulk sample, HV = hand shear vane test [kPa], pp = pocket penetrometer [kg/cm^2]

Date:	22 July 2014	**Groundwater details**	**Samples**	
Equipment:	Hand excavated	• Moderate inflow at 0.3m	0.5m	D
Stability:	Stable			
Remarks:	Left open to allow for further excavation by builder		**Logged by**: OT	

SoilConsultants

Site Location	**129 Blenheim Crescent, London W11 2EQ**	Trial Pit No: **TP2**
Client:	**Fiona Murphy & Anatole Kaletsky**	Report No: **9631/OT**
Engineer:	**Fluid Structures**	

CROSS SECTION A-A:



PHOTOGRAPHS OF TRIAL PIT

D = small disturbed sample, B = bulk sample, HV = hand shear vane test [kPa], pp = pocket penetrometer [kg/cm^2]

Date:	22 July 2014	**Groundwater details**	**Samples**	
Equipment:	Hand excavated	• None encountered	0.20M	D
Stability:	Stable			
Remarks:	Backfilled with compacted arisings		**Logged by**: OT	

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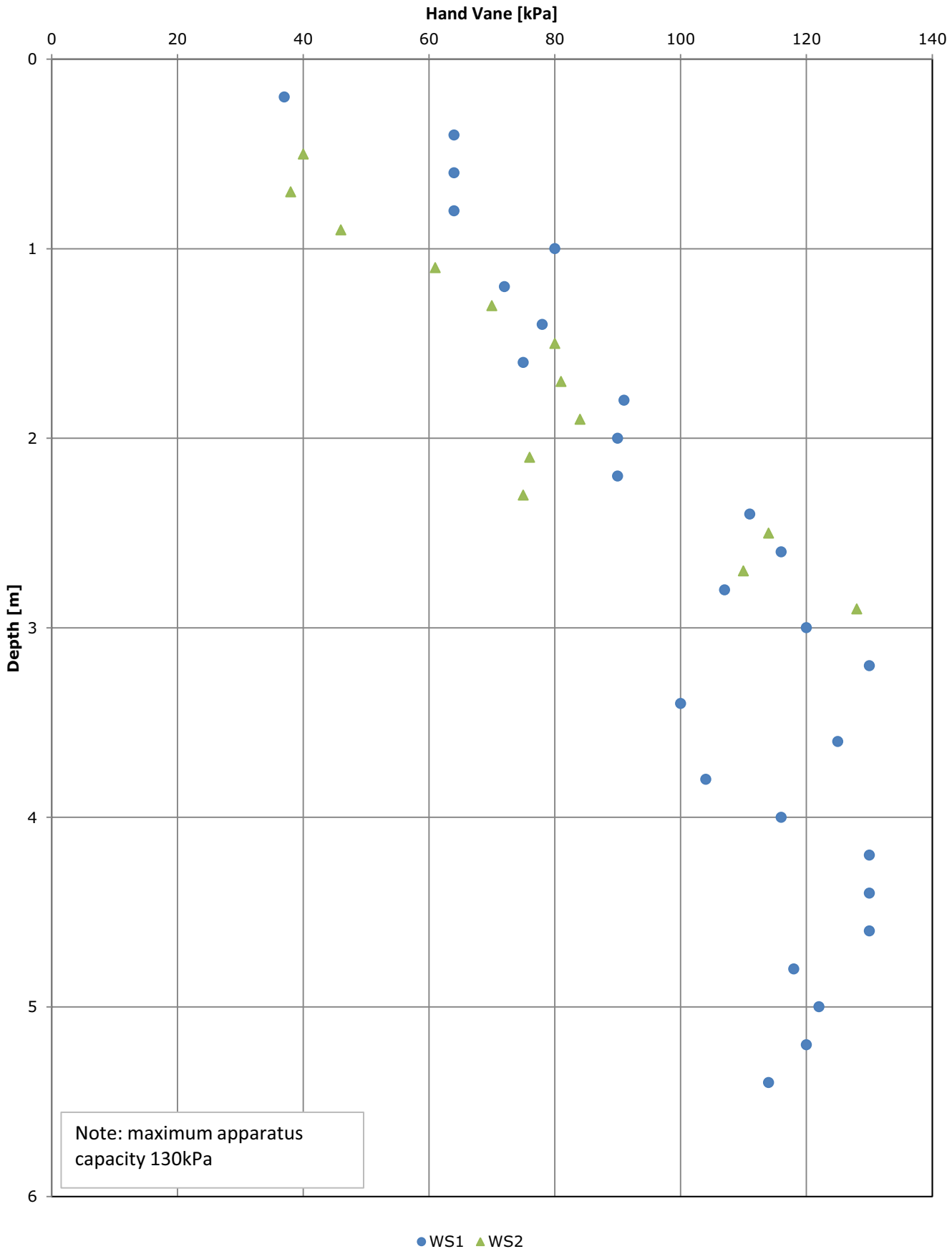
Site & Location	129 Blenheim Crescent London W11 2EQ	Report No:	9631/OT

Hand Vane profile vs depth



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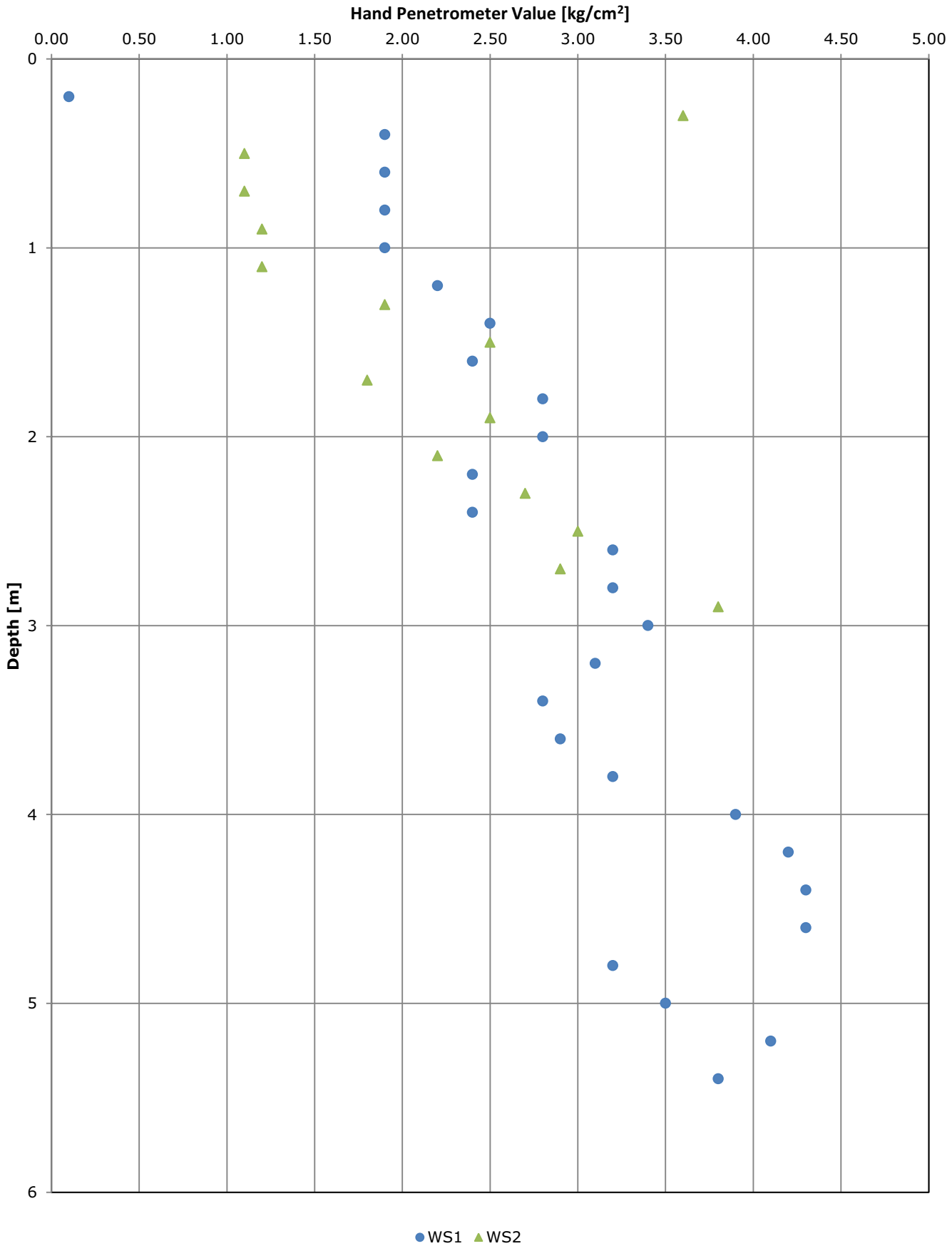
Site & Location	129 Blenheim Crescent London W11 2EQ	Report No:	9631/OT

Hand Penetrometer profile vs depth



Soil Consultants

Site & Location: **129 Blenheim Crescent, London W11 2EQ**

Report No: **9631/OT**

SUMMARY OF CLASSIFICATION TEST RESULTS

BH ID	Depth (m)	Type	w (%)	wL (%)	wP (%)	Pass 425 (%)	IP (%)	Mod IP (%)	IL (%)	LOI (%)	Description
WS1	0.50	D	28								Brown mottled grey CLAY
WS1	0.80	D	29								Brown mottled grey CLAY
WS1	1.10	D	31	74	21	>95	53		0.19		Brown mottled grey CLAY
WS1	1.40	D	29								Brown mottled grey CLAY
WS1	1.70	D	30								Brown mottled grey CLAY
WS1	2.00	D	30								Brown mottled grey CLAY
WS1	2.30	D	28	76	21	>95	55		0.13		Brown mottled grey CLAY
WS1	2.60	D	28								Brown mottled grey CLAY
WS1	2.90	D	27								Brown mottled grey CLAY
WS1	3.20	D	27								Brown mottled grey CLAY
WS1	3.50	D	28	75	25	>95	50		0.06		Brown mottled grey CLAY
WS1	3.80	D	29								Brown mottled grey CLAY
WS1	4.20	D	26								Brown mottled grey CLAY
WS1	4.60	D	29								Brown mottled grey CLAY
WS1	5.00	D	29	77	23	>95	54		0.11		Dark brown CLAY
WS2	0.30	D	24								Brown CLAY with grey patches [DESICCATED]
WS2	0.60	D	34								Brown CLAY with grey patches
WS2	0.90	D	28	74	18	>95	56		0.18		Brown CLAY with grey patches
WS2	1.20	D	25								Brown CLAY with grey patches

Testing in accordance with BS EN ISO 17892 unless specified otherwise

Date: 12 Aug 14

Modified Plasticity Index calculated in accordance with NHBC Standards Chapter 4.2 (reported if %passing 425mm <95%)

Percent passing 425μm: by estimation, by hand* or by sieving**

SoilConsultants

Site & Location: **129 Blenheim Crescent, London W11 2EQ**

Report No: **9631/OT**

SUMMARY OF CLASSIFICATION TEST RESULTS

BH ID	Depth (m)	Type	w (%)	wL (%)	wP (%)	Pass 425 (%)	IP (%)	Mod IP (%)	IL (%)	LOI (%)	Description
WS2	1.50	D	26								Brown CLAY with grey patches
WS2	1.80	D	28	75	21	>95	54		0.13		Brown CLAY with grey patches
WS2	2.10	D	27								Brown CLAY with grey patches
WS2	2.40	D	28								Brown CLAY with grey patches
WS2	2.70	D	26	77	27	>95	50		-0.03		Brown CLAY with grey patches
WS2	3.00	D	26								Brown CLAY with grey patches

Testing in accordance with BS EN ISO 17892 unless specified otherwise

Date: 12 Aug 14

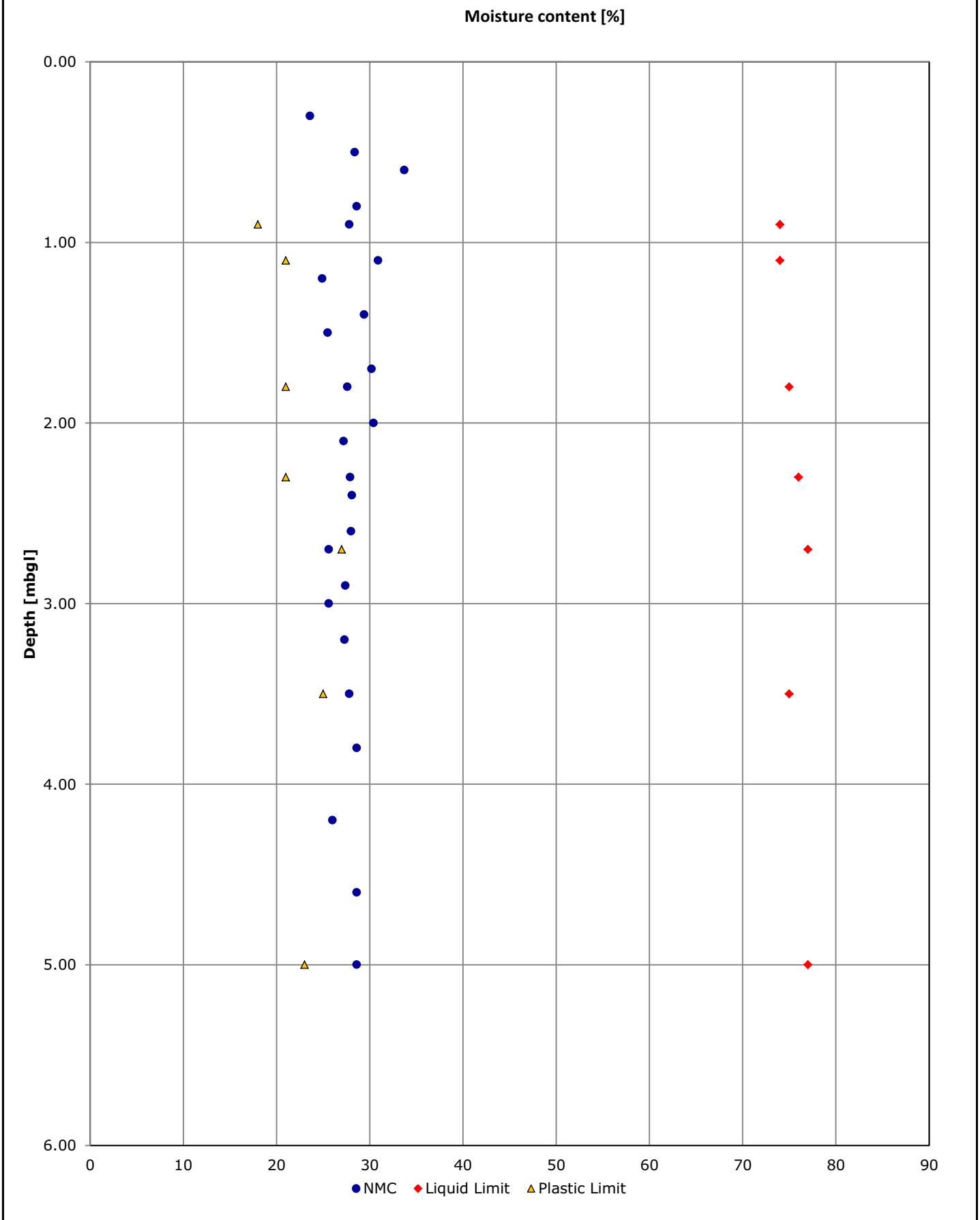
Modified Plasticity Index calculated in accordance with NHBC Standards Chapter 4.2 (reported if %passing 425mm <95%)

Percent passing 425μm: by estimation, by hand* or by sieving**

Soil Consultants

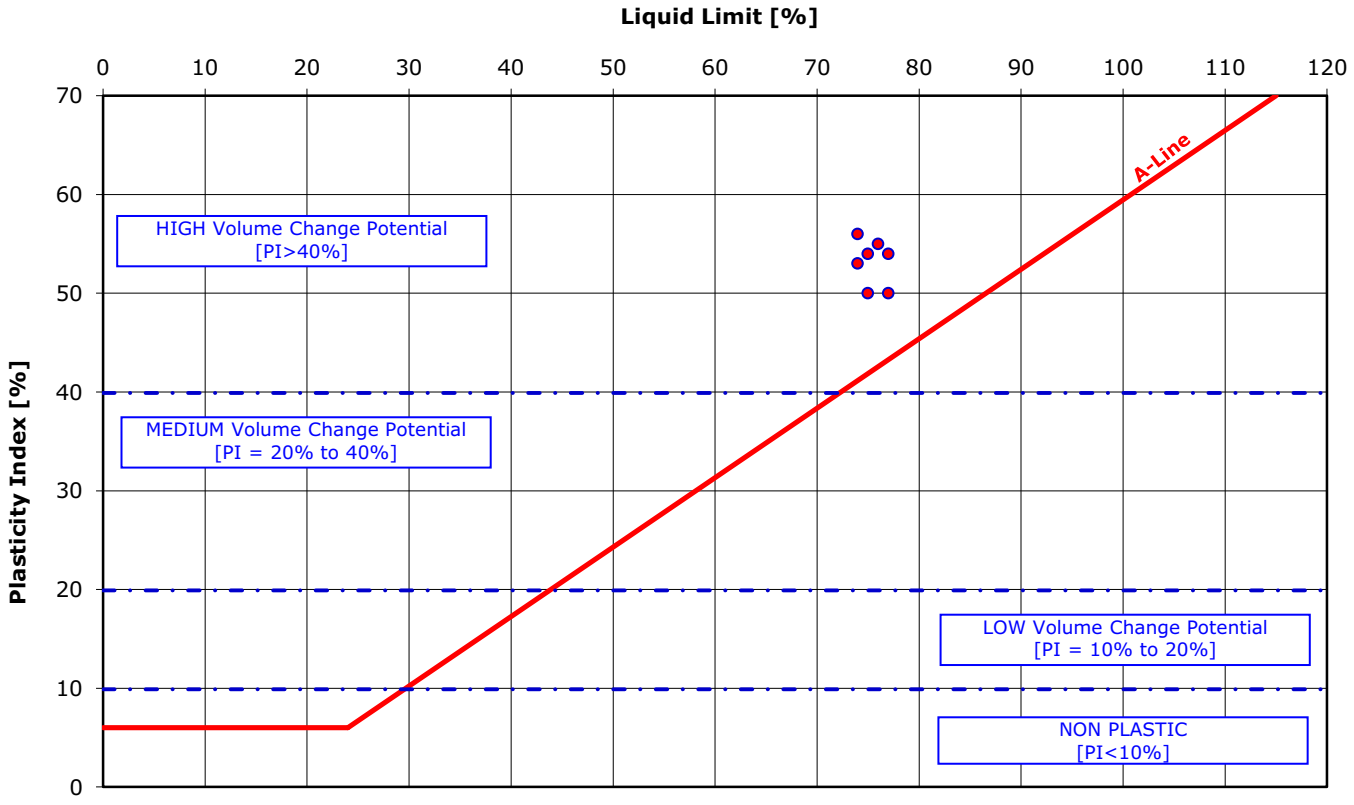
Site & Location	129 Blenheim Crescent London W11 2EQ	Report No:	9631/OT

Natural Moisture Content and Index Properties vs depth



Site & Location	**129 Blenheim Crescent London W11 2EQ**	Report No:	**9631/OT**

Plasticity Chart



Modified Plasticity Index, I'p:

$$I'p = \frac{Ip \times (\%\ \text{passing 425mm})}{100\%}$$

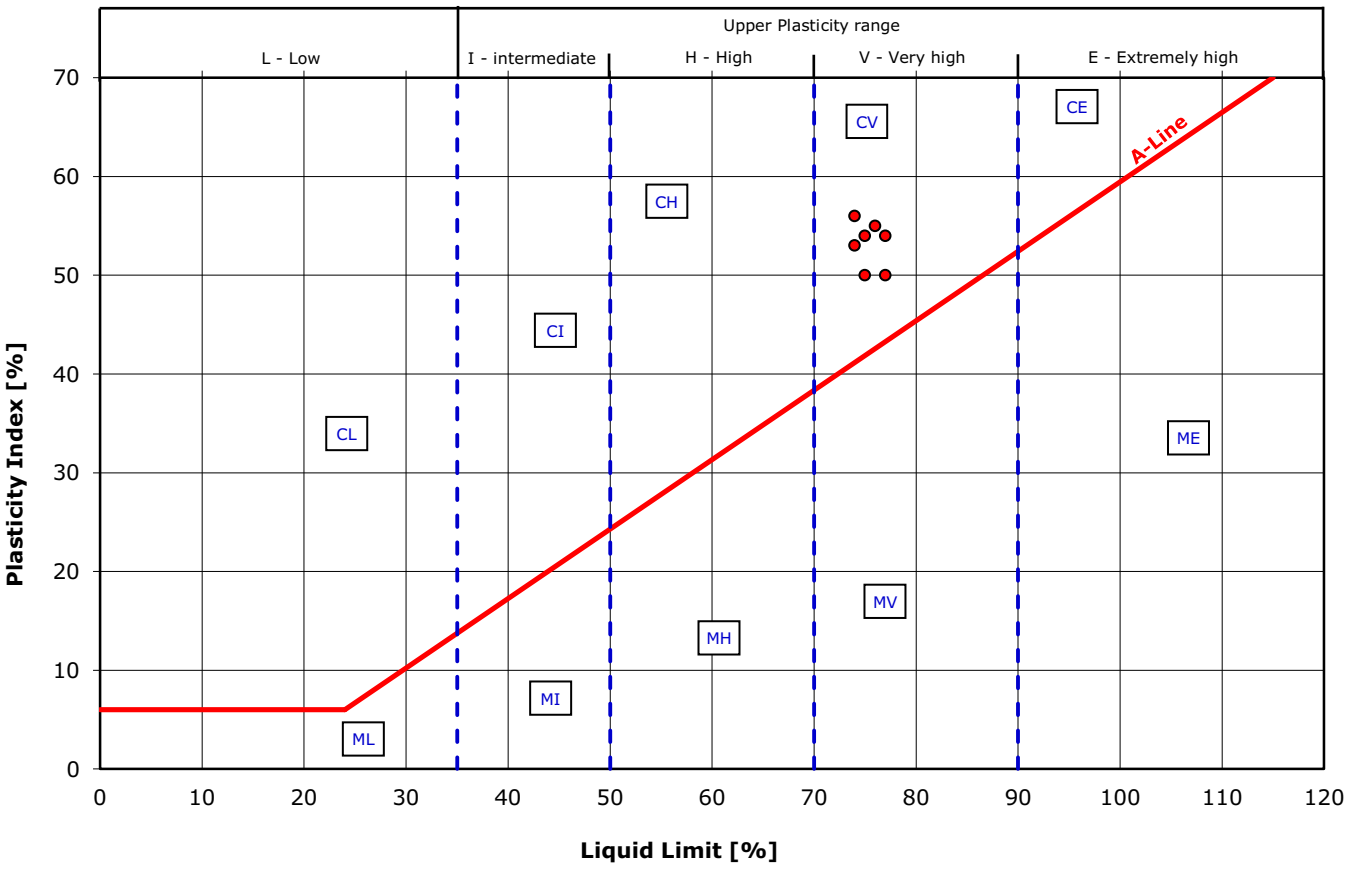
[where Ip = Plasticity Index]

Classification in accordance with NHBC Standards, Part 4 'Foundations', Chapter 4.2 'Building near trees'

Soil Consultants

Site & Location	**129 Blenheim Crescent London W11 2EQ**	Report No:	**9631/OT**

Plasticity Chart



M - SILT [plots below the A-Line}
C - CLAY [plots above the A-Line]

Classification in accordance with BS5930:1999+A2:2010 "Code of practice for site investigations"

Soil Consultants

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.

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russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 14-23335

Site Reference:	129 Blenheim Crescent, London W11 2EQ
Project / Job Ref:	9631/OT
Order No:	9631/OT
Sample Receipt Date:	25/07/2014
Sample Scheduled Date:	25/07/2014
Report Issue Number:	1
Reporting Date:	04/08/2014

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
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
QTS Environmental Report No: 14-23335	**Date Sampled**	22/07/14	22/07/14	22/07/14	22/07/14	22/07/14
Soil Consultants Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: 129 Blenheim Crescent, London W11 2EQ	**TP / BH No**	TP1	TP2	WS1	WS1	WS1
Project / Job Ref: 9631/OT	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 9631/OT	**Depth (m)**	0.50	0.20	0.80	1.40	2.30
Reporting Date: 04/08/2014	**QTSE Sample No**	112325	112326	112327	112328	112329

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	10.0	7.5	8.0	7.8	7.8
Electrical Conductivity	uS/cm	< 5	NONE	504	447			
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2			
Total Sulphate as SO_4	mg/kg	< 200	NONE	1901	3232			
W/S Sulphate as SO4 (2:1)	g/l	< 0.01	MCERTS	0.18	0.20	0.55	2.65	3.33
Total Sulphur	mg/kg	< 200	NONE	637	1078			
Organic Matter	%	< 0.1	NONE	0.9	10.8			
Arsenic (As)	mg/kg	< 2	MCERTS	3	6			
W/S Boron	mg/kg	< 1	NONE	< 1	< 1			
Cadmium (Cd)	mg/kg	< 0.5	MCERTS	< 0.5	< 0.5			
Chromium (Cr)	mg/kg	< 2	MCERTS	35	14			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	19	44			
Lead (Pb)	mg/kg	< 3	MCERTS	20	149			
Mercury (Hg)	mg/kg	< 1	NONE	< 1	1.6			
Nickel (Ni)	mg/kg	< 3	MCERTS	28	11			
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3			
Zinc (Zn)	mg/kg	< 3	MCERTS	62	174			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			
EPH (C10 - C40)	mg/kg	< 6	MCERTS	7	38			

Analytical results are expressed on a dry weight basis where samples are dried at less than 30^{o}C
Analysis carried out on the dried sample is corrected for the stone content
Subcontracted analysis $^{(S)}$

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Soil Analysis Certificate						
QTS Environmental Report No: 14-23335	**Date Sampled**	22/07/14	22/07/14	22/07/14	22/07/14	22/07/14
Soil Consultants Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: 129 Blenheim Crescent, London W11 2EQ	**TP / BH No**	WS1	WS1	WS1	WS2	WS2
Project / Job Ref: 9631/OT	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 9631/OT	**Depth (m)**	3.20	3.80	4.60	0.90	2.10
Reporting Date: 04/08/2014	**QTSE Sample No**	112330	112331	112332	112333	112334

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	7.0	7.6	7.5	7.9	7.8
Electrical Conductivity	uS/cm	< 5	NONE					
Total Cyanide	mg/kg	< 2	NONE					
Total Sulphate as SO_4	mg/kg	< 200	NONE					
W/S Sulphate as SO4 (2:1)	g/l	< 0.01	MCERTS	3.98	3.53	3.32	1.64	0.78
Total Sulphur	mg/kg	< 200	NONE					
Organic Matter	%	< 0.1	NONE					
Arsenic (As)	mg/kg	< 2	MCERTS					
W/S Boron	mg/kg	< 1	NONE					
Cadmium (Cd)	mg/kg	< 0.5	MCERTS					
Chromium (Cr)	mg/kg	< 2	MCERTS					
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	MCERTS					
Lead (Pb)	mg/kg	< 3	MCERTS					
Mercury (Hg)	mg/kg	< 1	NONE					
Nickel (Ni)	mg/kg	< 3	MCERTS					
Selenium (Se)	mg/kg	< 3	NONE					
Zinc (Zn)	mg/kg	< 3	MCERTS					
Total Phenols (monohydric)	mg/kg	< 2	NONE					
EPH (C10 - C40)	mg/kg	< 6	MCERTS					

Analytical results are expressed on a dry weight basis where samples are dried at less than 30^{O}C
Analysis carried out on the dried sample is corrected for the stone content
Subcontracted analysis $^{(S)}$

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Soil Analysis Certificate						
QTS Environmental Report No: 14-23335	**Date Sampled**	22/07/14				
Soil Consultants Ltd	**Time Sampled**	None Supplied				
Site Reference: 129 Blenheim Crescent, London W11 2EQ	**TP / BH No**	WS2				
Project / Job Ref: 9631/OT	**Additional Refs**	None Supplied				
Order No: 9631/OT	**Depth (m)**	3.00				
Reporting Date: 04/08/2014	**QTSE Sample No**	112335				

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	7.6				
Electrical Conductivity	uS/cm	< 5	NONE					
Total Cyanide	mg/kg	< 2	NONE					
Total Sulphate as SO_4	mg/kg	< 200	NONE					
W/S Sulphate as SO4 (2:1)	g/l	< 0.01	MCERTS	3.11				
Total Sulphur	mg/kg	< 200	NONE					
Organic Matter	%	< 0.1	NONE					
Arsenic (As)	mg/kg	< 2	MCERTS					
W/S Boron	mg/kg	< 1	NONE					
Cadmium (Cd)	mg/kg	< 0.5	MCERTS					
Chromium (Cr)	mg/kg	< 2	MCERTS					
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	MCERTS					
Lead (Pb)	mg/kg	< 3	MCERTS					
Mercury (Hg)	mg/kg	< 1	NONE					
Nickel (Ni)	mg/kg	< 3	MCERTS					
Selenium (Se)	mg/kg	< 3	NONE					
Zinc (Zn)	mg/kg	< 3	MCERTS					
Total Phenols (monohydric)	mg/kg	< 2	NONE					
EPH (C10 - C40)	mg/kg	< 6	MCERTS					

Analytical results are expressed on a dry weight basis where samples are dried at less than 30^{o}C
Analysis carried out on the dried sample is corrected for the stone content
Subcontracted analysis $^{(S)}$

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Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 14-23335	**Date Sampled**	22/07/14	22/07/14			
Soil Consultants Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: 129 Blenheim Crescent, London W11 2EQ	**TP / BH No**	TP1	TP2			
Project / Job Ref: 9631/OT	**Additional Refs**	None Supplied	None Supplied			
Order No: 9631/OT	**Depth (m)**	0.50	0.20			
Reporting Date: 04/08/2014	**QTSE Sample No**	112325	112326			

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.29			
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.24			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.15			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.16			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6			

Analytical results are expressed on a dry weight basis where samples are dried at less than 30^{O}C

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 14-23335		**Date Sampled**	22/07/14			**Landfill Waste Acceptance Criteria Limits**		
Soil Consultants Ltd		**Time Sampled**	None Supplied			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: 129 Blenheim Crescent, London W11 2EQ		**TP / BH No**	TP1					
Project / Job Ref: 9631/OT		**Additional Refs**	None Supplied					
Order No: 9631/OT		**Depth (m)**	0.50					
Reporting Date: 04/08/2014		**QTSE Sample No**	112325					
Determinand	**Unit**	**MDL**						
TOC	%	< 0.1	0.5			3%	5%	6%
Loss on Ignition	%	< 0.01	4			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.7	< 0.7			1	--	--
Mineral Oil	mg/kg	< 6	< 6			500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7			100	--	--
pH[MU]	pH Units	N/a	10.0			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.8			--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium	0.05	0.03		0.3	20	100	300
Cadmium	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium	0.072	0.030		0.33	0.5	10	70
Copper	0.02	< 0.01		< 0.5	2	50	100
Mercury	< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum	0.019	0.010		0.1	0.5	10	30
Nickel	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony	< 0.005	< 0.005		< 0.06	0.06	0.7	5
Selenium	< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc	0.008	0.006		< 0.2	4	50	200
Chloride[U]	28	6		76	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	24	36		353	1000	20000	50000
TDS	650	489		5025	**4000**	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	8.4	3.4		37.7	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.22						
Dry Matter (%)	79.8						
Moisture (%)	25.4						
Stage 1							
Volume Eluate L2 (litres)	0.31						
Filtered Eluate VE1 (litres)	0.15						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 14-23335	
Soil Consultants Ltd	
Site Reference: 129 Blenheim Crescent, London W11 2EQ	
Project / Job Ref: 9631/OT	
Order No: 9631/OT	
Reporting Date: 04/08/2014	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
112325	TP1	None Supplied	0.50	20.2	Light brown clayey gravel
112326	TP2	None Supplied	0.20	32	Brown clay with vegetation
112327	WS1	None Supplied	0.80	19	Light brown clay
112328	WS1	None Supplied	1.40	19.4	Light brown clay
112329	WS1	None Supplied	2.30	19.1	Light brown clay
112330	WS1	None Supplied	3.20	18.1	Light brown clay
112331	WS1	None Supplied	3.80	18.8	Light brown clay
112332	WS1	None Supplied	4.60	18	Light brown clay
112333	WS2	None Supplied	0.90	16.8	Light brown clay
112334	WS2	None Supplied	2.10	18.3	Light brown clay
112335	WS2	None Supplied	3.00	18.1	Light brown clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 14-23335
Soil Consultants Ltd
Site Reference: 129 Blenheim Crescent, London W11 2EQ
Project / Job Ref: 9631/OT
Order No: 9631/OT
Reporting Date: 04/08/2014

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	TPH LQM	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6 - C10)	Determination of hydrocarbons C6-C10 by headspace GC-MS	E001

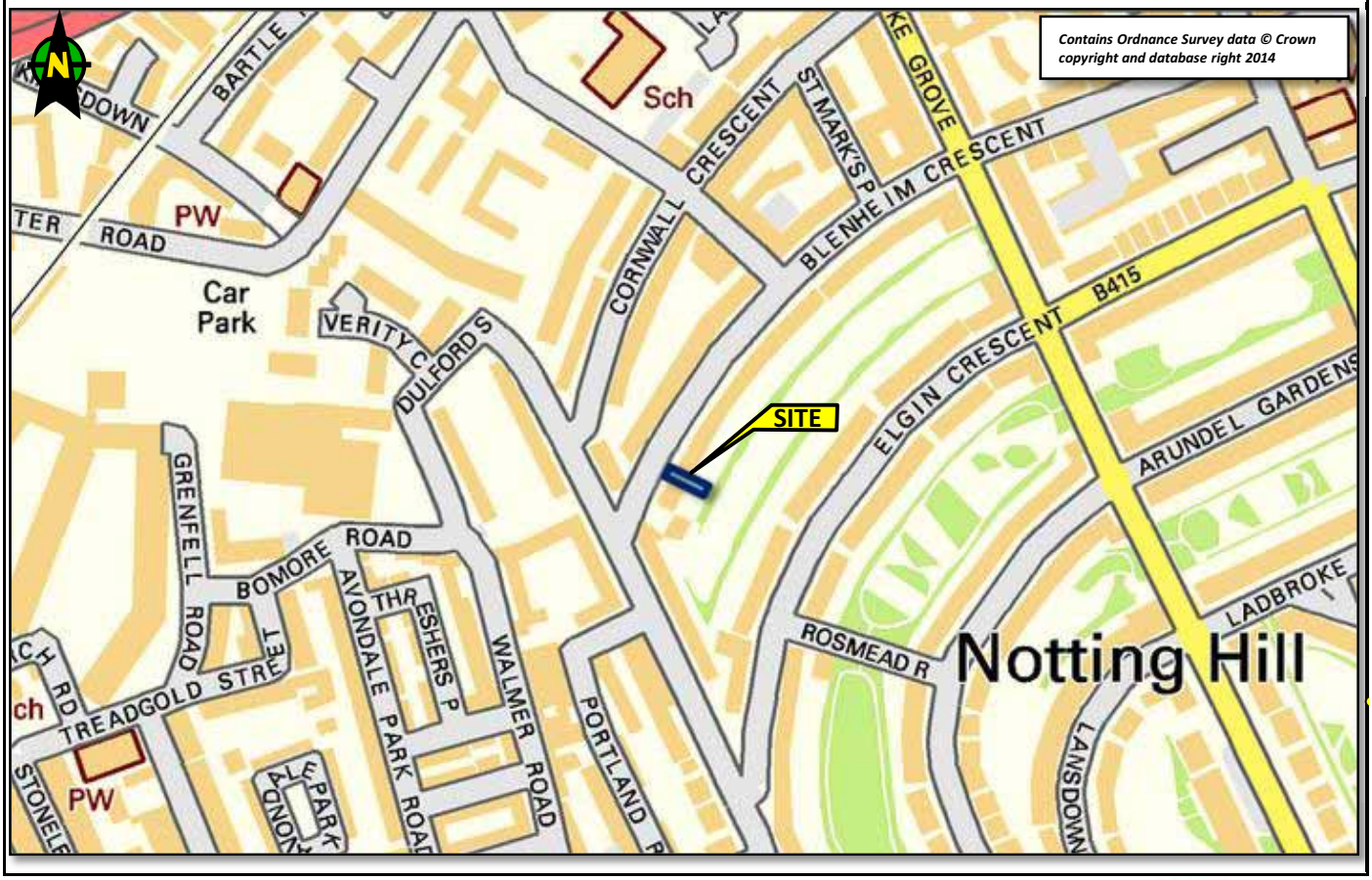
D Dried
AR As Received

Site Location	129 Blenheim Crescent, London W11 2EQ	Report No	9631/OT

Site Plan

Site Location	129 Blenheim Crescent, London W11 2EQ	Report No	9631/OT

Location Map



Approx NGR of site 524250E, 180910N

Soil Consultants

APPENDIX B

- GroundSure historical maps [Ref SCL-1573292]
- GroundSure EnviroInsight Report [Ref SCL-1573293]
- GroundSure GeoInsight Report [Ref SCL-1573294]

Soil Consultants
Ground Investigation
Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: 1056 Scale Town Plan

Map date: **1863**

Scale: 1:1,056

Printed at: 1:1,056

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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
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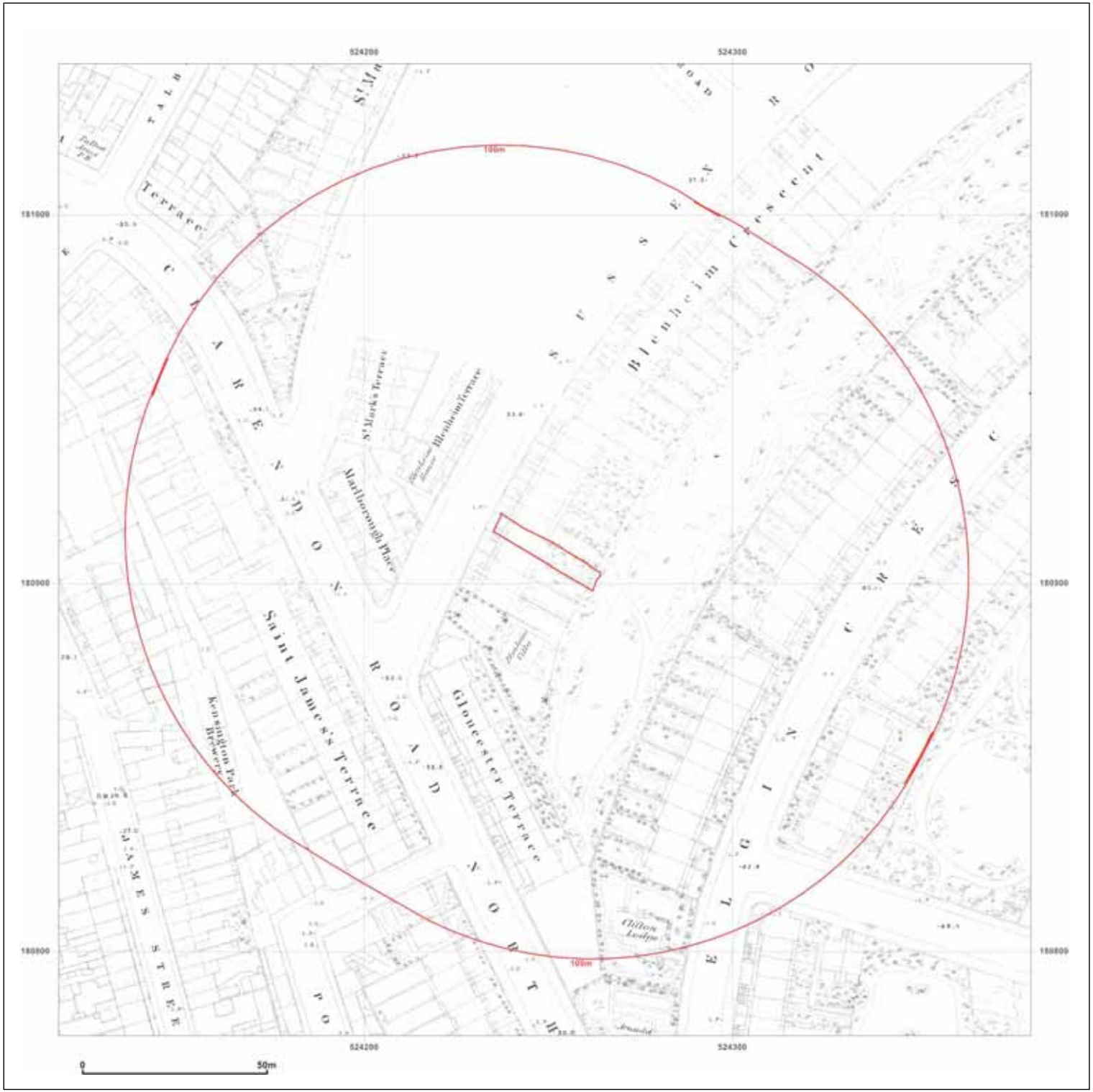
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 21 July 2014

To view map legend click here *Legend*



Soil Consultants
Ground Investigation
Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: 1056 Scale Town Plan
Map date: **1867**
Scale: 1:1,056
Printed at: 1:1,056

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Surveyed N/A
Revised N/A
Edition N/A
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Production date: 21 July 2014

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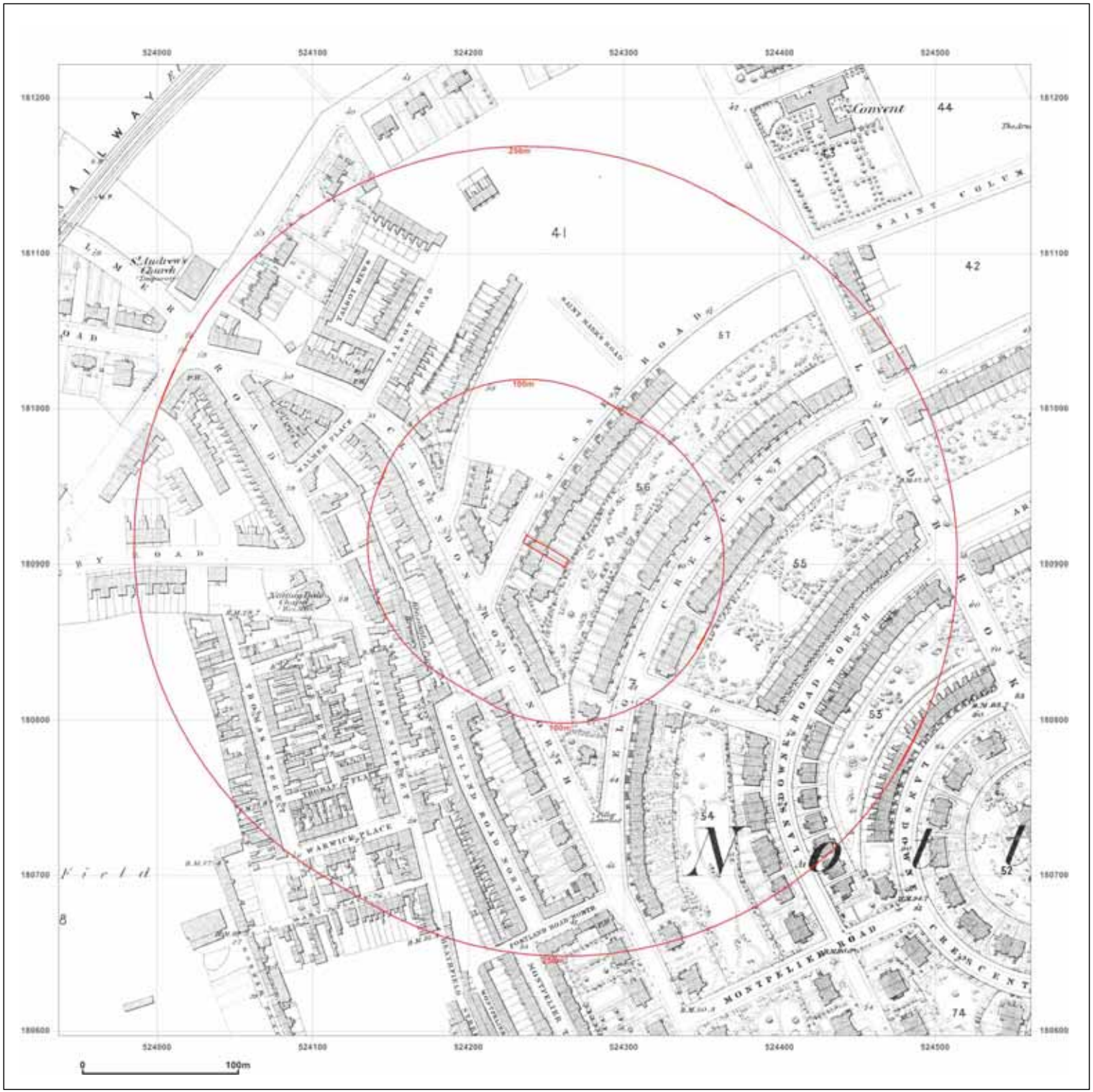

Soil Consultants
Ground Investigation
Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: County Series

Map date: **1871**

Scale: 1:2,500

Printed at: 1:2,500

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W E
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Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

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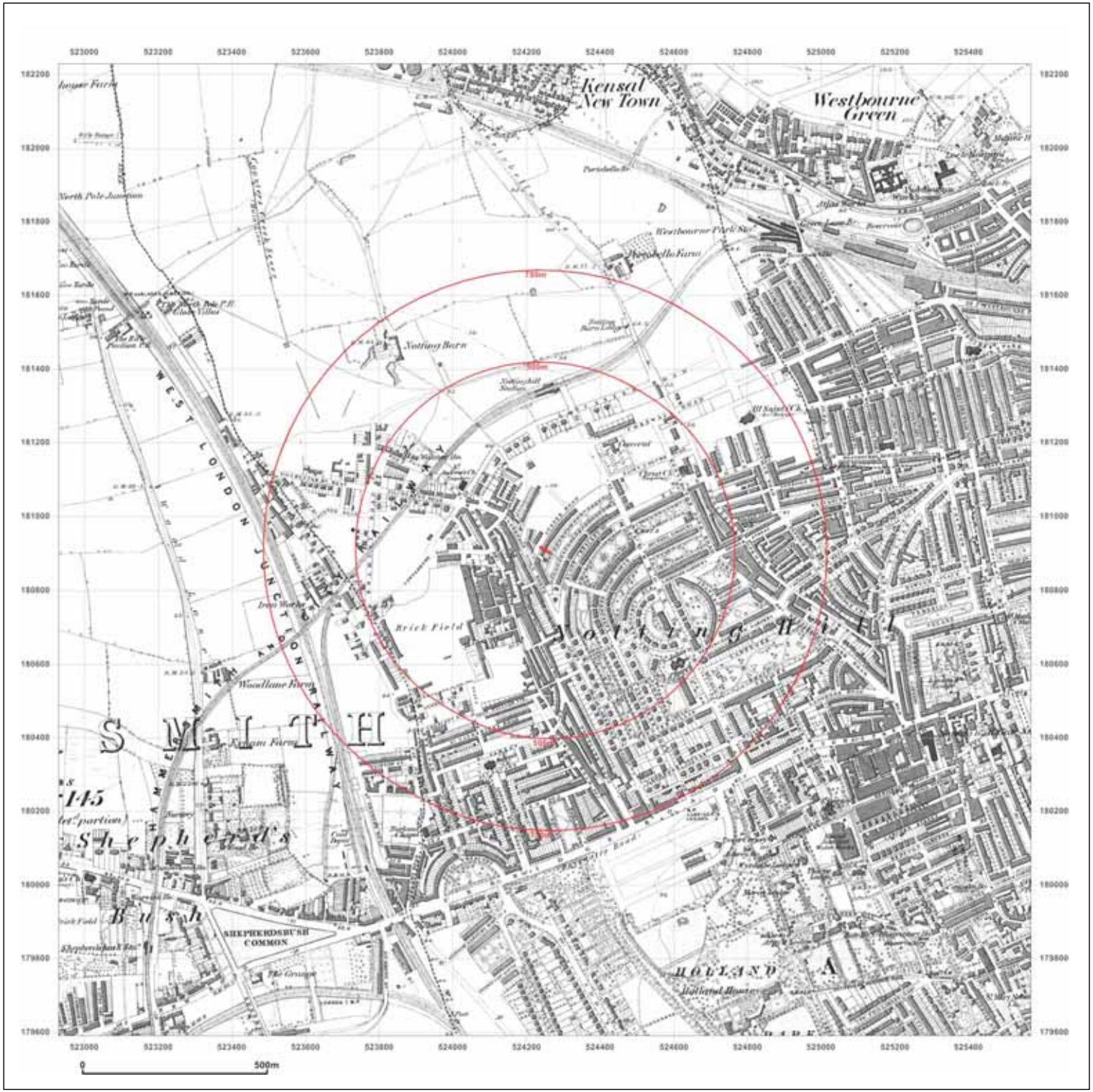

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: County Series

Map date: **1874**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1866
Revised 1874
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Production date: 21 July 2014

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Ground Investigation
Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: 1056 Scale Town Plan

Map date: **1893**

Scale: 1:1,056

Printed at: 1:1,056

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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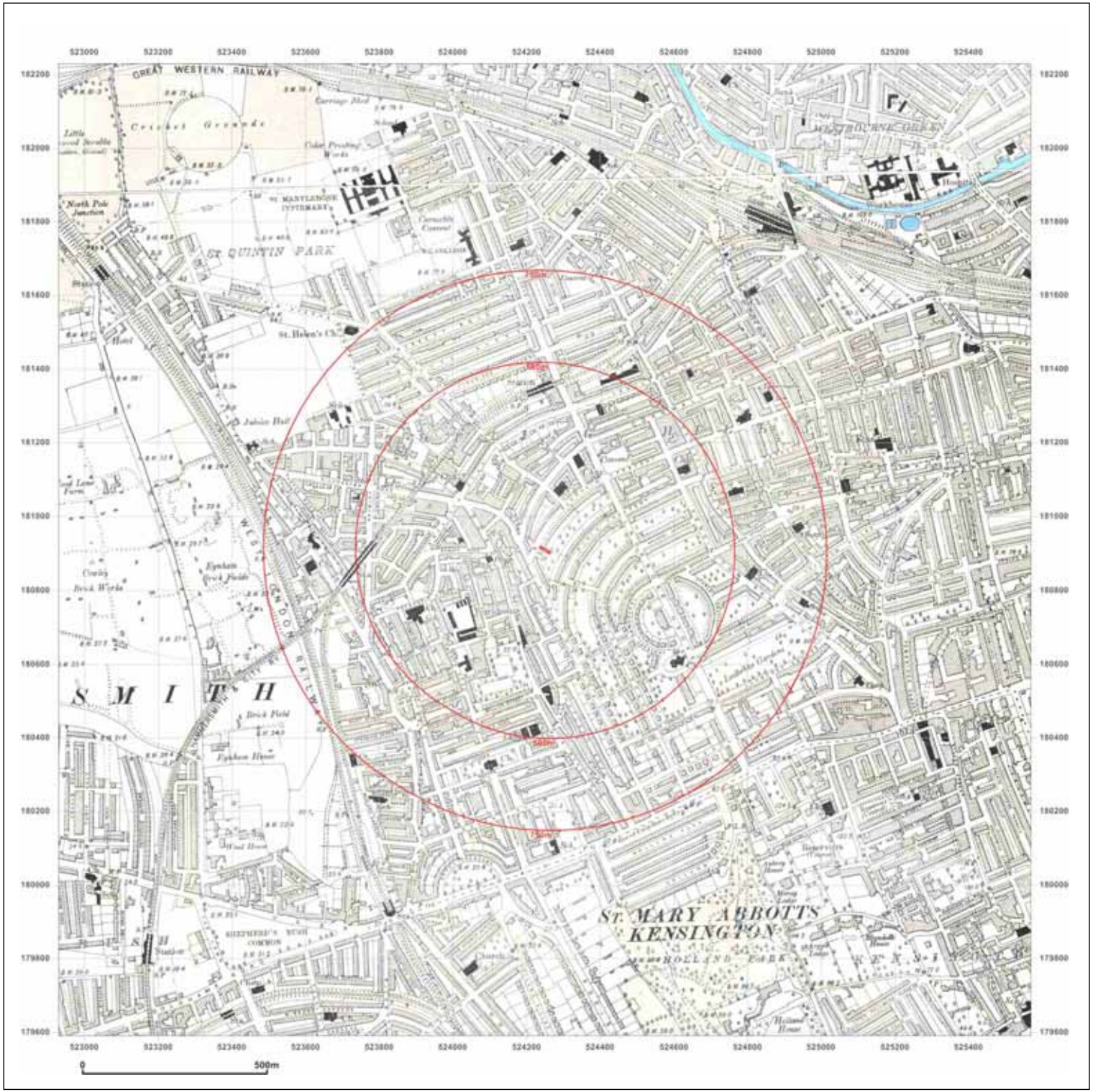

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Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: County Series

Map date: **1894**

Scale: 1:10,560

Printed at: 1:10,560

N
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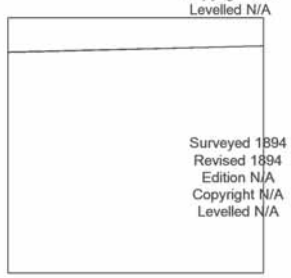
Surveyed 1894
Revised 1894
Edition N/A
Copyright N/A
Levelled N/A



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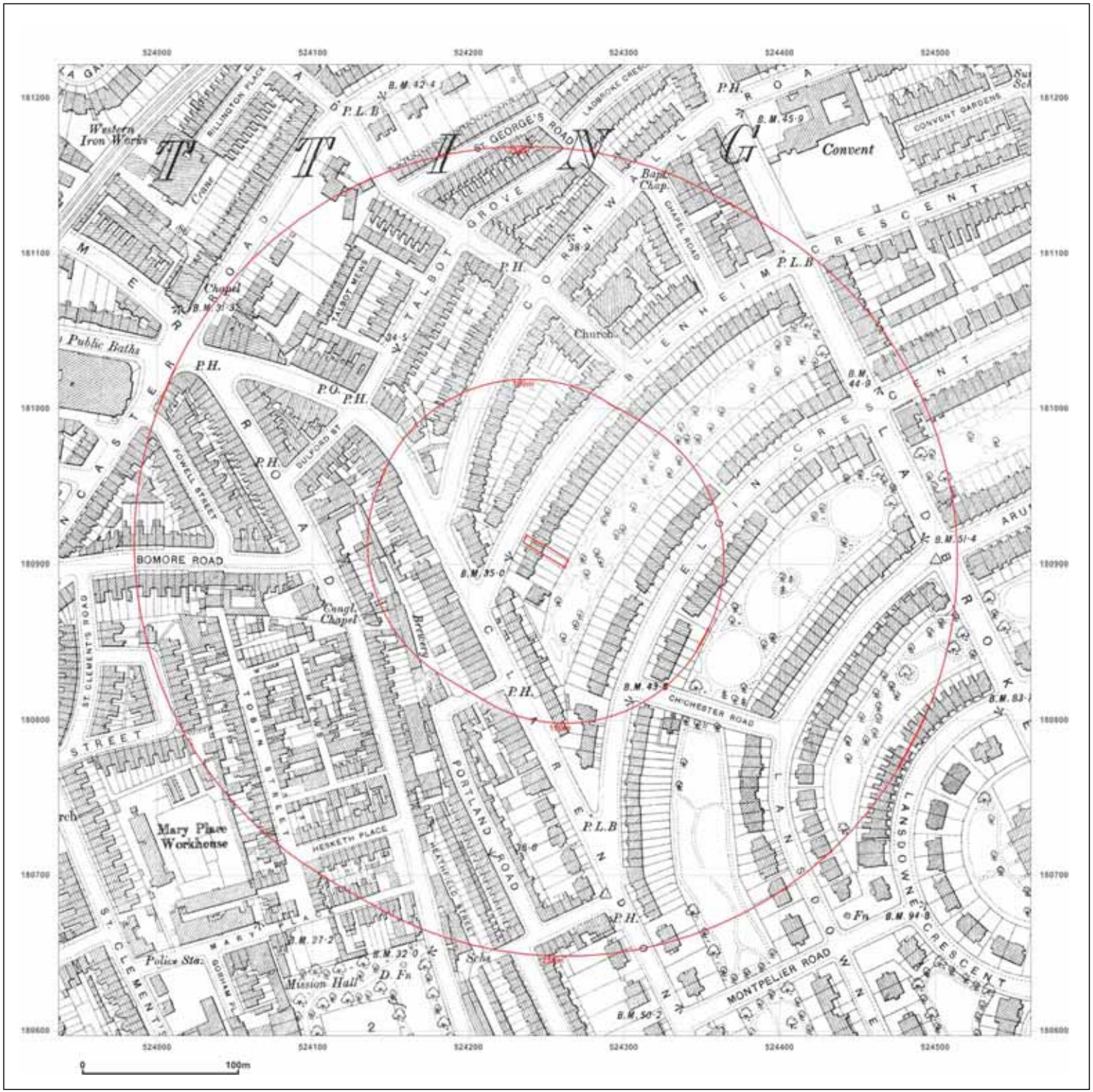

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: County Series

Map date: **1896**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1896
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: County Series

Map date: **1916**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1916
Revised 1916
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: County Series

Map date: **1920**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1865
Revised 1920
Edition N/A
Copyright N/A
Levelled N/A

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Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: Provisional

Map date: **1947-1951**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1940
Revised 1940
Edition N/A
Copyright 1951
Levelled N/A

Surveyed 1940
Revised 1940
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1940
Revised 1940
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1940
Revised 1948
Edition N/A
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Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1953**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1953
Revised 1953
Edition N/A
Copyright N/A
Levelled 1953

Surveyed 1953
Revised 1953
Edition N/A
Copyright N/A
Levelled 1953

Surveyed 1953
Revised 1953
Edition N/A
Copyright N/A
Levelled 1953

Surveyed 1953
Revised 1953
Edition N/A
Copyright N/A
Levelled 1932

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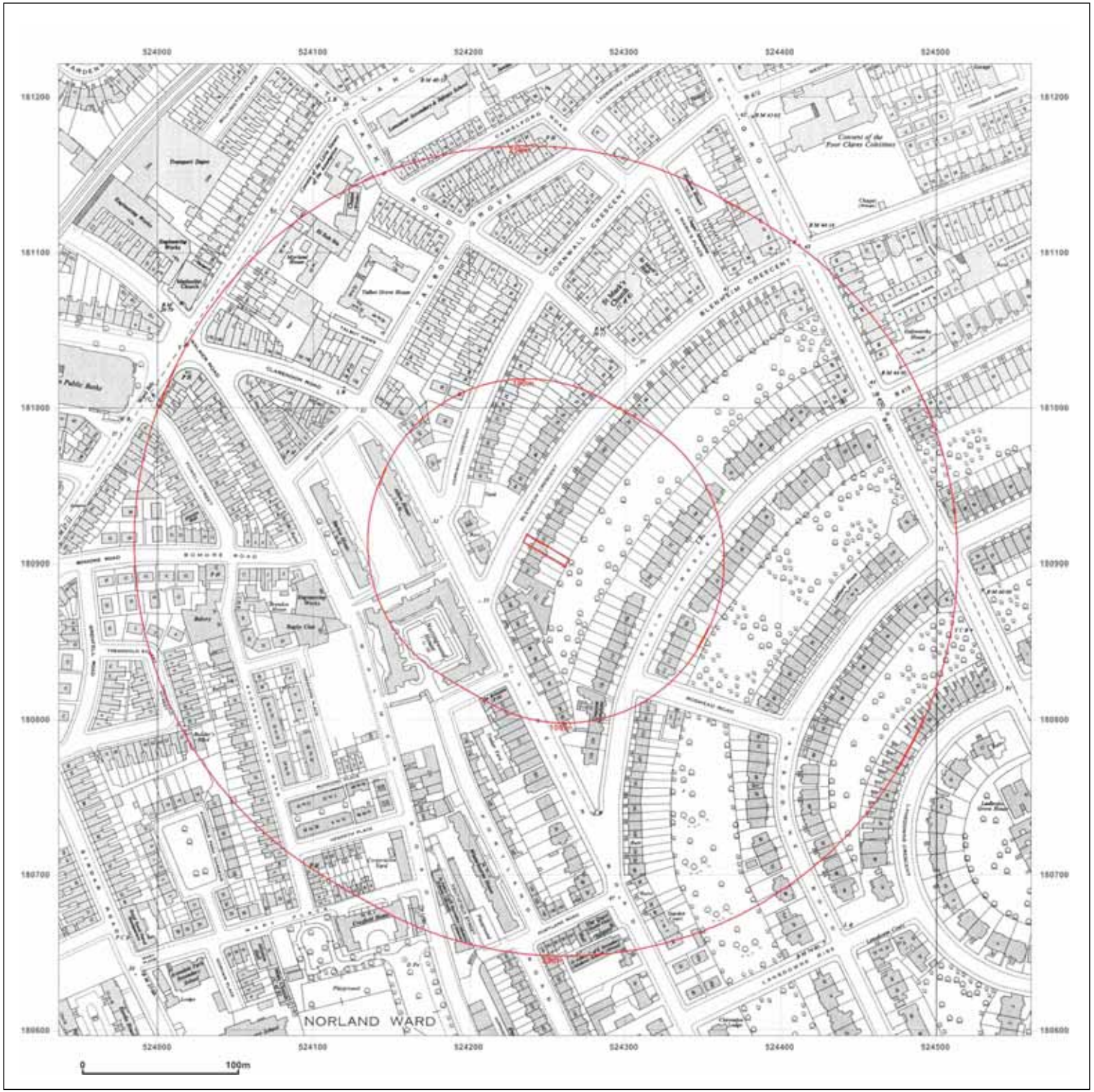

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1953**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1953
Revised 1953
Edition 1955
Copyright N/A
Levelled 1953

Surveyed 1953
Revised 1953
Edition 1955
Copyright N/A
Levelled 1953

Surveyed 1953
Revised 1953
Edition 1955
Copyright N/A
Levelled 1953

Surveyed 1953
Revised 1953
Edition 1955
Copyright N/A
Levelled 1934

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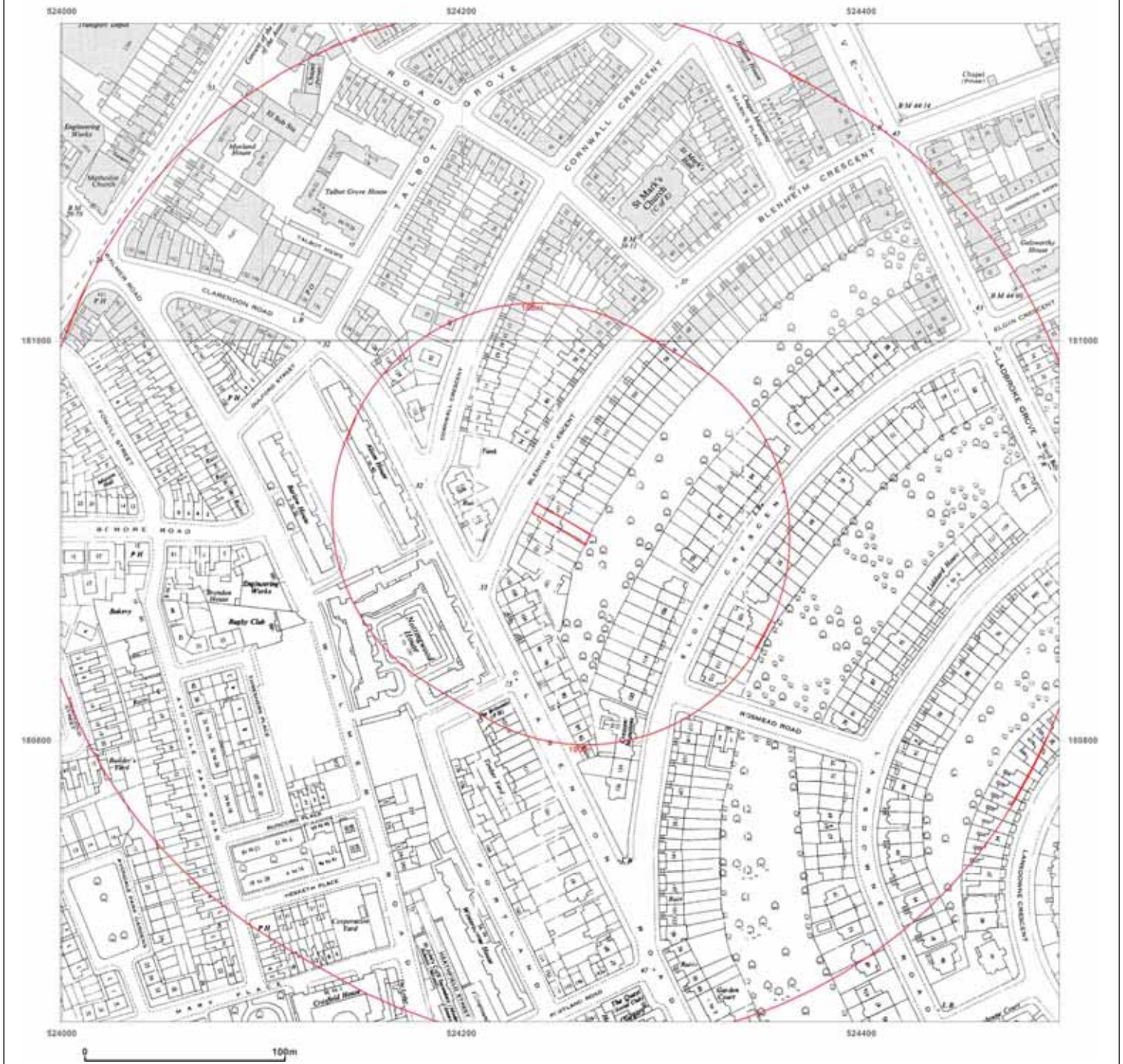

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1953-1954**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
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Surveyed 1953
Revised 1953
Edition N/A
Copyright N/A
Levelled 1953

Surveyed 1953
Revised 1953
Edition N/A
Copyright N/A
Levelled 1953

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
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Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1953-1955**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1953
Revised 1953
Edition 1955
Copyright N/A
Levelled 1953

Surveyed 1953
Revised 1953
Edition 1955
Copyright N/A
Levelled 1934

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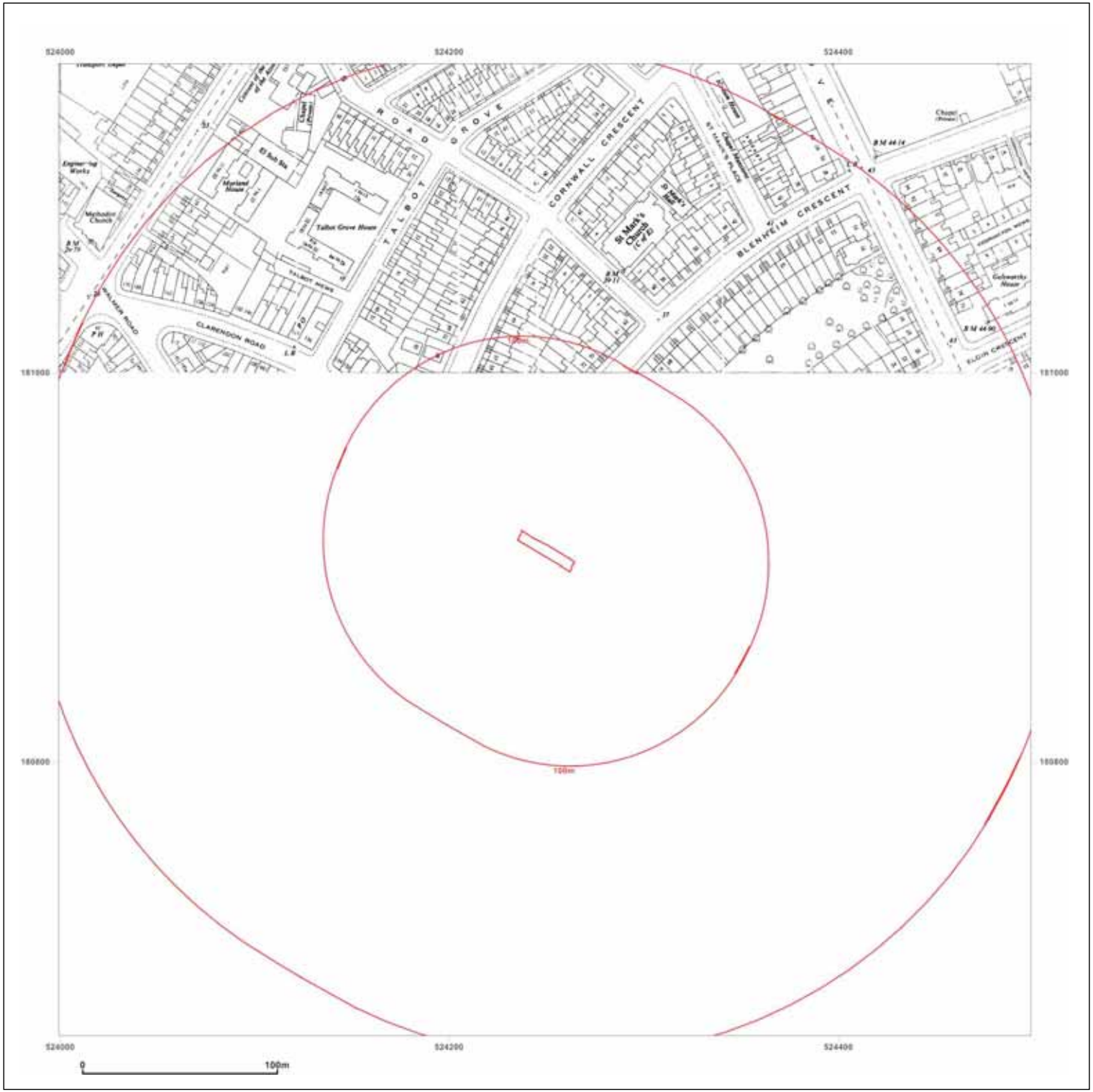

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1954-1955**

Scale: 1:1,250

Printed at: 1:2,000

N
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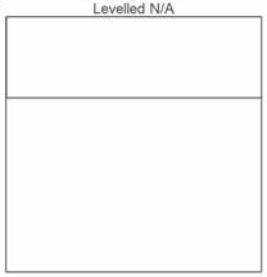
Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A



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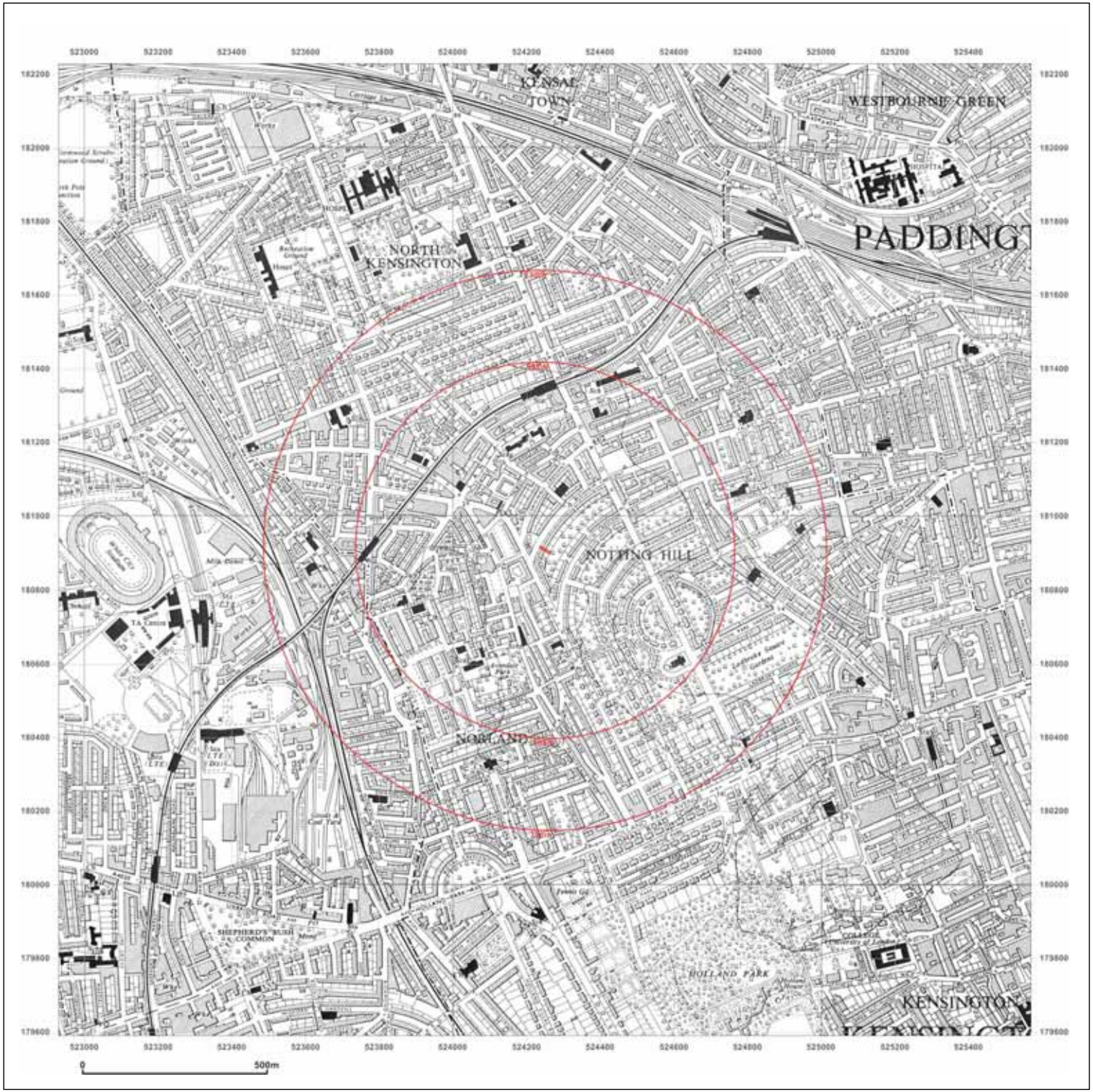

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: Provisional
Map date: **1955-1958**
Scale: 1:10,560
Printed at: 1:10,560

N
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Surveyed 1957
Revised 1957
Edition N/A
Copyright 1957
Levelled N/A

Surveyed 1957
Revised 1957
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1958
Revised 1958
Edition N/A
Copyright N/A
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Surveyed 1955
Revised 1955
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Production date: 21 July 2014

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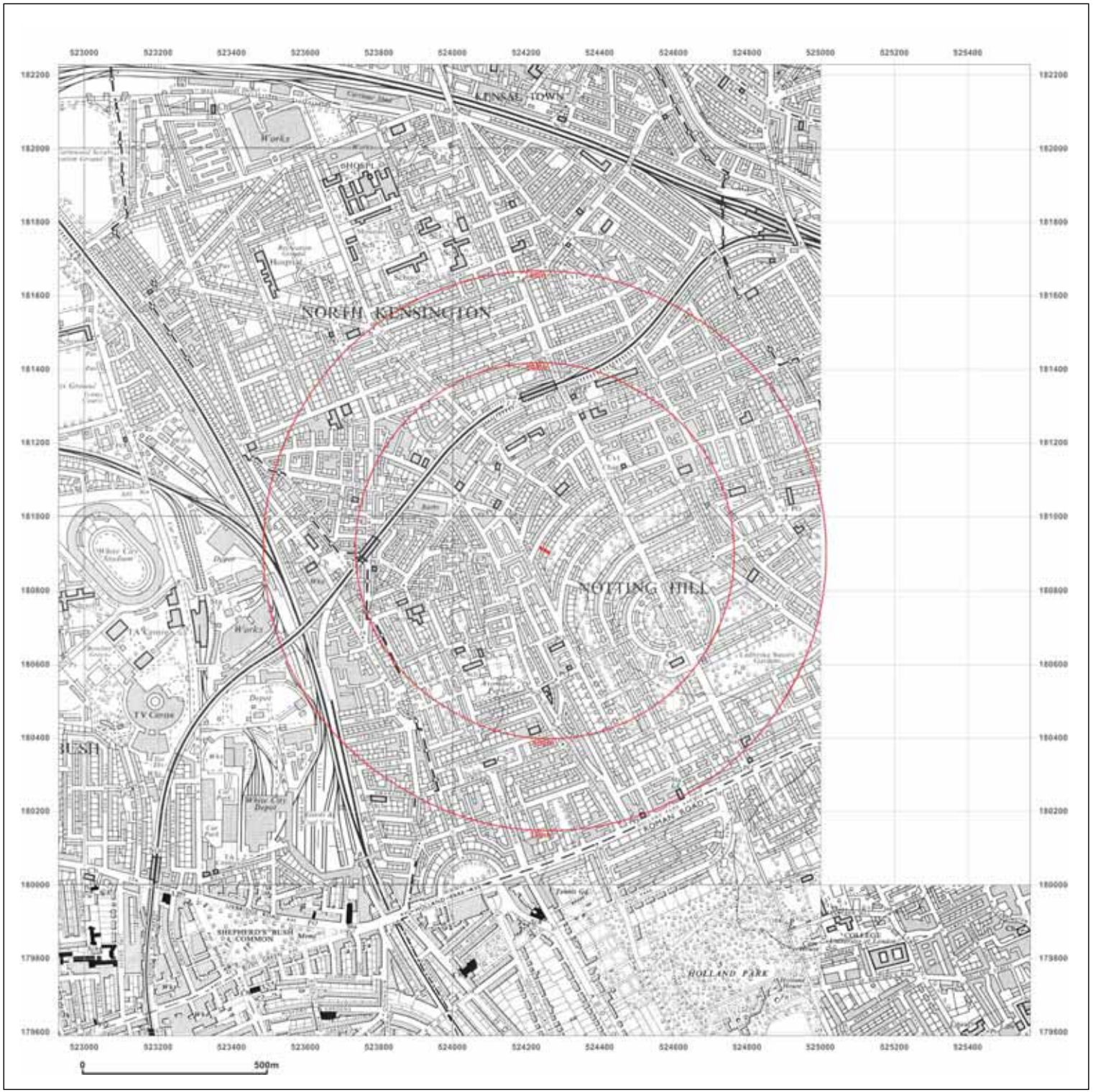

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: Provisional

Map date: **1962-1967**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1965
Revised 1965
Edition N/A
Copyright 1967
Levelled N/A

Surveyed 1958
Revised 1958
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1967
Revised 1967
Edition N/A
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Levelled N/A

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Production date: 21 July 2014

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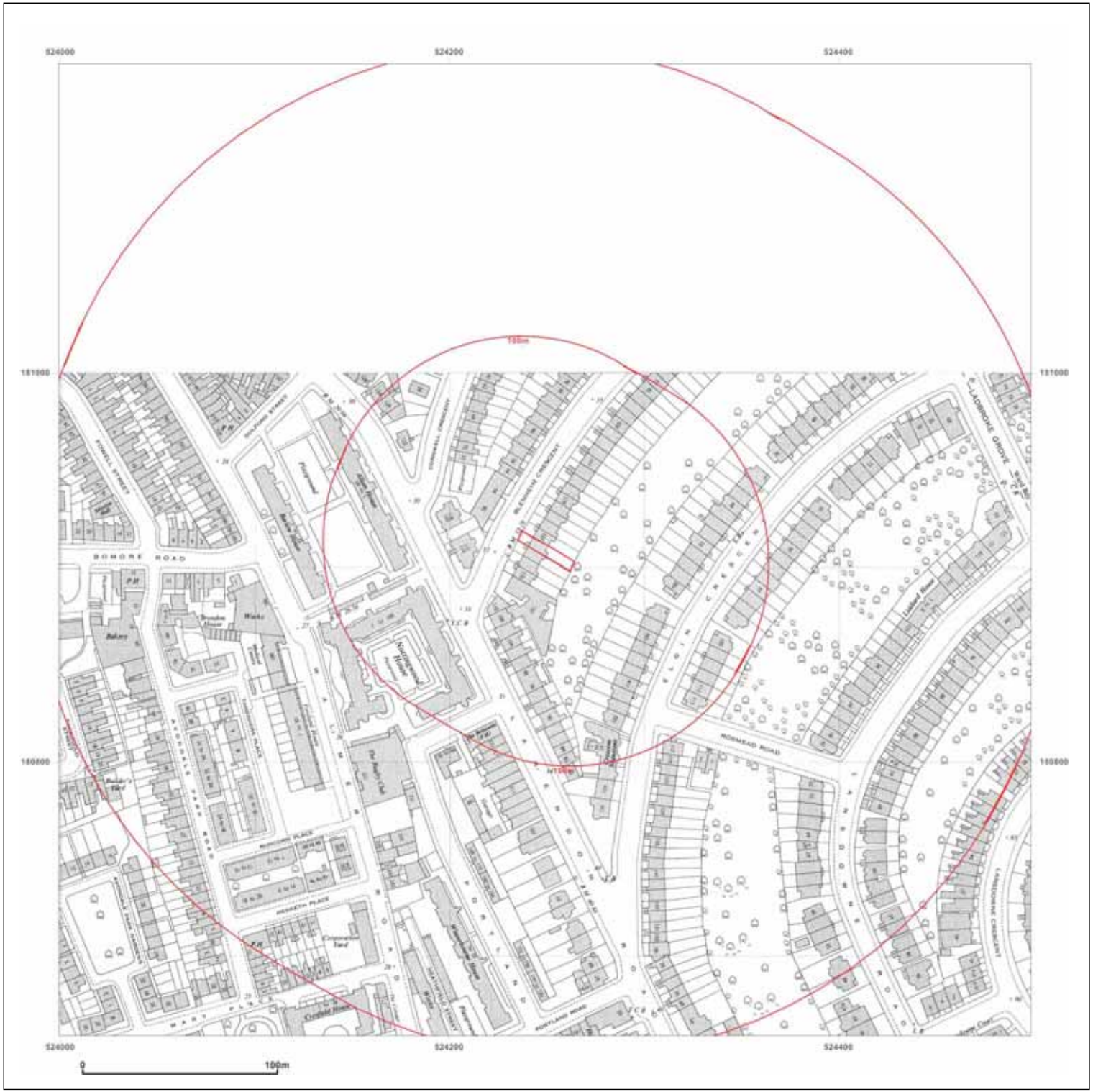

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Ground Investigation
Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1963-1965**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1963
Revised 1963
Edition N/A
Copyright 1965
Levelled 1953

Surveyed 1953
Revised 1963
Edition N/A
Copyright 1963
Levelled 1953

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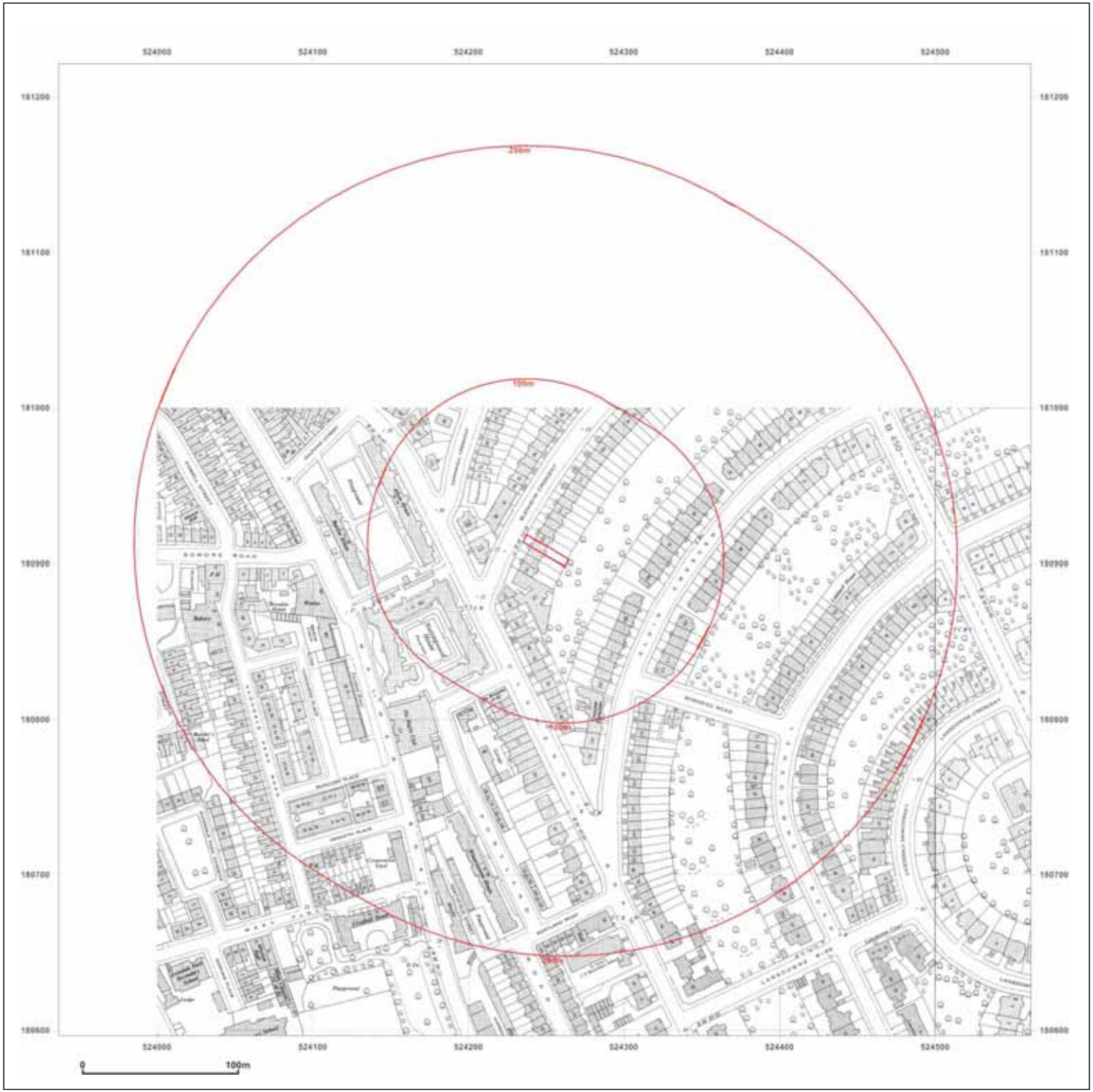

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1966**

Scale: 1:2,500

Printed at: 1:2,500

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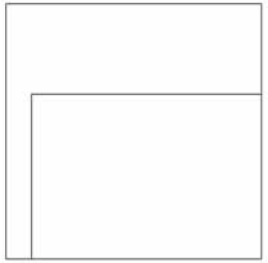

Surveyed 1963
Revised 1963
Edition 1966
Copyright 1966
Levelled 1953

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Site Details:

129,BLENHEIM CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1971-1973**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1953 Revised 1971 Edition N/A Copyright 1972 Levelled 1953	Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A
Surveyed 1953 Revised 1971 Edition N/A Copyright 1971 Levelled 1953	Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A

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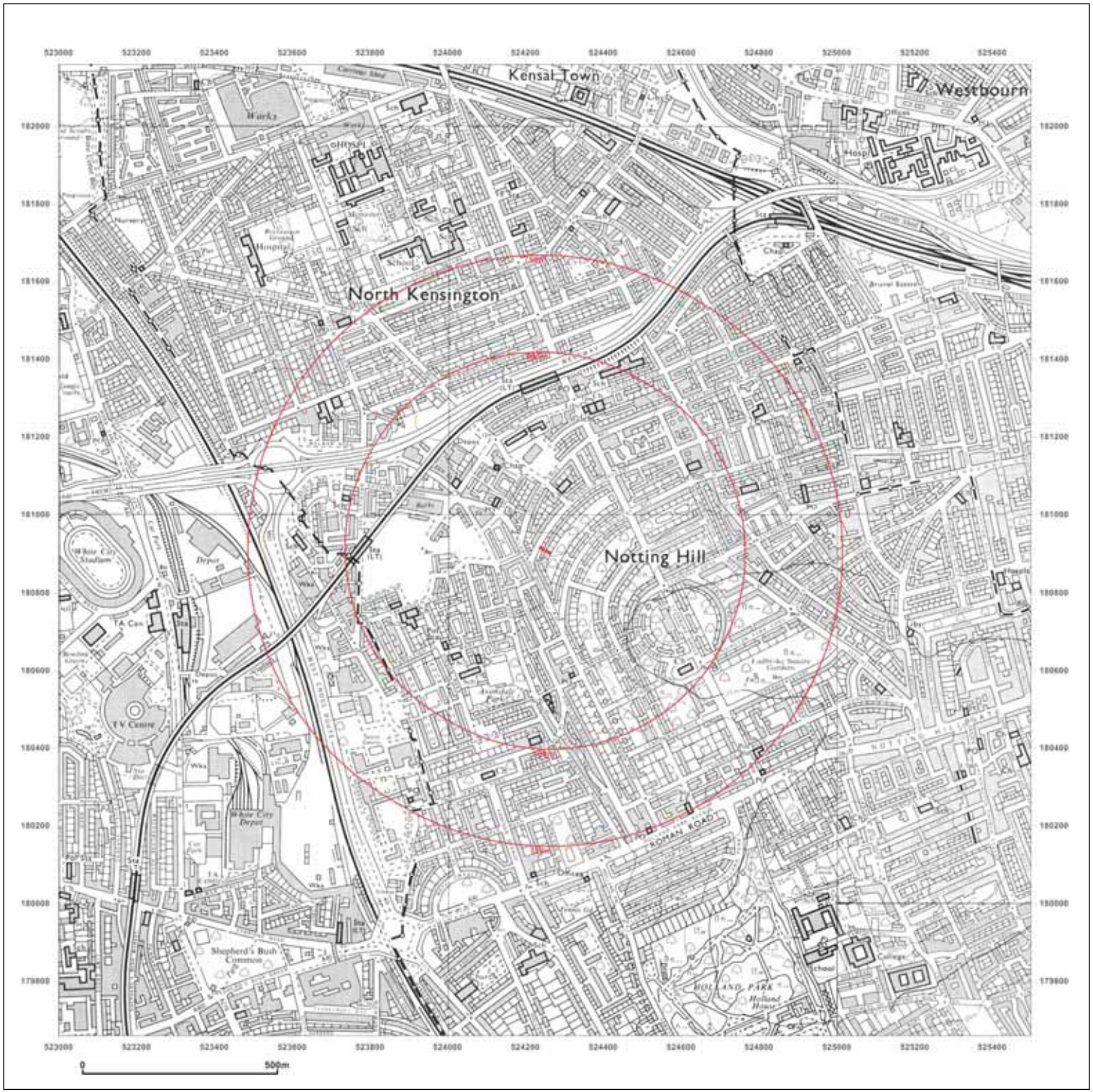

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid
Map date: **1973-1974**
Scale: 1:10,000
Printed at: 1:10,000

N
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Surveyed 1973
Revised 1973
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1972
Revised 1973
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1974
Revised 1974
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1973
Revised 1973
Edition N/A
Copyright N/A
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Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1973-1977**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1953
Revised 1971
Edition N/A
Copyright 1973
Levelled 1953

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1953
Revised 1975
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Levelled 1973

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Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1976-1981**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
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Levelled 1973

Surveyed 1953
Revised 1975
Edition N/A
Copyright 1976
Levelled 1973

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Contamination Assessment

Site Details:

129,BLENHEIM CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1981-1986**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1973 Revised 1986 Edition N/A Copyright 1986 Levelled 1973	Surveyed N/A Revised N/A Edition N/A Copyright 1981 Levelled 1974
Surveyed 1973 Revised 1986 Edition N/A Copyright 1986 Levelled 1973	Surveyed N/A Revised N/A Edition N/A Copyright 1981 Levelled 1974

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Contamination Assessment

Site Details:

129,BLENHEIM
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Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1982-1987**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1981
Revised 1982
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1981
Revised 1987
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1984
Revised 1985
Edition N/A
Copyright N/A
Levelled N/A

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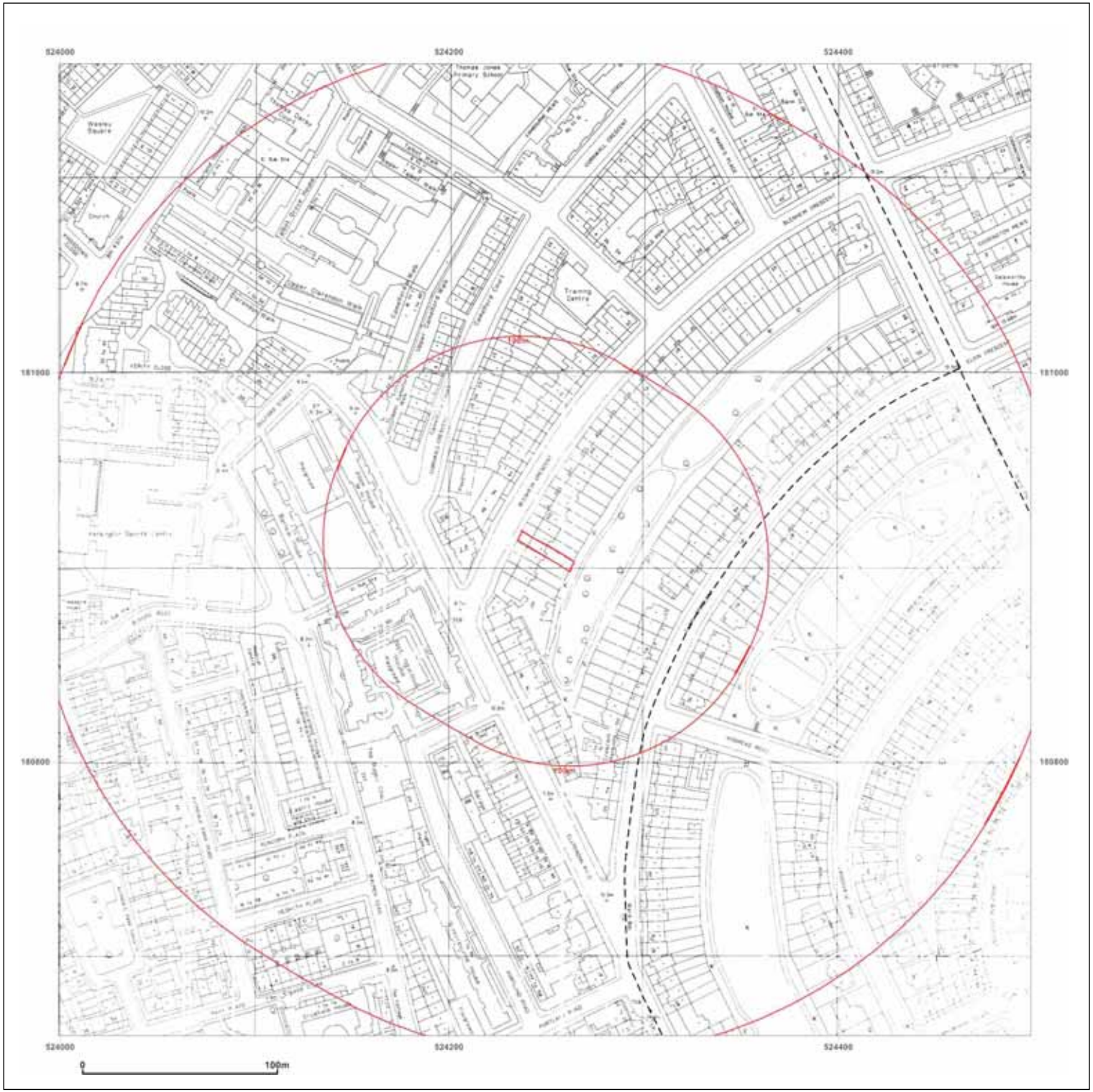

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1988-1991**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1991
Revised 1991
Edition N/A
Copyright 1991
Levelled N/A

Surveyed 1991
Revised 1991
Edition N/A
Copyright 1991
Levelled N/A

Surveyed 1973
Revised 1988
Edition N/A
Copyright 1988
Levelled 1973

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1991
Levelled N/A

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Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1989-1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed 1953
Revised 1989
Edition N/A
Copyright 1989
Levelled N/A

Surveyed 1991
Revised 1991
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Copyright 1991
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Production date: 21 July 2014

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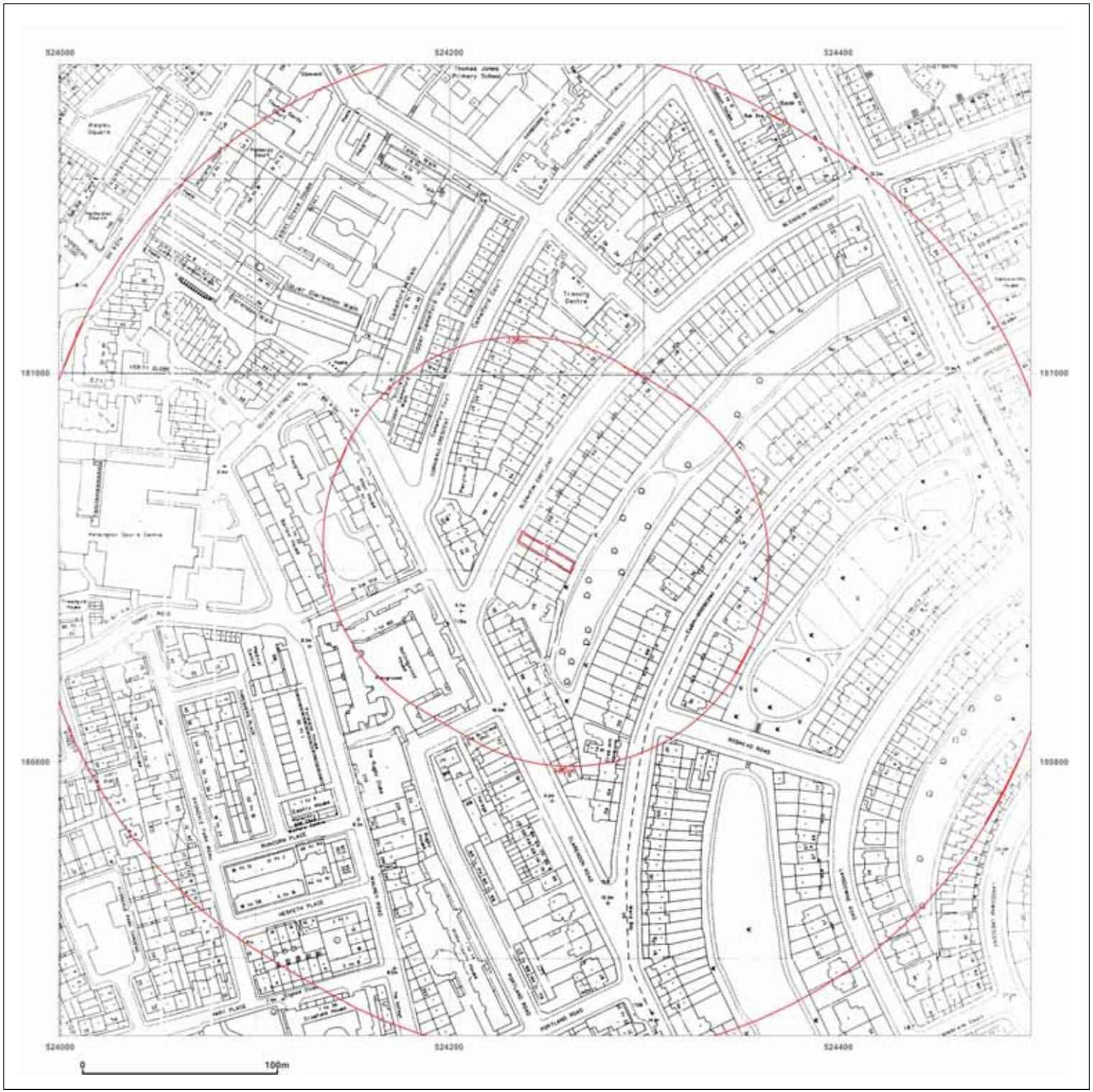

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Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid

Map date: **1991-1995**

Scale: 1:1,250

Printed at: 1:2,000

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Production date: 21 July 2014

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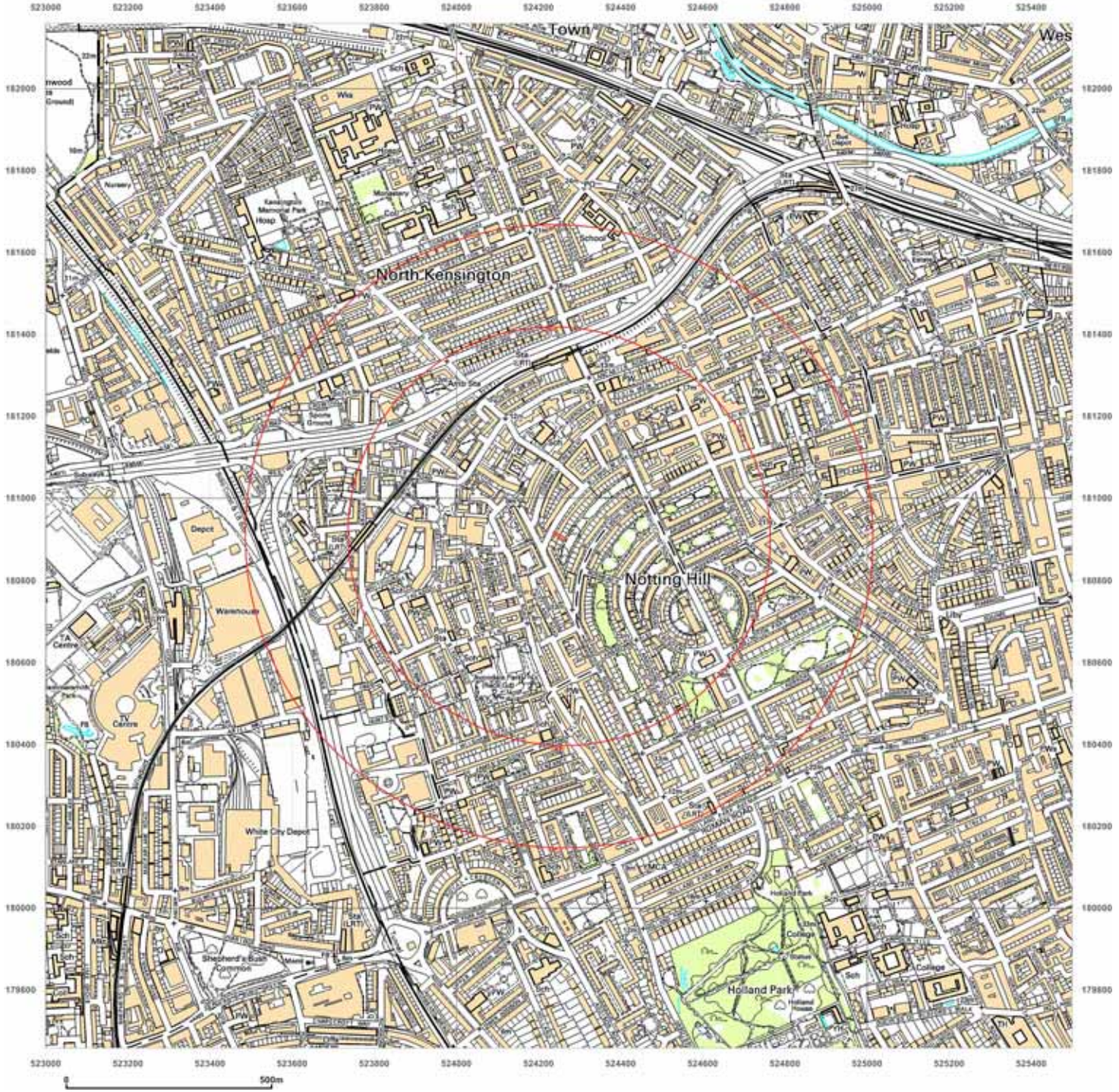

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM
CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: 1:10,000 Raster
Map date: **2002**
Scale: 1:10,000
Printed at: 1:10,000

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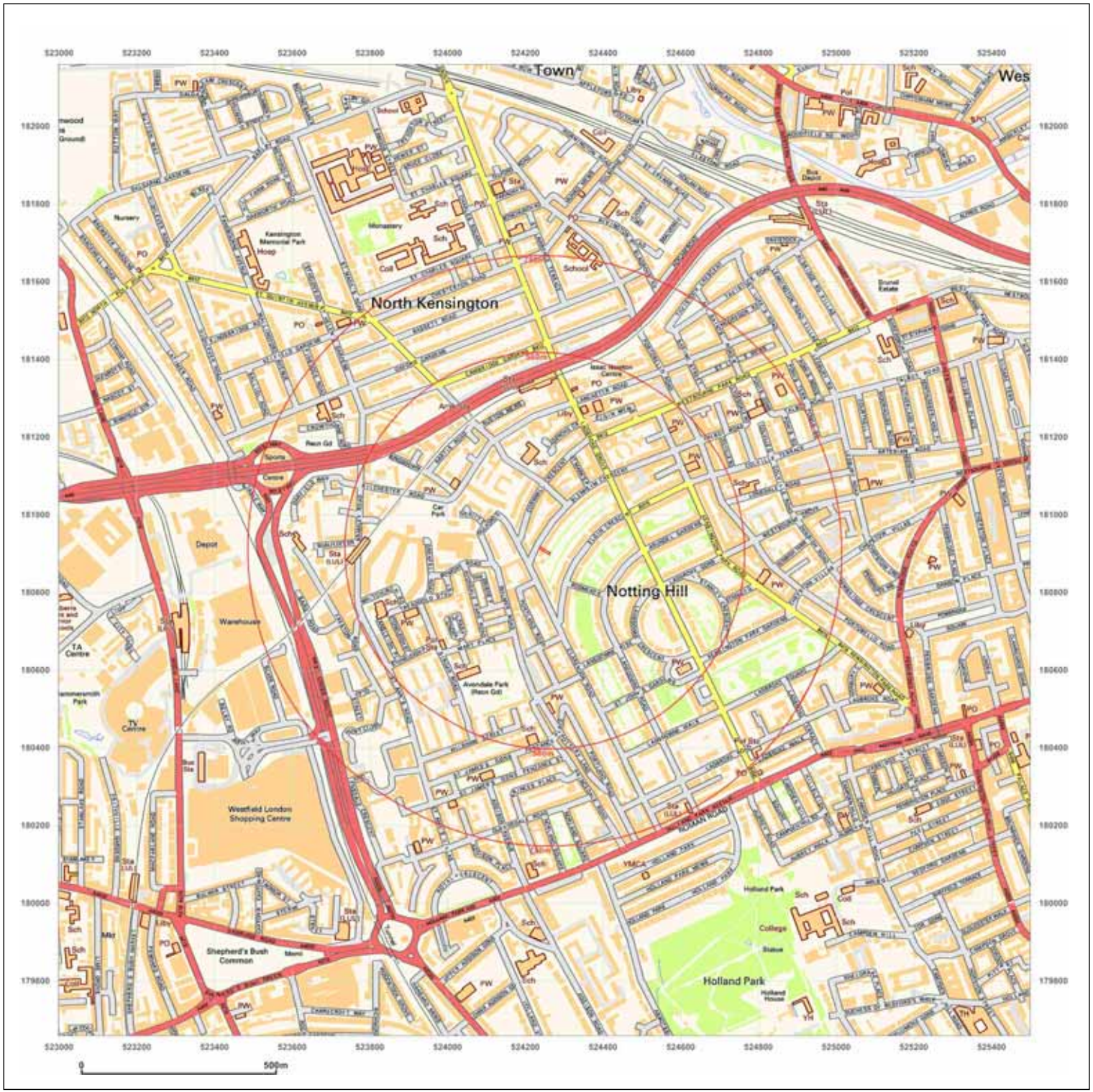

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Geotechnical Analysis
Contamination Assessment

Site Details:

129,BLENHEIM CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid
Map date: **2010**
Scale: 1:10,000
Printed at: 1:10,000

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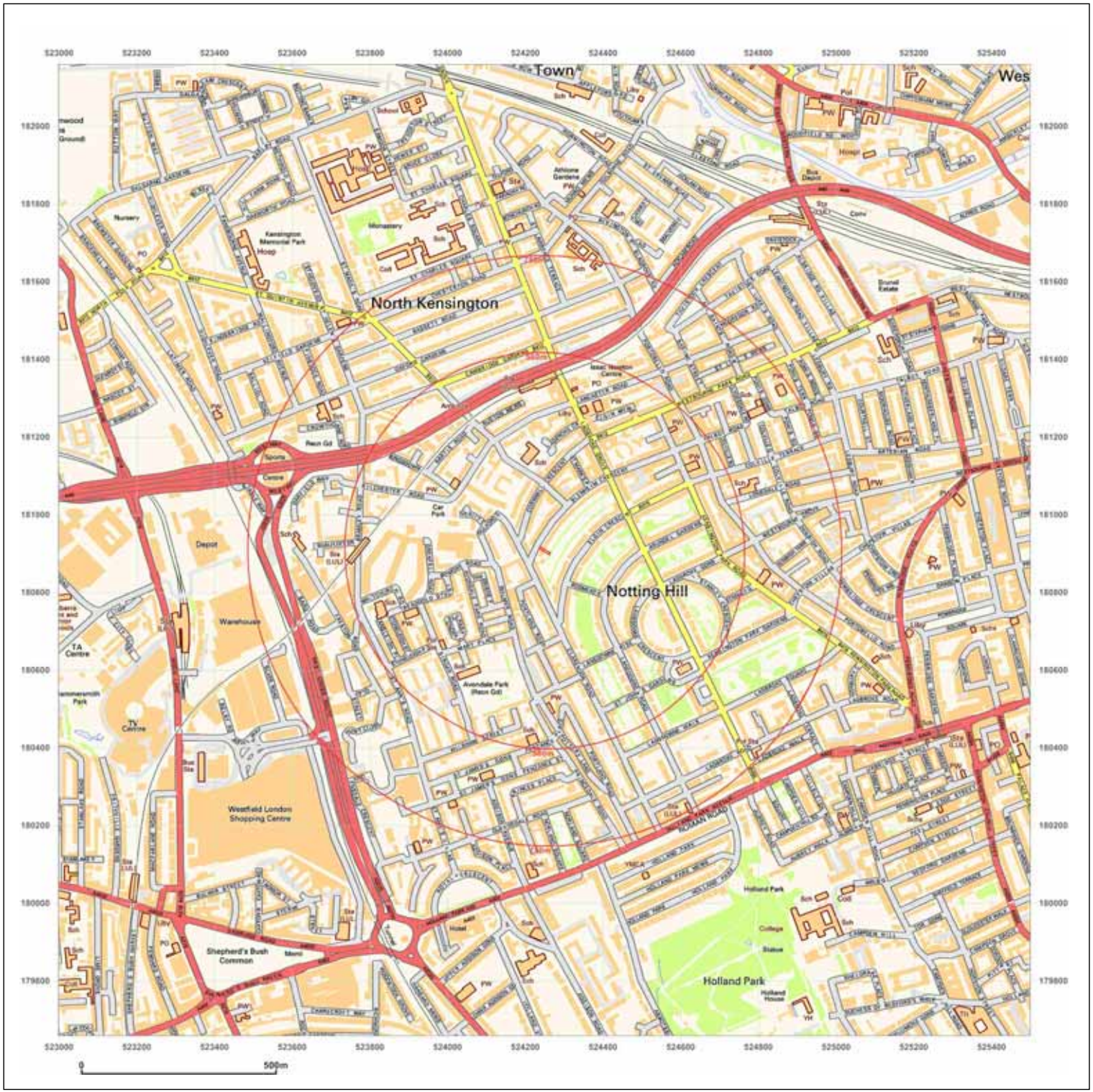

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Contamination Assessment

Site Details:

129,BLENHEIM CRESCENT,LONDON, W11 2EQ

Client Ref: 9631/OT
Report Ref: SCL-1573292
Grid Ref: 524249, 180909

Map Name: National Grid
Map date: **2014**
Scale: 1:10,000
Printed at: 1:10,000

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2014

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