



Mr P Cank

178 Royal College Street, Camden, London NW1 0SP

Preliminary Risk Assessment

1921113 R01 (00)

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RSK



RSK GENERAL NOTES

Project No.: 1921113 R01 (00)



Title: Preliminary Risk Assessment: 178 Royal College Street, Camden, London NW1 0SP

Client: Mr P Cank, 178 Royal College Street, Camden, London, NW1 0SP.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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EXECUTIVE SUMMARY

Commissioning and purpose of assessment	RSK Environment Limited (RSK) was commissioned by Delve Architects on behalf of Paul Cank to carry out a Phase 1 Desk Study of the land at 178 Royal College Street, Camden, NW1 0SP and grid reference TQ 29223 84172. The overall aim of the project was to assess any potential land contamination sources in line with the proposal to redevelop the site with an extension to the existing residential property.
Site description and proposed development	The site currently comprises a residential property and covers an area of approximately 100 m sq. The property is due to have a single storey extension built to the rear of the building maintaining its residential use.
History of site and surrounding area	The earliest available maps (1851) indicate the site has likely been used as a residential property since then. There are no potential sources of contamination identified on site. Several potentially contaminative current activities have been identified in the surrounding area, including two dry cleaners, a railway and a car repair garage.
Previous site investigation (SI) reports	There are no previous SI reports available.
Geology and environmental setting	The Site is underlain by London Clay according to published geological data for the site and surrounding area. No superficial deposits are present on site. No sensitive environmental receptors have been identified on site or within 250 m of the site boundary.
Geotechnical constraints assessment	There is the potential for shrinkable clay soils, silt rich soils, made ground, adverse ground chemistry and variable site topography to be present or affect the site and its proposed development.
Initial conceptual site model (CSM) and preliminary risk assessment (PRA)	No potentially complete contaminant linkages have been identified with a risk estimate of moderate to low or above. Uncertainties and data gaps have been identified in the CSM at desk study stage.
<i>The information given in this summary is necessarily incomplete and is provided for initial briefing purposes only. The summary must not be used as a substitute for the full text of the report.</i>	

1 INTRODUCTION

1.1 Commissioning

RSK Environment Limited (RSK) was commissioned by Delve Architects and Blue Engineering on behalf of the property owner (Mr Paul Cank) to carry out a Preliminary Risk Assessment of the land at 178 Royal College Street. The project was carried out to an agreed brief as set out in RSK's proposal (Ref. 1921113 T01 (00), dated 9th January 2020).

This report is subject to the RSK service constraints given in **Appendix A** and limitations that may be described through this document.

1.2 Proposed development

The site is due to be redeveloped with the erection of a single storey rear extension at lower ground floor level with roof terrace and garden access stair. The planned layout of the site is shown in **Appendix B**.

1.3 Objectives

The objective of the work is:

- to provisionally identify any land contamination and/or geotechnical constraints to the proposed development and to support discharge of relevant planning conditions and relevant building control requirements; and
- to identify the need for investigation or remediation works to demonstrate that the site is suitable for its proposed use.

The report would assist with the discharge of planning conditions as detailed below:

- Prior to the commencement of work for each section of the development (or stage in the development as may be agreed in writing by the Local Planning Authority (LPA)) a scheme including the following components (where applicable) to address the risk associated with site contamination shall be submitted to and approved in writing by the LPA:

A) A preliminary risk assessment which has identified all previous uses, potential contaminants associated with those uses (including asbestos, landfill gas, ground water contaminants); a conceptual model of the site indicating sources, pathways and receptors; and potentially unacceptable risks arising from contamination at the site.

B) A site investigation scheme based on (a) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off site.

C) The results of the investigation and detailed risk assessment referred to in (b) and, based on these, in the event that remediation measures are identified

necessary, a remediation strategy giving full details of the remediation measures required and how they are to be undertaken.

D) A verification plan demonstrating the works set out in the remediation strategy have been undertaken.

Any investigation and risk assessment must be undertaken in accordance with the requirements of the Environment Agency's Model Procedures for the Management of Contamination (CLR11). In the event that additional significant contamination is found at any time when carrying out the approved development it must be reported in writing immediately to the LPA.

For the avoidance of doubt, this condition can be discharged on a section by section basis.

1.4 Scope of works

The scope of this assessment has been developed in accordance with relevant British Standards and authoritative technical guidance as referenced through the report. The assessment of the contamination status of the site is in line with the technical approach presented in CLR 11 Model Procedures for the Management of Land Contamination (Environment Agency, 2004) and in general accordance with BS 10175: 2011 + A2 2017 (BSI, 2017). It is also compliant with relevant planning policy and guidance.

A brief summary of relevant legislation and policy relating to land contamination is given in Appendix C.

- review of the history of development on the site and surroundings, including a study of historical ordnance Survey mapping and other sources of historical information via an environmental database report;
- assessment of local geology, hydrogeology and surface water setting, including the identification of potential geological hazards including mining etc.;
- review of relevant information held by appropriate statutory authorities, e.g. local authority Environmental Health Departments and Environment Agency/ NRW/ SEPA*, obtained from the environmental database report and/ or consultations;
- development of an initial conceptual site model (CSM) identifying potential contaminant linkages for potential contaminants, completion of a preliminary risk assessment (PRA) and identification of key uncertainties and assumptions in the CSM;
- preliminary consideration of geotechnical constraints and hazards; and
- identification of the need for further action, e.g. intrusive investigations, where applicable.

1.5 Existing reports

No existing reports relevant to the site assessment have been provided to RSK.

1.6 Limitations

The study aims principally to identify and assess the potential risks and liabilities associated with contamination of the ground, on and in the vicinity of the site. While this includes consideration of current operations and housekeeping on the site, the report does not constitute a comprehensive environmental audit of the site, as covered under ISO 14001.

The study was designed generally to meet the objectives of a preliminary (phase 1) investigation, as defined by BS 10175:2011 (BSI, 2017).

This report should be considered in the light of any changes in legislation, statutory requirement or industry practices that have occurred subsequent to the date of issue.

The "vicinity" of the site for the purposes of this report is defined as locations situated within an approximate 250 m radius of the site, although certain sources and/or sensitive targets further than 250 m may also have been considered.

The opinions expressed in this report, and the comments and recommendations given, are based on the information obtained from the desk assessment and the site reconnaissance survey. No intrusive investigations have been undertaken to confirm the actual ground conditions and hence the environmental status of the site.

While asbestos-containing materials are not suspected to be present at the site, asbestos may well be present in soils in discrete areas and may be encountered during future ground investigation.

A detailed survey of invasive plant species is outside the scope of this investigation therefore detailed comments with regards to such species have been omitted from this report.

2 SITE DETAILS

2.1 Site location

Site location details are presented in **Table 1** and a site location plan is provided on Figure 1.

Table 1 Site location details

Site name	178 Royal College Street
Full site address and postcode	178 Royal College Street, Camden NW1 0SP
National Grid reference (centre of site)	TQ 29223 84172

2.2 Site description

The Site boundary and current site layout are shown on **Appendix B**. The Site covers an area of c. 0.01 hectares. It is currently occupied by residential land use.

The site entirely comprises a residential dwelling situated on the western half with associated outside space to the east, at the rear of the property. The site is roughly rectangular in shape orientated north east to south west.

2.3 Surrounding land uses

The Site is located in the London borough of Camden, within a predominantly residential setting. Immediate surrounding land uses are described in **Table 2**.

Table 2 Surrounding land uses

North	Residential housing, railway line with further residential housing and commercial units beyond
East	Residential housing with ground floor commercial units
South	Residential housing with ground floor commercial units and Regents Canal beyond
West	Residential housing with ground floor commercial units and Camden Road Rail Station beyond

2.4 Development plans

The proposed layout of the site, at the time of preparing this report, is shown in **Appendix B**.

The proposed development on site comprises a single storey extension to the rear of the property, housing a kitchen and a strong walk-on flat roof with skylight. A small outside space will be retained, furthest away from the property.

Camden Borough Council have a record of an application to erect a single storey rear extension at lower ground floor level with roof terrace and garden access staircase, the current status of the application is awaiting final decision.

No details of the proposed ground levels have been provided therefore for the purpose of this report it has been assumed that the current levels will remain unchanged.

3 DESK-BASED ASSESSMENT

3.1 Site history

3.1.1 Historical development record

The development history of the site and surrounding area based upon assessment of historical plans and records is detailed in **Table 3** Summary of historical development. The historical maps reviewed are shown within the environmental database report in **Appendix D**.

Table 3 Summary of historical development

Date from	Date to	Historical Land Use (on-site)	Area of site
1851	Present	Residential housing with small garden to the east	Whole site
Date from	Date to	Historical Land Use (off-site)	Distance (m) and orientation
Pre 1873	Present	Residential development of the Camden area	Immediate surrounds and beyond in all directions
1873	1896	Coal Depot for St Pancras Station	500 m west
1873	1990	Railway yards for St Pancras	Between 200 m and 1200 m east
1873	1999	Camden Goods Depot	550 m west
1873	Present	Camden Road rail station	40 m west

1920	Present	Electrical substation	800 m south
1920	Present	St Pancras Hospital	750 m south east
1920	1972	Coal Depot	1000 m south east
1920	1990	Train carriage shed	750 m south west
1957	1972	Factory at St Pancras Station	475 m east
1962	1972	Works for unknown industry	220 m south east
1962	2006	Hospital	375 m south west
1990	Present	Warehouse and depot	550 m south east
Relevant information sources: Historical OS maps <input checked="" type="checkbox"/> Town plans <input checked="" type="checkbox"/> Information from the Local Planning Authority <input type="checkbox"/> Aerial photography <input type="checkbox"/> Previous reports <input type="checkbox"/>			
<i>Note: Reference to published historical maps provides invaluable information regarding the land use history of the site, but historical evidence may be incomplete for the period pre-dating the first edition and between successive maps.</i>			

3.1.2 Unexploded ordnance

A review of publicly available unexploded ordnance (UXO) risk maps indicates that the site is located in an area with moderate potential for wartime bombs to be present (Zetica, 2020). However, the presence of hardstanding/existing building on the site since before 1873 indicates in reality the likelihood of locating an unexploded device is very unlikely.

3.2 Information from environmental database report

Relevant environmental permits and incidents detailed within the environmental database report (see **Appendix D**) are summarised below in **Table 4** Summary of environmental permits, landfills and incidents.

Table 4 Summary of environmental permits, landfills and incidents

Data type	Entries on-site	Entries <250m from site	Entries >250m from site of relevance	Details
Agency and hydrological				
Environmental permits – incorporating Integrated Pollution Prevention and Control, Integrated Pollution Controls, Local Authority Integrated Pollution Prevention and Control	No	Yes	23	Local Authority Pollution Prevention and Control, 63 m north, dry cleaners, 25 th January, permitted, 122 Camden Road
Enforcement and prohibition notices	No	No	No	N/A
Pollution incidents to controlled waters, Prosecutions relating to controlled waters, Substantiated pollution incident register, Water Industry Act referrals	No	Yes	3	Pollution incident to controlled waters, 141 m north west, unknown oil pollutant, 15 th January 1996, category 3 – minor incident
Discharge consents	No	No	3	trade discharges into the canal and River Guc – Paddington Arm
Registered radioactive substances	No	1	18	234 m south east Proxima Concepts Limited
Landfill and waste				
Active landfills	No	No	No	N/A
Historic/closed landfills	No	No	No	N/A
Other waste management licences	No	No	5	Registered waste transfer sites, treatment or disposal sites. Nearest is 497 m west for civic waste amenity site.

Data type	Entries on-site	Entries <250m from site	Entries >250m from site of relevance	Details
Potentially in-filled land (pit, quarry, pond, marsh, river, stream, dock etc)	No	No	5	N/A
Hazardous substances/industrial land uses				
Control of Major Accident Hazards (COMAH) sites	No	No	No	N/A
Explosives sites, Notification of Installations Handling Hazardous Substances (NIHHS), Planning hazardous substance consents/enforcements	No	No	No	N/A
Contaminated land Part 2A register entries and notices	No	No	No	N/A
Contemporary trade directory entries	No	48	400	Dry cleaners – 33 m north. Car repair shop – 49 m east. Carpet, curtain and upholstery cleaners – 68 m south west. Various garages to the east. Footwear manufacturers 110 m south. Clothes manufacturers 250 – 300 m south east.
Fuel station entries	No	No	8	Nearest is located 260 m North and is obsolete, closest operational one is 520 m north east operated by Esso.
<i>Note: Entries have only been included within the table where they are located within a 250m radius of the site or, where they fall outside of this radius but are considered to comprise a significant entry.</i>				

In summary, items that have been identified to represent an on-going potential source of contamination that could affect the site comprise:

- Dry cleaners 33 m north.
- Car repair shop 49 m east.
- Curtain, carpet and upholstery cleaners 68 m west.

These entries have been carried forward for consideration within the initial conceptual site model contained in Section 6.

3.3 Information from regulatory authorities

3.3.1 Planning records

Planning records held by the Local Authority Planning Department pertaining to the site and relevant to the current assessment are summarised in Table 5 Planning information.

Table 5 Planning information

Year	Details and application reference no.	Part of site
21 st August 2019	Ref No. (2019/2377/P) Erection of a single storey extension at lower ground floor level with roof terrace and garden access stair. Permission granted.	Entire site

3.3.2 Site services

Buried utility services and their backfill can provide preferential pathways for gas, vapour or groundwater to migrate along to another part of the site or to a receptor. They can also represent significant constraints to development.

Obtaining a full set of service plans was outside the scope of this report.

3.4 Site geology

3.4.1 Anticipated geological sequence

Published records (British Geological Survey, 1994.) for the area and available historical borehole logs indicate the geology of the site to be characterised by the succession recorded in **Table 7** Site geology. There are over 50 publicly available BGS historical boreholes located on or within 500 m of the site, a selection of which are presented in **Appendix E**.

Table 6 Site geology

Strata	Description	Estimated thickness	Permeability
Made Ground	Unknown	>1.5 m	Unknown
London Clay Formation	Poorly laminated blue-grey or grey-brown clay	45 m	Impermeable
Lambeth Group	Vertically and laterally variable sequences of mostly clays, sands and gravels	10 m	Variable
White Chalk Subgroup	White nodular chalk with flints and discrete marl seams	70 m	Poor in weathered zone, increasingly permeable with depth

Relevant information sources: BGS Geotitles borehole logs Previous SI reports

3.4.2 Radon

The environmental database report indicates that the site is not located within an 'Affected Area'. An 'Affected Area' is one with 1% or more homes above the radon Action Level of 200 Bq m⁻³, and therefore the risk of significant ingress of radon into structures on-site is considered low and protection measures are not necessary in the construction of non-domestic buildings.

Although the radon data used in production of the UK Radon Indicative Atlas comes from measurements in homes, the maps indicate the likely extent of the local radon hazard in all buildings.

3.5 Hydrogeology

A summary of the hydrogeological setting of the site, with respect to the anticipated geological sequence set out in Section 3.5 is presented below in **Table 7** Summary of hydrogeological setting.

Table 7 Summary of hydrogeological setting

Condition	Description
Aquifer characteristics	The site is underlain by a unproductive strata relating to the London Clay formation. The presence of low permeability clay at relatively shallow depths beneath the site, while restricting downwards migration, may increase the potential for lateral migration of shallow groundwater (and therefore mobile contamination, if present).

Condition	Description
Depth to groundwater and flow	<p>The anticipated depth to the groundwater table is in the order of 30 m below ground level estimated from BGS Borehole logs within the Thanet Sand deposits.</p> <p>The site is underlain by approximately 30 m of London Clay that confines the aquifer within the Thanet Sands and Chalk which are in hydraulic continuity.</p> <p>Shallow groundwater in the site area is anticipated to flow in a southerly direction, i.e. towards and in the direction of flow of the River Thames.</p> <p>It is likely that shallow water may be present in any made ground deposits present on-site.</p>
Rising groundwater levels	Not applicable.
Groundwater recharge/attenuation	Most of the site is currently covered with buildings and hardstanding and therefore this will limit infiltration to ground and groundwater recharge, except where SUDS are present.
Historical implications for hydrogeology	None are recorded near to or beneath the site.
Licensed groundwater abstractions	The environmental database report indicates that there are 13 current licensed groundwater abstractions, of which none are public water supply boreholes within a 2 km radius of the site.
Source protection zones	Information available in the Envirocheck report/ MAGIC website indicates that the site does not lie within a currently designated groundwater Source Protection Zone (SPZ).

3.6 Hydrology

A summary of the hydrology within the site area is summarised in **Table 8**.

Table 8 Summary of hydrology in site area

Condition	Description
Surface watercourses/ features	There are no ponds, streams or drainage ditches on or adjacent to the site. The nearest watercourse is the Grand Union Canal located approximately 100 m south of the site.
Surface water abstractions	The environmental database report indicates that there are 4 current licensed surface water abstractions within a 2 km radius of the site. The closest of these, which is located 732 m west and is utilised for spray irrigation.
Site drainage	Surface water drainage is likely to discharge into a mains public sewer / surface water drain.
Preliminary flood risk assessment	The indicative floodplain map for the area, shows that the site lies within Flood Zone 1 and has a low probability of flooding. There is no requirement at this stage to undertake a flood risk assessment which is outside the scope of this report. https://flood-map-for-planning.service.gov.uk/ https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?easting=471054&northing=261111&address=15112141

3.7 Sensitive land uses

Table 9 provides a summary of any environmentally sensitive areas identified within 500 m of the site based on the environmental database report/other data source

Table 9 Environmentally sensitive areas

Feature	Present within 500m of site?	Details	Likely pathways from site?
International designations – Ramsar wetland, Special Area of Conservation (SAC), Special Protection Area (SPA)	No	NA	NA
National designations – Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), ancient woodland	No	NA	NA
Local designations – Local Nature Reserve, Site of Importance for Nature Conservation (SINC)	No	NA	NA
Nearest high sensitivity development, e.g. residential	Yes	The site is surrounded by residential property	Unlikely

4 PRELIMINARY GEOTECHNICAL CONSTRAINTS

4.1 Design class

BS EN 1997-1 defines three different Geotechnical Categories that structures may fall into, which are summarised as follows:

- Category 1: Small and relatively simple structures for which it is possible to ensure that the fundamental requirements will be satisfied on the basis of experience and qualitative geotechnical investigations; with negligible risk
- Category 2: Conventional types of structure and foundation with no exceptional risk or difficult ground or loading conditions
- Category 3: Structures or part of structures, which fall outside limits of Geotechnical Categories 1 and 2. Examples include very large or unusual structures; structures involving abnormal risks, or unusual or exceptionally difficult ground or loading conditions; structures in highly seismic areas; structures in areas of probable site instability or persistent ground movements that require separate investigation or special measures.

Based on the information provided above on the proposed development and in view of the anticipated ground conditions, a Geotechnical Category of 2 has been assumed.

4.2 Preliminary geotechnical hazards assessment

A summary of commonly occurring geotechnical hazards associated with the anticipated geology outlined in Section 3 above is given in **Table 10** together with an assessment of whether the site may be affected by each of the stated hazards.

Table 10 Summary of preliminary geotechnical risks that may affect site

Hazard category	Hazard status based on desk study findings and proposed development		Engineering considerations if hazard affects site
	Could be present and/or affect site	Unlikely to be present and/or affect site	
Sudden lateral changes in ground conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Likely to affect ground engineering and foundation design and construction
Shrinkable clay soils	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Design to NHBC Standards Chapter 4 or similar
Highly compressible and low bearing capacity soils, (including peat and soft clay)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Likely to affect ground engineering and foundation design and construction

Hazard category	Hazard status based on desk study findings and proposed development		Engineering considerations if hazard affects site
	Could be present and/or affect site	Unlikely to be present and/or affect site	
Silt-rich soils susceptible to rapid loss of strength in wet conditions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likely to affect ground engineering and foundation design and construction
Running sand at and below water table	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Likely to affect ground engineering and foundation design and construction
Karstic dissolution features (including 'swallow holes' in Chalk terrain)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	May affect ground engineering and foundation design and construction – refer to Section 4.1.2
Evaporite dissolution features and/or subsidence	<input type="checkbox"/>	<input checked="" type="checkbox"/>	May affect ground engineering and foundation design and construction
Ground subject to or at risk from landslides	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Likely to require special stabilisation measures
Ground subject to periglacial valley cambering with gulls possibly present	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Likely to affect ground engineering and foundation design and construction
Ground subject to or at risk from coastal or river erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Likely to require special protection/stabilisation measures
High groundwater table (including waterlogged ground)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	May affect temporary and permanent works
Rising groundwater table due to diminishing abstraction in urban area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	May affect deep foundations, basements and tunnels
Underground mining	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Likely to require special stabilisation measures
Effects of extreme temperature (e.g. cold stores or brick kilns/furnaces)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Likely to affect ground engineering and foundation design and construction
Existing sub-structures (e.g. tunnels, foundations, basements, and adjacent sub-structures)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Likely to affect ground engineering and foundation design and construction
Filled and made ground (including embankments, infilled ponds and quarries)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Likely to affect ground engineering and foundation design and construction

Hazard category	Hazard status based on desk study findings and proposed development		Engineering considerations if hazard affects site
	Could be present and/or affect site	Unlikely to be present and/or affect site	
Adverse ground chemistry (including expansive slags and weathering of sulphides to sulphates)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	May affect ground engineering and foundation design and construction
Site topography	<input checked="" type="checkbox"/>	<input type="checkbox"/>	May affect ground engineering and foundation design and construction
Note: Seismicity is not included in the above table as this is not normally a design consideration in the UK.			

5 INITIAL CONCEPTUAL SITE MODEL

In the UK land contamination is assessed using a risk-based approach taking account of the magnitude (severity of the hazard) and likelihood (probability) of occurrence. A 'receptor' is something that could be adversely affected by contamination (e.g. people, an ecological system, property or a water body). A 'pathway' is a route or means by which a receptor is or could be exposed to or affected by a contaminant. A 'contaminant source' is a hazard but it can only pose a risk to a receptor where a pathway is present. The relationship between sources, pathways and receptors are referred to as a conceptual site model. A risk can only be released where a contaminant source, pathway and receptor are all in place, referred to as a 'pollutant linkage'.

In line with CLR11 (Environment Agency, 2004) and BS 10175: 2011 + A2 2017 (BSI, 2017), RSK has used information in the preceding sections to identify sources of contaminants, receptors that may be impacted and plausible linking pathways. Where all three are present this is termed a potentially complete contaminant linkage and a qualitative risk estimation is made.

5.1 Potential soil, soil vapour and groundwater linkages

5.1.1 Potential sources of contamination

Potential sources of soil and groundwater contamination identified from current activities and the history of the site and surrounding area are presented in **Table 11**. Ground gas sources are addressed in the next section.

Table 11 Potential sources of soil and groundwater contamination

Potential sources	Contaminants of concern	Current or historical?
Off-site		
Dry cleaning premises, 33 m north	Chlorinated solvents, phenols	Current
Car repair garage, 49 m east	Petroleum hydrocarbons, toxic and phytotoxic metals, inorganics, PAHs, asbestos, herbicides	Current
Curtain, carpet and upholstery cleaners 68 m west	Chlorinated solvents, phenols	Current
Railway, 100 m north-west of site	Petroleum hydrocarbons, toxic and phytotoxic metals, inorganics, PAHs, asbestos, herbicides	Current

There are unlikely to be any on site sources of contamination, as it is assumed that the property has been a residential house since at least 1851.

Off-site there are two specialist cleaning companies which are likely to use chlorinated solvents on site and are likely to form DNAPL if released into the environment.

5.1.2 Sensitive receptors and linking exposure/migration pathways

Sensitive receptors identified at or in the vicinity of the site that could be affected by the potential sources identified above comprise:

- current site users – residential users [oral, dermal and inhalation exposure with impacted soil, soil vapour and dust/fibres, ingestion of home-grown produce].
- future buildings and services [direct contact with contaminated soils or groundwater and chemical attack].
- existing and future vegetation [direct contact with contaminated soils or groundwater and root uptake leading to phytotoxicity].

Potential linking pathways are show in brackets for each item above.

Please note that construction workers and future maintenance workers have not been identified in the conceptual model as receptors because risks are considered to be managed through health and safety procedures according to the CDM Regulations.

Ecological receptors are only considered within the conceptual model in the context of statutory protected sites.

5.2 Potential ground gas linkages

No significant potential sources of ground gas generation have been identified therefore this potential issue has not been taken forward.

Construction workers have not been identified as receptors for the purposes of this assessment. Risks may still be present to construction workers especially where works include the entry into excavations within the ground. Construction workers should undertake appropriate risk assessments and risks should be managed through health and safety procedures and the use of PPE.

5.3 Preliminary risk assessment

The preliminary risk assessment findings and potentially complete contaminant linkages are shown in **Table 12** overleaf. The risk classification based on the combination of hazard consequence and probability using a risk matrix from CIRIA C552 (Rudland et al., 2001), a summary of which is included in **Appendix C**.

Table 12 Risk estimation for potentially complete contaminant linkages

Potential source	Potential receptor	Possible pathway	Likelihood	Severity	Potential risk	Justification
Off-site sources including dry cleaners, car repair garage and railway.	Current and future site user	Oral and dermal contact. Inhalation of vapours from groundwater	Low likelihood	Mild	Low	The site is underlain by London Clay, any groundwater will be perched in the made ground. Migration of any off-site contamination towards the site is only via perched water on the surface of the London clay. The presence of DNAPL from the breakdown of the chlorinated solvents potentially presents a risk to human health from inhalation of vapours. However, considering the distance between the identified contamination sources and the site, it is considered unlikely that there is a pathway (a continuous layer of a made ground with perched water) for contamination in a form of chlorinated solvents migrating onto the site.
	Future buildings and services	Chemical attack from contaminated groundwater	Unlikely	Medium	Low	
	Existing and future vegetation	Contact with groundwater and root uptake leading to phytotoxicity	Low likelihood	Mild	Low	
	Groundwater	Vertical migration of dissolved contaminants	Unlikely	Medium	Low	The London Clay is approximately 30 m thick in the vicinity of the site. It is unlikely that contaminated perched water would be able to migrate through the confining clay layer into the underlying principal aquifer.

Risk matrix		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very low	Very low

There are no complete contaminant linkages with a potential risk of moderate to low or higher.

5.4 Data gaps and uncertainties

Key data gaps and uncertainties identified in the CSM at desk study stage include:

- gaps in available historical OS maps [1879, 1955, 1967, 1975, 1985];
- site was developed before first published OS map and prior history not known;
- there are no previous investigations available for the site, therefore no information on actual concentrations of contaminants in soil and groundwater at this stage;
- groundwater depth and flow direction are conceptual at this stage in the deeper aquifer and the presence of any shallow groundwater;
- no site visit was conducted as a part of this study; and
- The Environmental Health Officer has not provided a response to the request for information for this site at the time of issuing this report.

6 CONCLUSIONS AND RECOMMENDATIONS

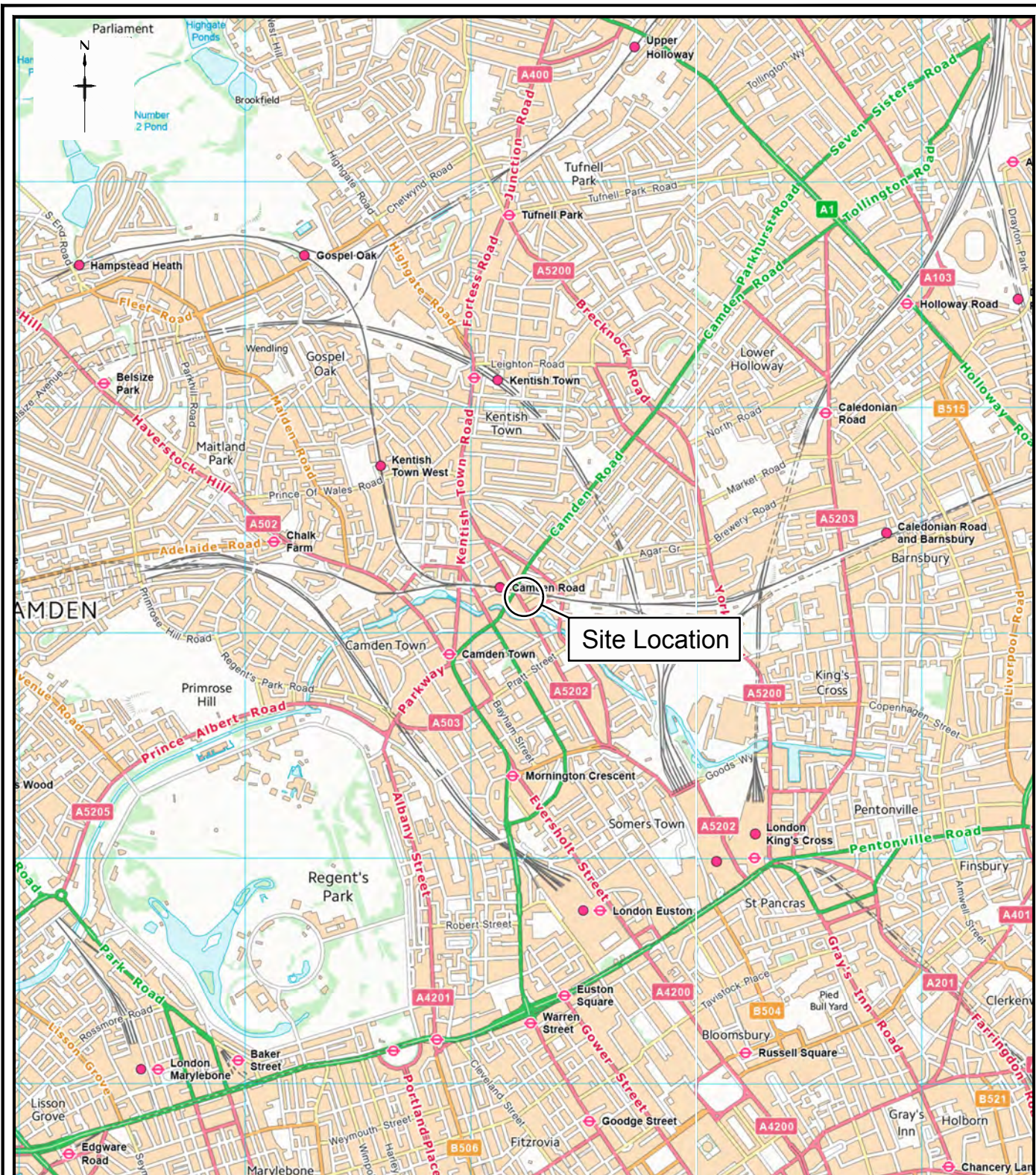
There are no contaminant linkages that have been identified to be potentially complete and that would require further action.

As such no further investigation works are recommended for the site.

7 REFERENCES

- British Standards Institution (2015), 'BS 5930:2015. Code of practice for ground investigations.
- British Standard Institution (BSI) (2019), 'BS 8485:2015+A1:2019. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'.
- British Standards Institution (2011), 'BS 10175:2011 + A2:2017. Investigation of potentially contaminated sites: Code of practice'.
- British Standards Institution (2013), BS8576:2013. Guidance on investigations for ground gas – permanent gases and volatile organic compounds (VOCs).
- Environment Agency (2004), Model Procedures for the Management of Contaminated Land. Contaminated Land Report Number 11 (CLR11), September (Bristol: Environment Agency).
- Part IIA of the Environmental Protection Act (Contaminated Land Regulations (England) 2002 (London: HMSO).
- Rudland, D. J., Lancefield, R. M. and Mayell, P. N. (2001), CIRIA C552. Contaminated Land Risk Assessment: A Guide to Good Practice (London: CIRIA).
- Stone, K., Murray, A., Cooke, S., Foran, J., Gooderham, L., (2009) CIRIA C681, Unexploded Ordnance (UXO). A guide or the construction industry.

FIGURES



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Client	BLUE ENGINEERING	
Project Title	189 ROYAL COLLEGE STREET	
Drawing Title	SITE LOCATION PLAN	

Rev	Drawn	Date	Checked	Date	Approved	Date	Project Number	Drawing File	Drawing Number
01	SAY	29.01.20	WC	29.01.20	WC	29.01.20	1921113 - R01 (00)	1921113 - SLP.dwg	FIGURE 1
Dimensions		Scale		Original Size					
m		1:25,000		A4					



APPENDIX A

SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Mr Paul Cank (the "Client") in accordance with the terms of a contract [RSK Environment Standard Terms and Conditions] between RSK and the Client, dated 9th January 2020. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by an environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.
2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the Client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials, unless specifically identified in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the Client on the history and usage of the site, unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):



- a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.
- b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.
- c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the Client and RSK.

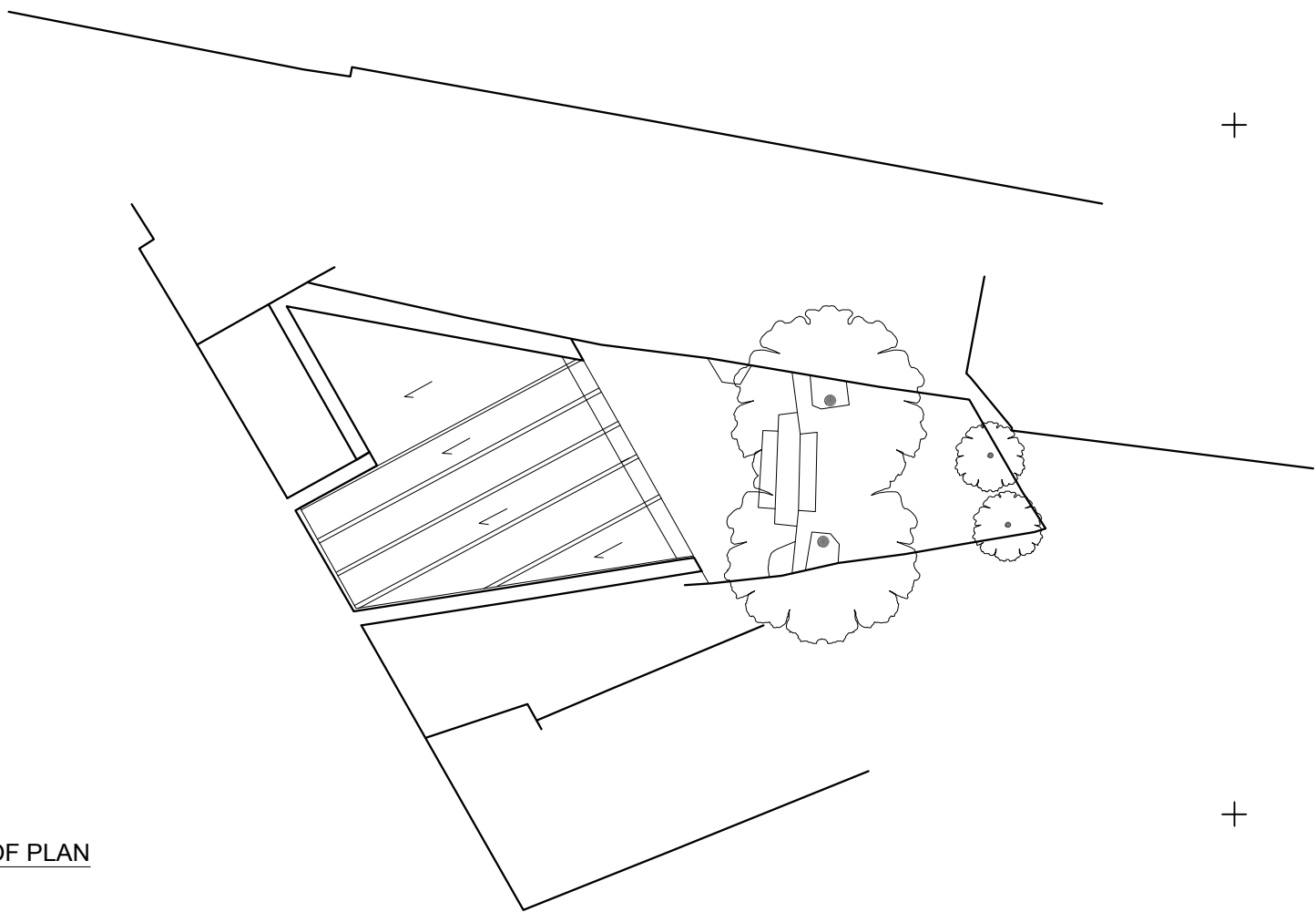
8. The intrusive environmental site investigation aspects of the Services are a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope between the client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.
10. The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.
11. Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works.
12. Unless stated otherwise, only preliminary geotechnical recommendations are presented in this report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed.



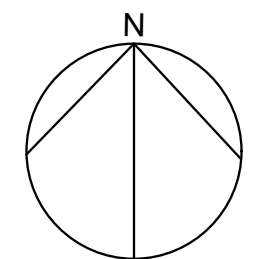
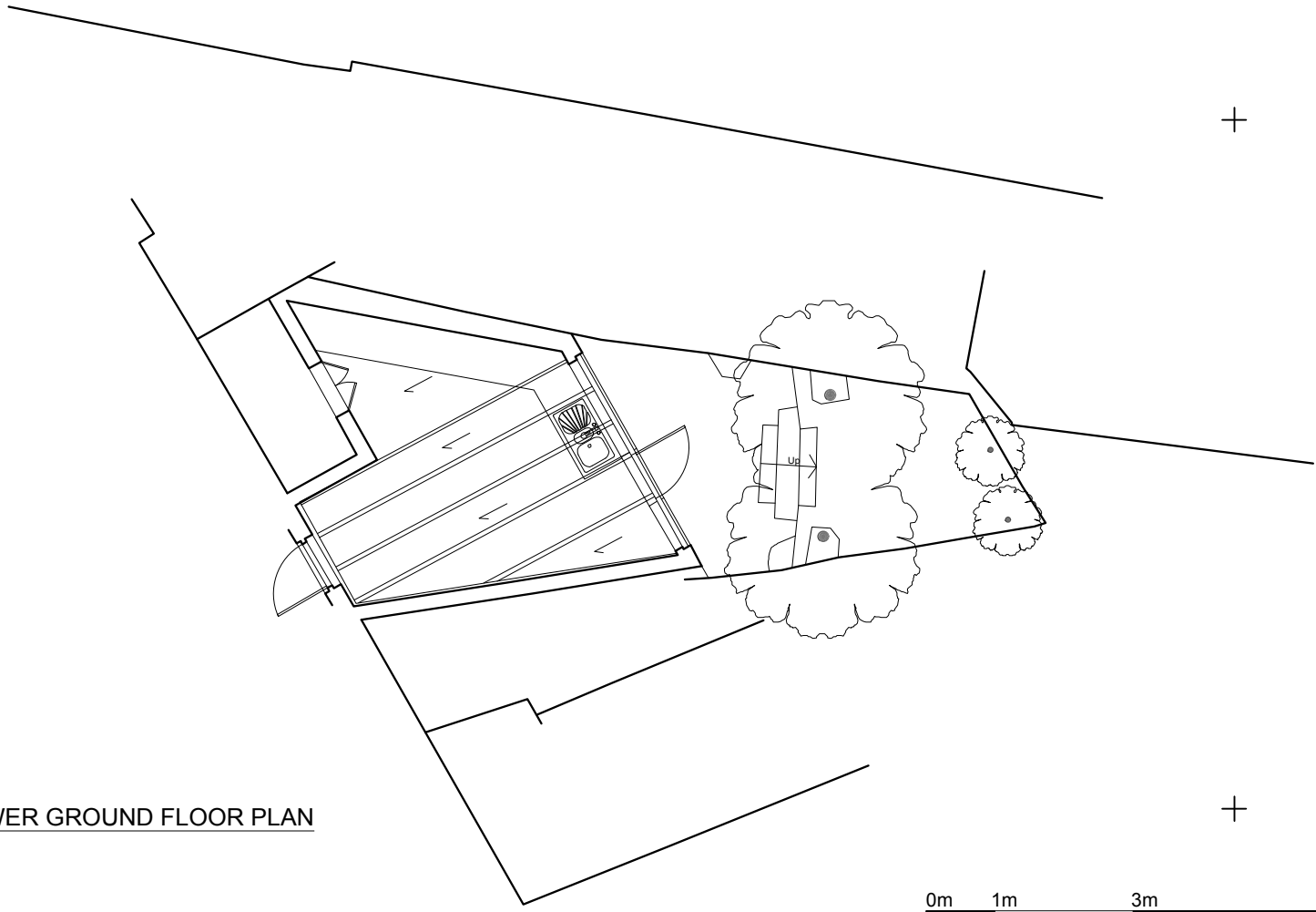
APPENDIX B

DEVELOPMENT DRAWINGS

2 EXISTING ROOF PLAN
A1000 Scale: 1:100



1 EXISTING LOWER GROUND FLOOR PLAN
A1000 Scale: 1:100



All dimensions and levels to be verified on site and any discrepancies or ambiguities reported immediately to the architect prior to construction or fabrication.

Read in conjunction with relevant consultants drawings.

Do not scale from this drawing.

REV	DATE	DESC
P1	30.04.2019	

Project 178 ROYAL COLLEGE STREET
CAMDEN
LONDON

DRAWING TITLE
EXISTING
GROUND FLOOR & ROOF PLAN

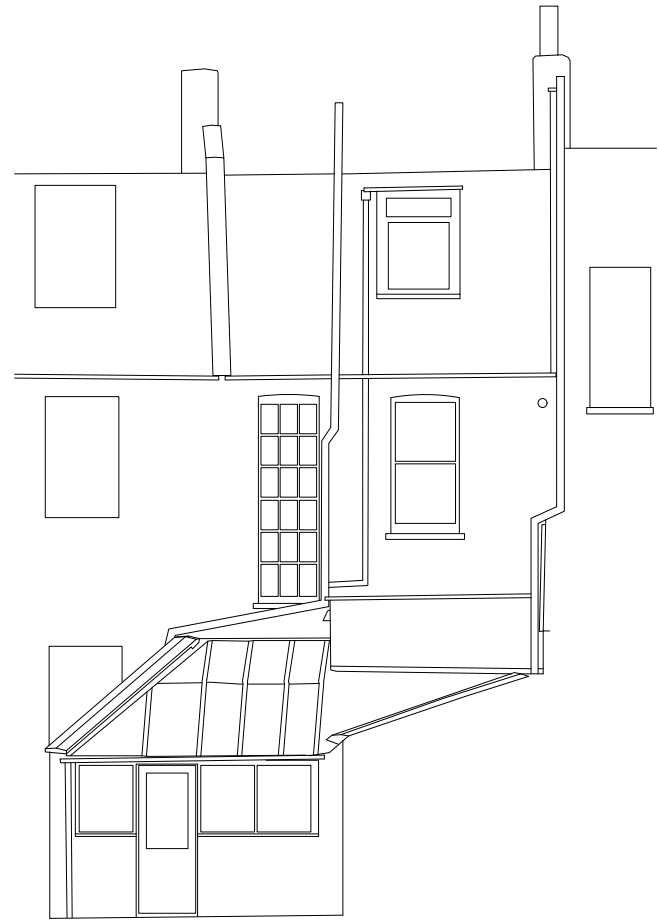
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Project Number 048 Drawing Number & Revision A1000_P1

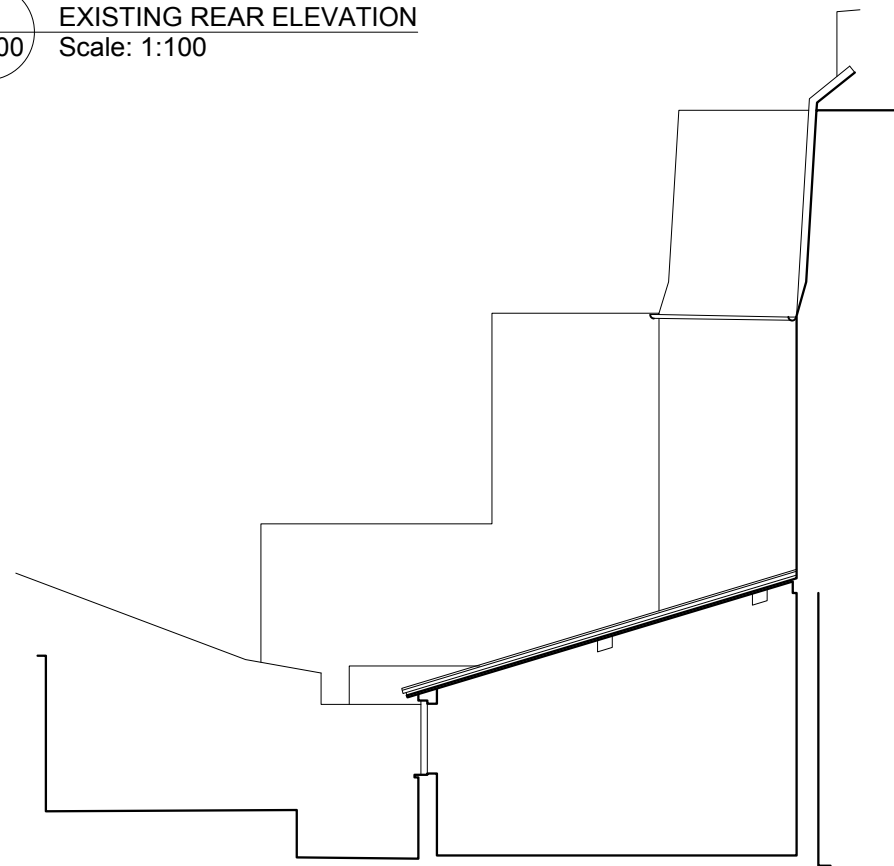
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	02	Design	01	
	Planning	02		
	Pre-construction	03		
	Construction	04		



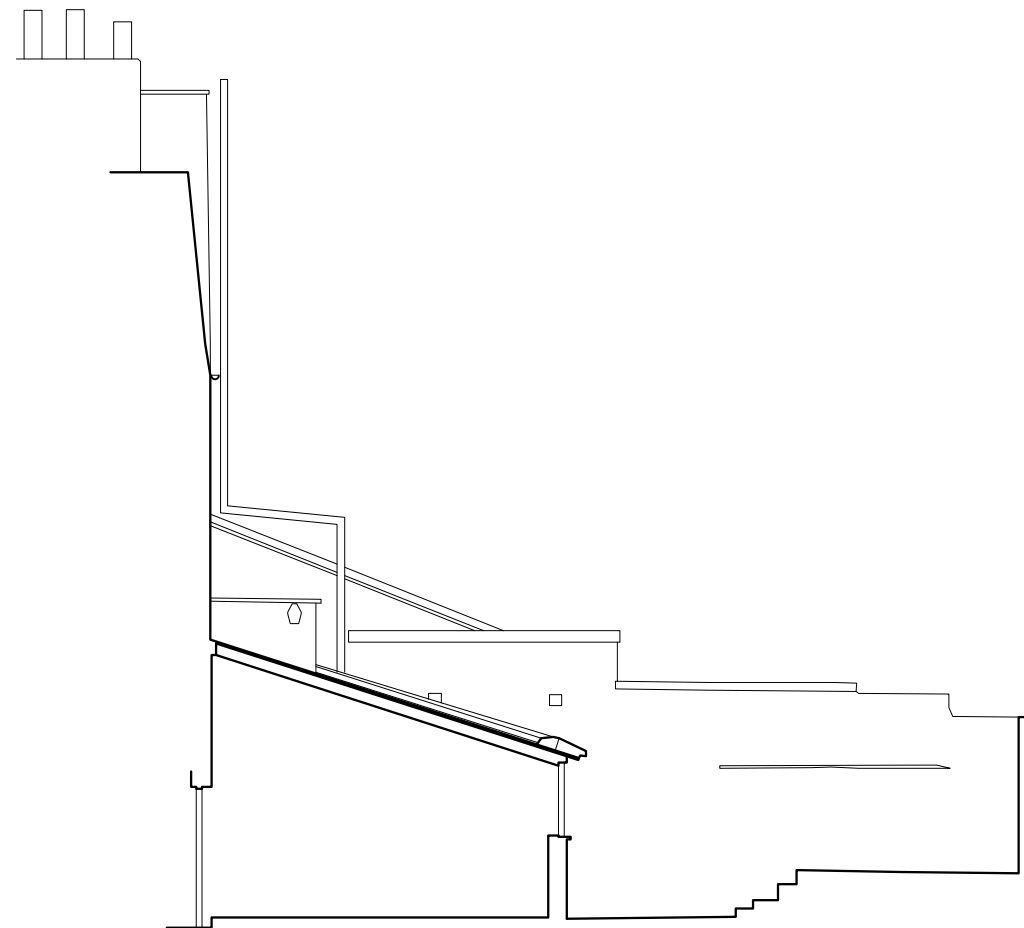
10 Rockells Place
London SE22 0RT
020 3742 1404
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1 EXISTING REAR ELEVATION
A1100 Scale: 1:100



2 EXISTING SECTION BB
A1100 Scale: 1:100



3 EXISTING SECTION AA
A1100 Scale: 1:100



All dimensions and levels to be verified on site and any discrepancies or ambiguities reported immediately to the architect prior to construction or fabrication.

Read in conjunction with relevant consultants drawings.

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REV	DATE	DESC
P1	30.04.2019	

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CAMDEN
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DRAWING TITLE
EXISTING
SECTIONS & ELEVATION

Date 30.04.2019 Scale 1:100 @ A3

Project Number Drawing Number & Revision
048 A1100_P1

STATUS STATUS KEY:
02 Design 01
Planning 02
Pre-construction 03
Construction 04

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Timber decking to solid portion of new flat roof

Walk on glass rooflight

Powdercoated metal spindles and handrail

Powdercoated lightweight perforated metal staircase down to lower ground floor level

AA

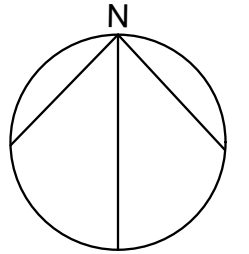
AA

BB

BB

2no. existing trees to be maintained

2 PROPOSED ROOF PLAN
A2000 Scale: 1:100



All dimensions and levels to be verified on site and any discrepancies or ambiguities reported immediately to the architect prior to construction or fabrication.

Read in conjunction with relevant consultants drawings.

Do not scale from this drawing.

REV	DATE	DESC
P1	30.04.2019	

Project 178 ROYAL COLLEGE STREET
CAMDEN
LONDON

DRAWING TITLE
PROPOSED
GROUND FLOOR & ROOF PLAN

Date 30.04.2019 Scale 1:100 @ A3

Project Number Drawing Number & Revision
048 A2000_P1

STATUS	STATUS KEY:
02	Design 01 Planning 02 Pre-construction 03 Construction 04

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10 Rockells Place
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Glass skylight above

AA

AA

Powdercoated lightweight perforated metal staircase down to lower ground floor level

Existing brickcourtyard maintained as existing

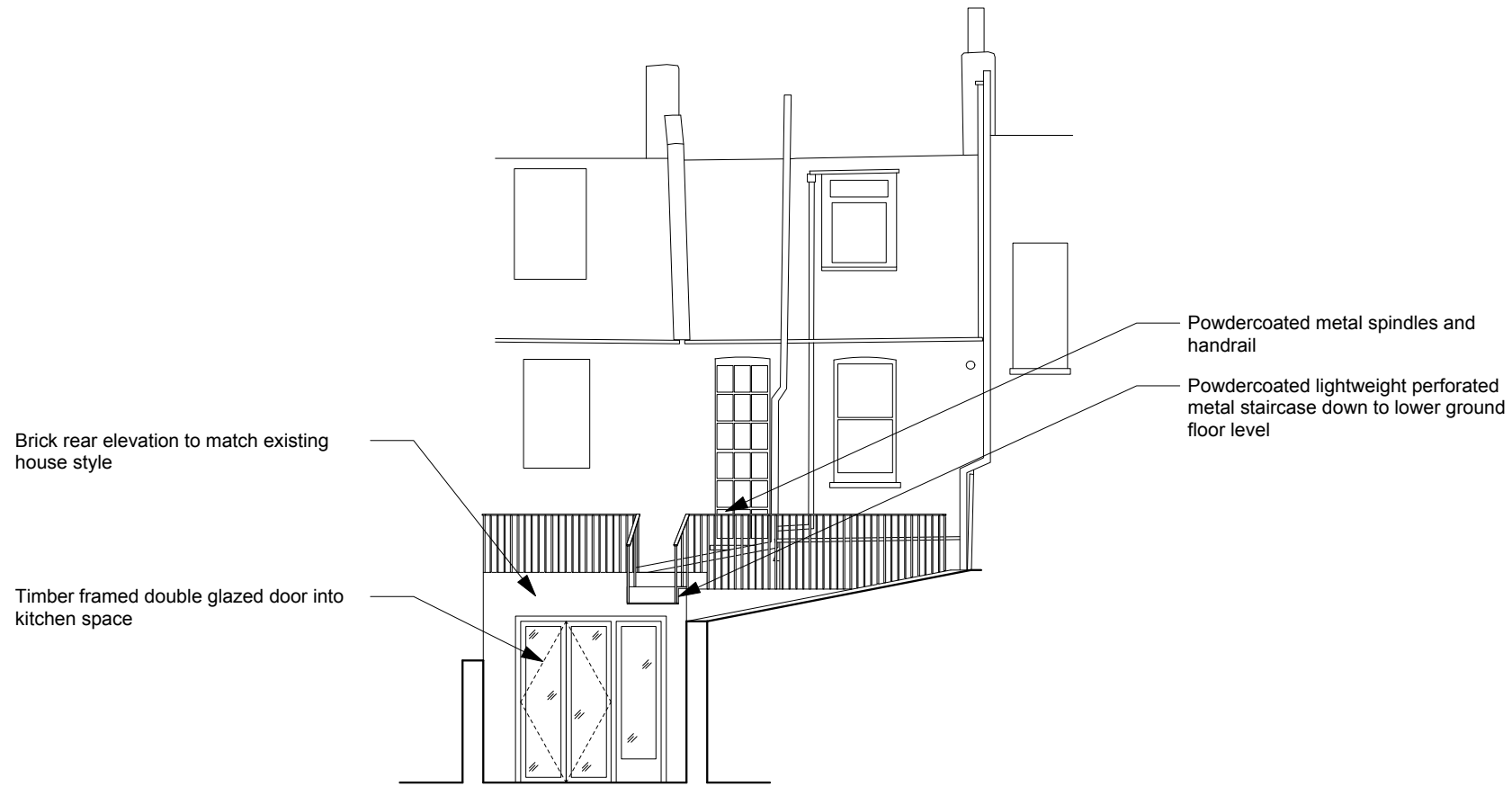
Hardwood timber framed double glazed doors into new kitchen space

BB

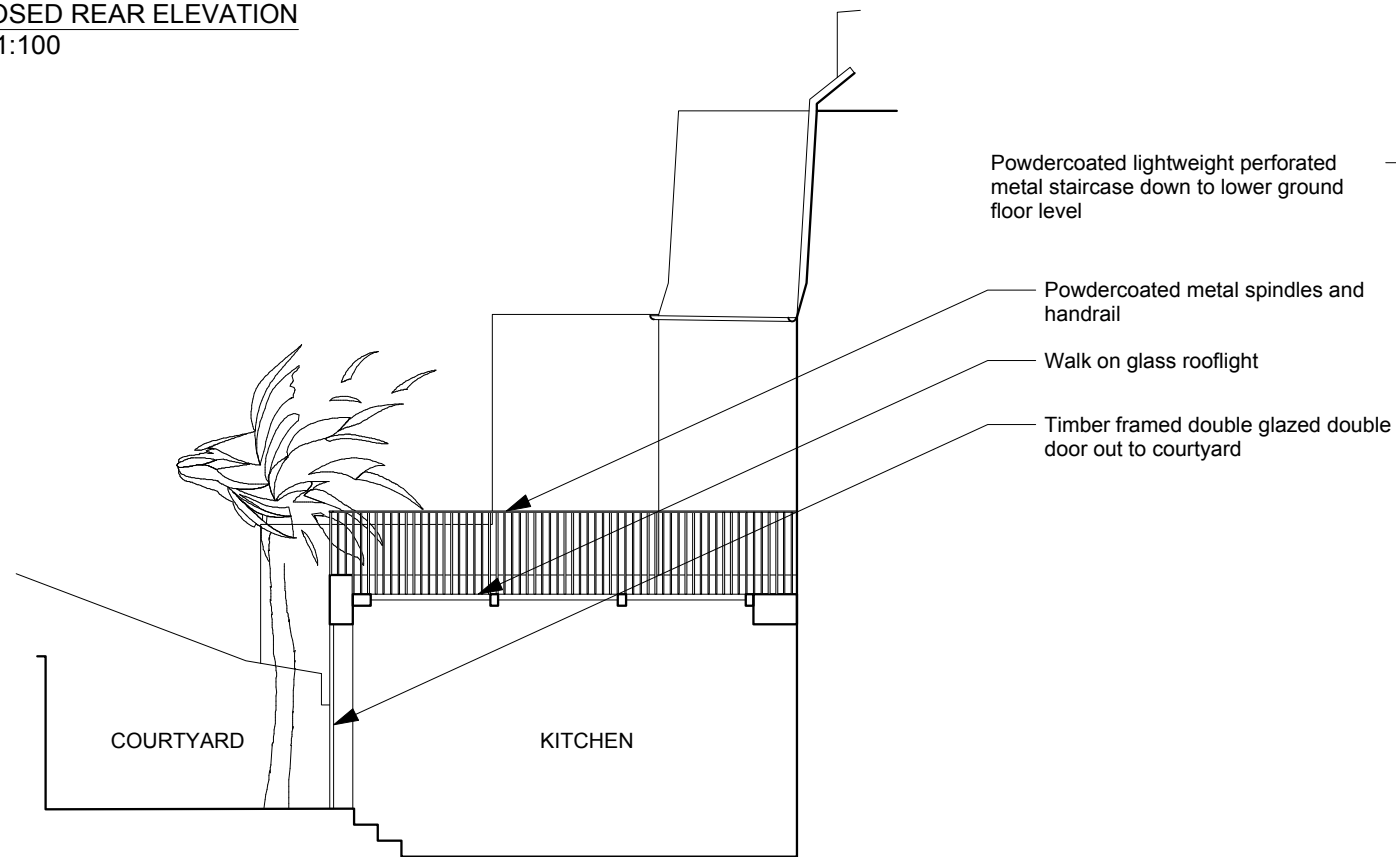
BB

1 PROPOSED LOWER GROUND FLOOR PLAN
A2000 Scale: 1:100

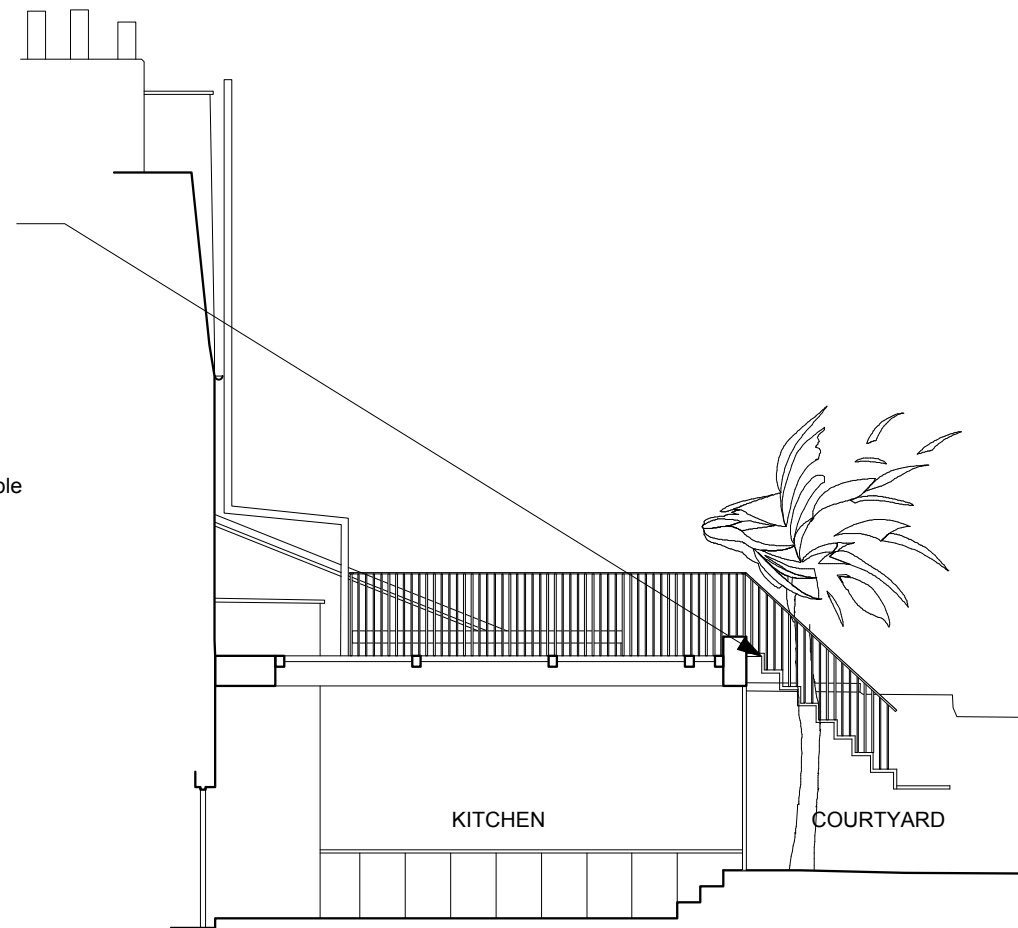




3 PROPOSED REAR ELEVATION
A2100 Scale: 1:100



4 PROPOSED SECTION BB
A2100 Scale: 1:100



5 PROPOSED SECTION AA
A2100 Scale: 1:100



All dimensions and levels to be verified on site and any discrepancies or ambiguities reported immediately to the architect prior to construction or fabrication.

Read in conjunction with relevant consultants drawings.

Do not scale from this drawing.

REV	DATE	DESC
P1	30.04.2019	

Project 178 ROYAL COLLEGE STREET
CAMDEN
LONDON

DRAWING TITLE
PROPOSED
SECTIONS & ELEVATIONS

Date 30.04.2019 Scale 1:100 @ A3

Project Number Drawing Number & Revision
048 **A2100_P1**

STATUS	STATUS KEY:
02	Design 01 Planning 02 Pre-construction 03 Construction 04

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APPENDIX C

SUMMARY OF LEGISLATION AND POLICY RELATING TO LAND CONTAMINATION

Part IIA of the Environmental Protection Act 1990

Part IIA of the Environmental Protection Act 1990 (Part IIA) and its associated Contaminated Land Regulations 2000 (SI 2000/227), which came into force in England on 1 April 2000, formed the basis for the current regulatory framework and the statutory regime for the identification and remediation of contaminated land. Part IIA of the EPA 1990 defines contaminated land as 'any land which appears to the Local Authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that significant harm is being caused, or that there is significant possibility of significant harm being caused, or that pollution of controlled waters is being or is likely to be caused'. Controlled waters are considered to include all groundwater, inland waters and estuaries.

In August 2006, the Contaminated Land (England) Regulations 2006 (SI 2006/1380) were implemented, which extended the statutory regime to include Part IIA of the EPA as originally introduced on 1 April 2000, together with changes intended chiefly to address land that is contaminated by virtue of radioactivity. These have been replaced subsequently by the Contaminated Land (England) (Amendment) Regulations 2012, which now exclude land that is contaminated by virtue of radioactivity.

The intention of Part IIA is to deal with contaminated land issues that are considered to cause significant harm on land that is not undergoing development (see Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, April 2012). This document replaces Annex III of Defra Circular 01/2006, published in September 2006 (the remainder of this document is now obsolete).

Planning Policy

Contaminated land is often dealt with through planning because of land redevelopment. This approach was documented in Planning Policy Statement: Planning and Pollution Control PPS23, which states that it remains the responsibility of the landowner and developer to identify land affected by contamination and carry out sufficient remediation to render the land suitable for use. PPS23 was withdrawn early in 2012 and has been replaced by much reduced guidance within the National Planning Policy Framework (NPPF), reference ISBN: 978-1-5286-1033-9, February 2019.

The new framework has only limited guidance on contaminated land, as follows:

Chapter 11. Making effective use of land

- 117 Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land.
118. Planning policies and decisions should:

c) give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land.

Chapter 15. Conserving and enhancing the natural environment

170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Ground conditions and pollution

178. Planning policies and decisions should ensure that:

a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);

b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990; and

c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.

179. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

Water Resources Act (WRA)

The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 updated the Water Resources Act 1991, which introduced the offence of causing or knowingly permitting pollution of controlled waters. The Act provides the Environment Agency with powers to implement remediation necessary to protect controlled waters and recover all reasonable costs of doing so.

Water Framework Directive (WFD)

The Water Framework Directive 2000/60/EC is designed to:

- enhance the status and prevent further deterioration of aquatic ecosystems and associated wetlands that depend on the aquatic ecosystems
- promote the sustainable use of water
- reduce pollution of water, especially by 'priority' and 'priority hazardous' substances
- ensure progressive reduction of groundwater pollution.

The WFD requires a management plan for each river basin be developed every six years.

Groundwater Directive (GWD)

The 1980 Groundwater Directive 80/68/EEC and the 2006 Groundwater Daughter Directive 2006/118/EC of the WFD are the main European legislation in place to protect groundwater. The 1980 Directive is due to be repealed in December 2013. The European legislation has been transposed into national legislation by regulations and directions to the Environment Agency.

Priority Substances Directive (PSD)

The Priority Substances Directive 2008/105/EC is a 'Daughter' Directive of the WFD, which sets out a priority list of substances posing a threat to or via the aquatic environment. The PSD establishes environmental quality standards for priority substances, which have been set at concentrations that are safe for the aquatic environment and for human health. In addition, there is a further aim of reducing (or eliminating) pollution of surface water (rivers, lakes, estuaries and coastal waters) by pollutants on the list. The WFD requires that countries establish a list of dangerous substances that are being discharged and EQS for them. In England and Wales, this list is provided in the River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010. In order to achieve the objectives of the WFD, classification schemes are used to describe where the water environment is of good quality and where it may require improvement.

Environmental Permitting Regulations (EPR)

The Environmental Permitting (England and Wales) Regulations 2016 (as amended) provide a single regulatory framework that streamlines and integrates waste management licensing, pollution prevention and control, water discharge consenting, groundwater authorisations, and radioactive substances regulation. Schedule 22, paragraph 6 of EPR 2016 states: 'the regulator must, in exercising its relevant functions, take all necessary measures - (a) to prevent the input of any hazardous substance to groundwater; and (b) to limit the input of non-hazardous pollutants to groundwater so as to ensure that such inputs do not cause pollution of groundwater.'

Notes:

- 1. The above information is provided for background but does not constitute site-specific advice*
- 2. The above summary applies to England only. Variations exist within other countries of the United Kingdom*