

23rd February 2023

Our reference: 372864-L01 (00) Radon

C Field Construction
Tower Bridge Business Centre
46-48 East Smithfield
London
E1W 1AW

For the attention of Duncan Miller

Dear Duncan,

**RE: ROYAL COLLEGE STREET, LONDON.
SITE SPECIFIC RADON ASSESSMENT**

1. INTRODUCTION

It is understood that as part of the development works at the above site the local authority has highlighted that a site specific assessment of radon be undertaken. Notwithstanding the further completion of the a site specific assessment, in order to satisfy the requirements of the Management of Health and Safety at Work Regulations (1999), the Health and Safety Executive (HSE) and Public Health England (PHE) measurements of radon are required for below ground workplaces (occupied for more than 1 hour per weeks 52 hours per year), irrespective of whether a site is situated in a radon affected area or not. It is therefore considered that a further site specific assessment is necessary to determine whether radon protective measures are required, in addition to the completion of insitu measurements post construction.

RSK Environment, on behalf of C Field Construction (the Client), has undertaken a further detailed site specific radon assessment in relation to the redevelopment of 70-86 Royal College Street, London, NW1 0DN.

It is understood the proposed development will comprise the excavation of a basement to some 7.00 m bgl prior to the construction of the basement box. Although the detailed design of the basement has not been formalised at this stage it is understood that the basic waterproofing measures will comprise a primary water resistive reinforced concrete box with a secondary cavity wall system with associated sump pumps.

It is noted that that previous buildings on site have now been demolished, however, the construction of the new basement and building has not yet commenced. The site in its current state comprises a surface covering of levelled crushed concrete and demolition rubble.

2. SCOPE OF WORK

As part of the supplementary radon assessment that following will be undertaken:



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- Review Ground Investigation Report and Geotechnical / Geo-environmental Assessment 371944-01 (01), including desk-based radon assessment
- Review of UKSHA site specific report
- Review of BGS_330887/42018 site specific report

3. GROUND INVESTIGATION REVIEW

A Geotechnical / Geo-environmental Assessment 371944-01 (01), conducted by RSK in August 2019 comprised the completion of two cable percussive methods, three boreholes by dynamic / windowless sampling methods and three hand excavated trial pits

The investigation was to establish ground conditions underlying the site, to investigate specific potential sources of contamination, to determine groundwater depth and flow direction, to determine the ground gas regime underlying the site, to assess geotechnical properties of the soils and to obtain details of the existing foundations of the buildings on site, but also included a desk-based radon assessment

3.1 Ground Conditions

The exploratory holes revealed that the site is underlain by a variable thickness of made ground and reworked London Clay Formation over the London Clay Formation.

The made ground encountered from surface, to a maximum depth of 3.40 m bgl, generally comprised sandy gravelly clay and gravelly sand. The gravel content typically comprised of angular to rounded, fine to coarse brick, flint, concrete, roadstone and asphalt, ash, with occasional cobbles of broken brick and concrete.

Possible reworked London Clay Formation was encountered within BH2 and WS2 beneath the made ground to a maximum depth of 3.30 m bgl. This stratum generally comprised firm slightly sandy gravelly clay. The gravel content typically comprised angular to rounded fine to coarse flint, chert and mixed lithologies.

The London Clay Formation was encountered beneath the made ground / reworked London Clay Formation between 1.00 to 3.40 m bgl and comprised a firm to very stiff consistency, high to extremely high strength, silty greyish brown clay proven to a depth of 30.45 m below ground level.

3.2 Groundwater

Groundwater was not encountered during the intrusive investigation works. The supplementary monitoring findings reflected a potentially perched groundwater table at the made ground/reworked London Clay and London Clay Formation interface.

3.3 Preliminary Radon Assessment

A review of available environmental database reports 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 ukradon indicative atlas comes from measurements in homes, the maps indicate the likely extent of the local radon hazard in all buildings.

4. UKHSA REPORT

A review of the UKHSA report for the site is detailed below.

Guidance for existing properties

Is this property in a radon Affected Area? - No

A radon Affected Area is defined as where the radon level in at least one property in every hundred is estimated to exceed the Action Level.

The estimated probability of the property being above the Action Level for radon is: 0-1%

The probability result is only valid for properties above ground. All basement and cellar areas are considered to be at additional risk from high radon levels. The result may not be valid for buildings larger than 25 metres. If this site is for redevelopment, it is noted a GeoReport provided by the British Geological Survey should be acquired. This report only informs the reader of the estimated probability that a particular property is above the Action Level for radon. It does not necessarily mean there is a radon problem in the property; the only way to find out whether it is above or below the Action Level is to carry out a radon measurement on site.

5. BGS REPORT

A review of the BGS report, which is suggested for buildings larger than 25 metre, is detailed below.

BGS Report: BGS_330887/42018 outlines information on whether radon protective measures are required. Depending on the probability of buildings having high radon levels, the Regulations may require either:

1. No protective measures
2. Basic protective measures
3. Full protective measures

The determination below follows advice in *BR211 Radon: Guidance on protective measures for new buildings (2015 edition)*, which also provides guidance on what to do if the result indicates that protective measures are required.

- 1. Is the property in an area where radon protective measures are required for new buildings or extensions to existing ones as described in publication BR211 (2015 edition) Radon: Guidance on protective measures for new buildings?**

No radon protective measures are required for the report area.

2. Is the property in a radon Affected Area as defined by the UK Health Security Agency (UKHSA) and if so what percentage of homes are estimated to be at or above the Action Level?

No, the property is in an area where less than 1% of homes are estimated to be at or above the action level. The property is not in a radon affected area.

The report informs the reader whether the property is in a radon Affected Area and the percentage of homes that are estimated to be at or above the radon Action Level at this location. Being in an Affected Area does not necessarily mean there is a high radon level within the property; the only way to determine the radon level is to carry out a radon measurement.

6. SUMMARY

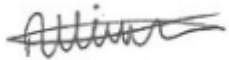
In consultation with RSK Radiological, it has been determined that there is no imperative for radon measurements to be acquired on the pre-developed site. This is due to the data presented in the UKHSA and BGS radon reports which adequately demonstrate that the entire area is neither in, nor near to, a radon affected area. Furthermore, any radon measurements conducted in the pre-developed site would not be representative of those likely encountered in the constructed building which may differ significantly from the results of any monitoring undertaken prior to construction. The impact of atmospheric conditions along with the moisture content of the materials at and below the ground surface should not be underestimated; it is due to these influences that radon measurements are typically recommended to be acquired over the course of three months, or longer, in rooms which are at least partially occupied.

It should be noted that, as there will be normally occupied basement rooms below ground level, radon measurements will be required in the completed and occupied building in line with the Management of Health and Safety at Work Regulations (1999), the Health and Safety Executive (HSE) and Public Health England (PHE). The completion of these post construction measurements will be in accordance with the latest published guidance.

The data collected following any programme of monitoring on the site, pre-construction, would not be indicative of any radon levels in a constructed building on site and could only give an approximate indication of the likely amounts of radon that may be released from the ground on site, for the site-specific atmospheric conditions and ground moisture content at the specific time of data collection.

We hope that the information provided within this letter is sufficient for your current requirements. If you have any questions, then please contact the undersigned.

Yours sincerely,
For RSK Environment Ltd



Archie Harrison
Geotechnical Engineer



Andy Tyler
Associate Director

Enclosed:

Figure 1 UK Radon Risk Map

Appendix A RSK service constraints

Appendix B UKSHA Report

Appendix C BGS Report

FIGURES

Radon Affected Area

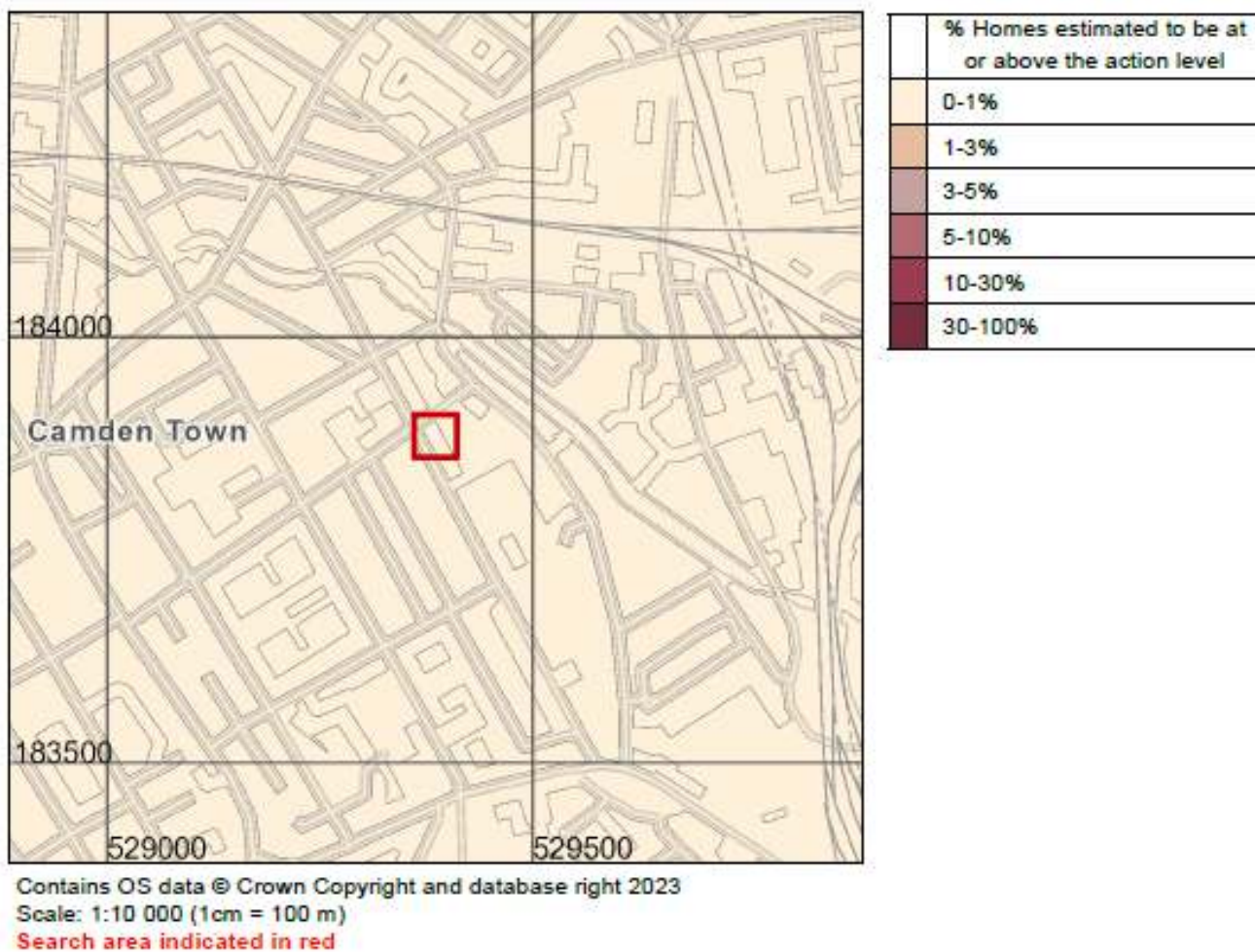


Figure 1 - UK Radon Risk Map

APPENDIX A

SERVICE CONSTRAINTS

This technical note (together the "Services") has been carried out by RSK Environment Limited (RSK) for C Field Construction (the "Client") in accordance with the terms of a contract [RSK Environment Standard Terms and Conditions] between RSK and the Client 16th February 2023. 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.

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.

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.**

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.

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.

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.

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.

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.

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.

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.

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.

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

Report of address search for radon risk

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Address searched: 70-86 Royal College Street, London, NW10TH

Date of report: 21 February 2023

Guidance for existing properties

Is this property in a radon Affected Area? - No

A radon Affected Area is defined as where the radon level in at least one property in every hundred is estimated to exceed the Action Level.

The estimated probability of the property being above the Action Level for radon is: 0-1%

The probability result is only valid for properties above ground. All basement and cellar areas are considered to be at additional risk from high radon levels.

The result may not be valid for buildings larger than 25 metres.

If this site is for redevelopment, you should undertake a GeoReport provided by the British Geological Survey.

This report informs you of the estimated probability that this particular property is above the Action Level for radon. This does not necessarily mean there is a radon problem in the property; the only way to find out whether it is above or below the Action Level is to carry out a radon measurement in an existing property.

Radon Affected Areas are designated by the UK Health Security Agency. UKHSA advises that radon gas should be measured in all properties within Radon Affected Areas.

If you are buying a currently occupied property in a Radon Affected Area, you should ask the present owner whether radon levels have been measured in the property. If they have, ask whether the results were above the Radon Action Level and if so, whether remedial measures were installed, radon levels were re-tested, and the results of re-testing confirmed the effectiveness of the measures.

Further information is available from UKHSA or <https://www.ukradon.org>

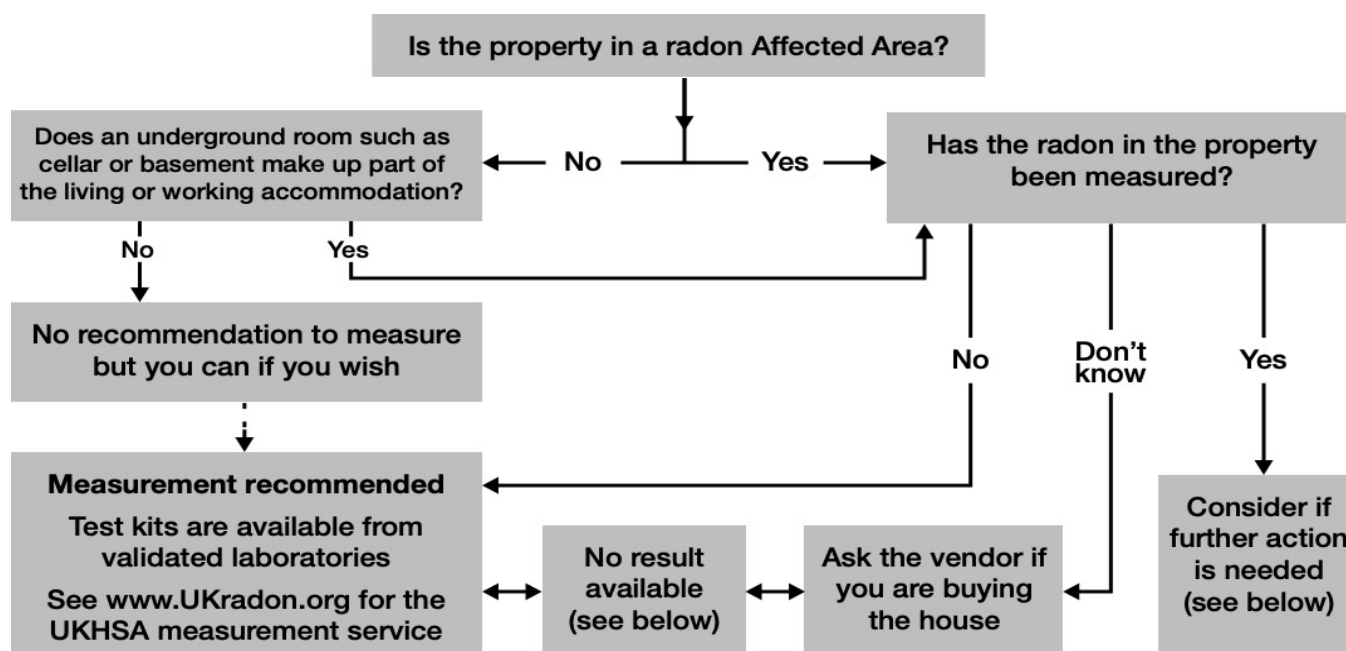
Guidance for new buildings and extensions to existing properties

What is the requirement under Building Regulations for radon protection in new buildings and extensions at the property location? - None

If you are buying a new property in a Radon Affected Area, you should ask the builder whether radon protective measures were incorporated in the construction of the property.

See the Radon and Building Regulations for more details.

UKHSA guidance for occupiers and prospective purchases



Existing radon test results: There is no public record of individual radon measurements. Results of previous tests can only be obtained from the seller. Radon levels can be significantly affected by changes to the building or its use, particularly by alterations to the heating and ventilation which can also be affected by changes in occupier. If in doubt, test again for reassurance.

Radon Bond: This is simply a retained fund, the terms of which are negotiated between the purchaser and the vendor. It allows the conveyance of the property to proceed without undue delay. The purchaser is protected against the possible cost of radon reduction work and the seller does not lose sale proceeds if the result is low. Make sure the agreement allows enough time to complete the test, get the result and arrange the work if needed.

High Results: Exposure to high levels of radon increases the risk of developing lung cancer. If a test in a home gives a result at or above the Action Level of 200 Becquerels per cubic metre of air (Bq/m³), formal advice will be given to lower the level. Radon reduction will also be recommended if the occupants include smokers or ex-smokers when the radon level is at or above the Target Level of 100 Bq/m³; these groups have a higher risk. Information on health risks and radon reduction work is available from UKHSA. Guidance about radon reduction work is also available from some Local Authorities, the Building Research Establishment and specialist contractors.

UKHSA designated radon website: <https://www.ukradon.org>

Building Research Establishment: <http://www.bre.co.uk/page.jsp?id=3137>

APPENDIX C

Duncan Miller
48
RAVENSBOURNE ROAD
LONDON
SE6 4UX

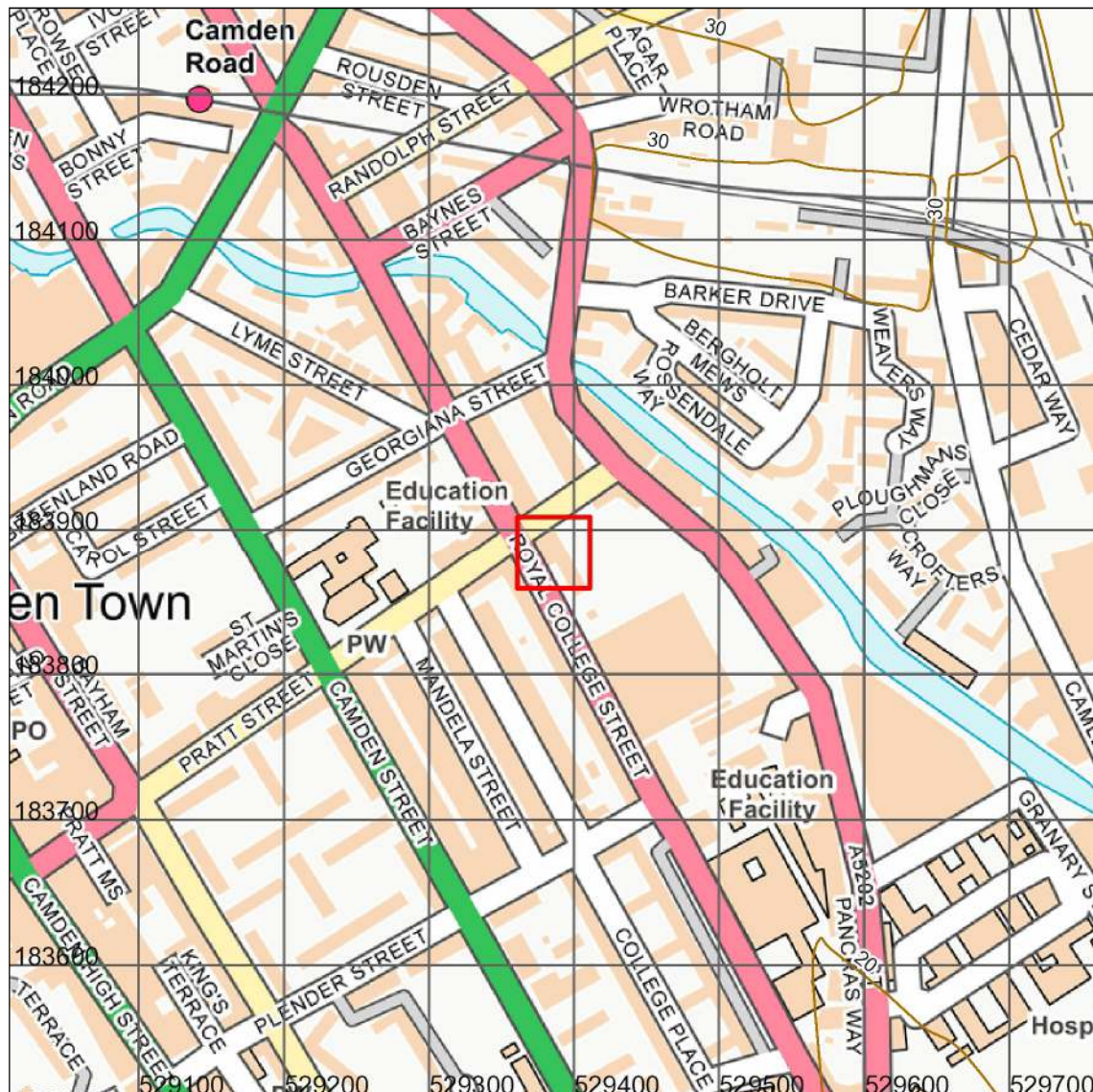
Radon Report

Advisory report on the requirement for radon protective measures in new buildings, conversions and extensions to existing buildings. The report also indicates whether a site is located within a radon Affected Area

Report Id: *BGS_330887/42018*

Client reference:

Search location



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Search location indicated in red

Site Address:

70-86
ROYAL COLLEGE STREET
LONDON
NW1 0TH

This report describes a site located at the National Grid Reference obtained from Ordnance Survey OS Places API.

Note that for sites of irregular shape, this point may lie outside the site boundary.

Where the client has submitted a site plan the assessment will be based on the area

given.

Radon Report: UK

When extensions are made to existing buildings in high radon areas, or new buildings are constructed in these areas, the Building Regulations for England, Wales, Scotland and Northern Ireland require that protective measures are taken against radon entering the building.

This report provides information on whether radon protective measures are required. Depending on the probability of buildings having high radon levels, the Regulations may require either:

1. No protective measures
2. Basic protective measures
3. Full protective measures

This is an advisory report on the requirement for radon protective measures in new buildings, conversions and extensions. The report also indicates whether a site is located within a radon Affected Area

Requirement for radon protective measures

The determination below follows advice in *BR211 Radon: Guidance on protective measures for new buildings (2015 edition)*, which also provides guidance on what to do if the result indicates that protective measures are required.

Is the property in an area where radon protective measures are required for new buildings or extensions to existing ones as described in publication BR211 (2015 edition) Radon: Guidance on protective measures for new buildings?

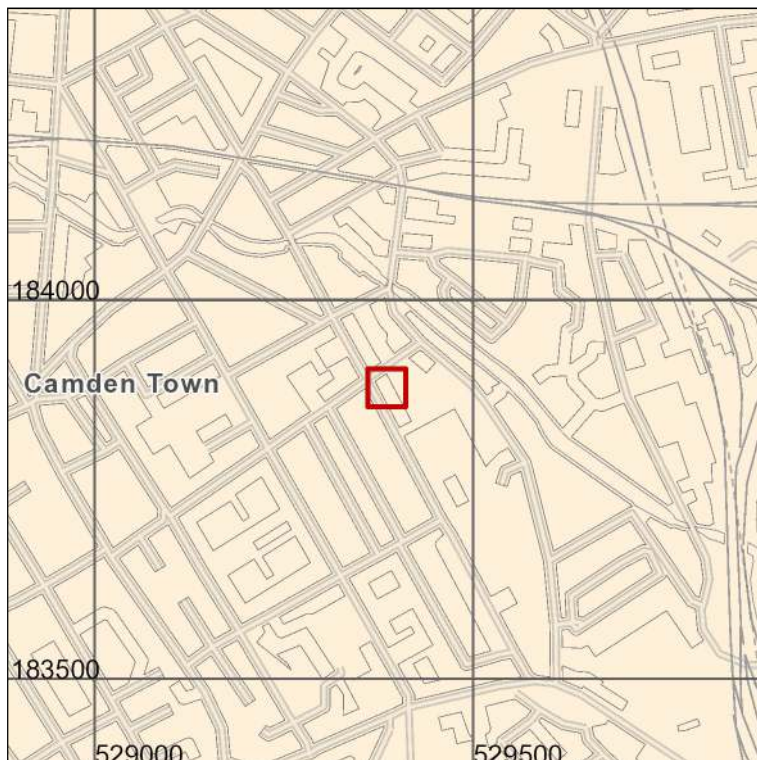
NO RADON PROTECTIVE MEASURES ARE REQUIRED FOR THE REPORT AREA.

More details of the protective measures required are available in *BR211 Radon: Guidance on protective measures for new buildings (2015 Edition)*. Additional information and guidance is available from the Building Research Establishment website (<http://www.bre.co.uk/radon/>).

Whether or not the radon level in a building is above or below the radon Action Level can only be established by having the building tested. The UKHSA provides a radon testing service which can be accessed at www.ukradon.org or by telephone (01235 822622).

If you require further information or guidance, you should contact your local authority building control officer or approved inspector.

Radon Affected Area



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Scale: 1:10 000 (1cm = 100 m)

Search area indicated in red

| % Homes estimated to be at or above the action level |
|--|
| 0-1% |
| 1-3% |
| 3-5% |
| 5-10% |
| 10-30% |
| 30-100% |

Is the property in a radon Affected Area as defined by the UK Health Security Agency (UKHSA) and if so what percentage of homes are estimated to be at or above the Action Level? NO

Additional Information

THE PROPERTY IS IN AN AREA WHERE LESS THAN 1% OF HOMES ARE ESTIMATED TO BE AT OR ABOVE THE ACTION LEVEL. THE PROPERTY IS NOT IN A RADON AFFECTED AREA.

The UKHSA recommends a radon 'Action Level' of 200 Becquerels per cubic metre of air (Bq m^{-3}) for the annual average of the radon gas concentration in a home. Where 1% or more of homes are estimated to be at or above the Action Level the area should be regarded as a radon Affected Area.

This report informs you whether the property is in a radon Affected Area and the percentage of homes that are estimated to be at or above the radon Action Level at this location. Being in an Affected Area does not necessarily mean there is a high radon level within the property; the only way to determine the radon level is to carry out a radon measurement.

The UKHSA advises that radon gas should be measured in all properties within radon Affected Areas and that homes with radon levels at or above the Action Level (200 Bq m⁻³) should be remediated. Householders with levels between the Target Level (100 Bq m⁻³) and Action Level should seriously consider reducing their radon level, especially if they are at greater risk, such as if they are current or ex smokers. Whether or not a home is in fact above or below the Action Level or Target Level can only be established by having the building tested. The UKHSA provides a validated radon testing service which can be accessed at www.ukradon.org.

The information in this report provides an answer to one of the standard legal enquiries on house purchase in England and Wales, known as Law Society CON29 Enquiries of the Local Authority (2016); 3.14 Radon Gas: Do records indicate that the property is in a “Radon Affected Area” as identified by the UKHSA. The data can also be used to advise house buyers and sellers in Scotland and Northern Ireland.

If you are buying a new build property in a Radon Affected Area, you should ask the builder whether radon protective measures were incorporated in the construction of the property.

If you are buying a currently occupied property in a radon Affected Area, you should ask the present owner whether radon levels have been measured in the property. If they have, ask whether the results were at or above the radon Action Level and if so, whether remedial measures were installed, radon levels were re-tested, and if the results of re-testing confirmed the effectiveness of the measures.

Further information on radon is available from the UKHSA at www.ukradon.org.

What is radon?

Radon is a naturally occurring radioactive gas, which is produced by the radioactive decay of radium which, in turn, is derived from the radioactive decay of uranium. Uranium is found in small quantities in all soils and rocks, although the amount varies from place to place. Radon released from rocks and soils is quickly diluted in the atmosphere. Concentrations in the open air are normally very low and do not present a hazard. Radon that enters enclosed spaces such as some buildings (particularly basements), caves, mines, and tunnels may reach high concentrations in some circumstances. The construction method and degree of ventilation will influence radon levels in individual buildings. A person's exposure to radon will also vary according to how particular buildings and spaces are used.

Inhalation of the radioactive decay products of radon gas increases the chance of developing lung cancer. If individuals are exposed to high concentrations for significant periods of time, there may be cause for concern. In order to limit the risk to individuals, the Government has adopted an Action Level for radon in homes of 200 becquerels per cubic metre (Bq m^{-3}). The Government advises householders that, where the radon level is at or above the Action Level, measures should be taken to reduce the concentration.

Radon in workplaces

The Ionising Radiation Regulations 2017 require employers to take action when radon is present above a defined level in the workplace. Advice may be obtained from your local Health and Safety Executive Area Office or the Environmental Health Department of your local authority. The BRE publishes a guide (BR293): **Radon in the workplace**. BRE publications may be obtained from the BRE Bookshop, Tel: 01923 664262, email: bookshop@bre.co.uk website: www.brebookshop.com

Contact Details

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General Terms & Conditions

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Important notes about this Report

- The data, information and related records supplied in this Report by BGS can only be indicative and should not be taken as a substitute for specialist interpretations, professional advice and/or detailed site investigations. You must seek professional advice before making technical interpretations on the basis of the materials provided.
- Geological observations and interpretations are made according to the prevailing understanding of the subject at the time. The quality of such observations and interpretations may be affected by the availability of new data, by subsequent advances in knowledge, improved methods of interpretation, and better access to sampling locations.
- Raw data may have been transcribed from analogue to digital format, or may have been acquired by means of automated measuring techniques. Although such processes are subjected to quality control to ensure reliability where possible, some raw data may have been processed without human intervention and may in consequence contain undetected errors.
- Detail, which is clearly defined and accurately depicted on large-scale maps, may be lost when small-scale maps are derived from them.
- Although samples and records are maintained with all reasonable care, there may be some deterioration in the long term.
- The most appropriate techniques for copying original records are used, but there may be some loss of detail and dimensional distortion when such records are copied.
- Data may be compiled from the disparate sources of information at BGS's disposal, including material donated to BGS by third parties, and may not originally have been subject to any verification or other quality control process.
- Data, information and related records, which have been donated to BGS, have been produced for a specific purpose, and that may affect the type and completeness of the data recorded and any interpretation. The nature and purpose of data collection, and the age of the resultant material may render it unsuitable for certain applications/uses. You must verify the suitability of the material for your intended usage.
- If a report or other output is produced for you on the basis of data you have provided to BGS, or your own data input into a BGS system, please do not rely on it as a source of information about other areas or geological features, as the report may omit important details.
- The topography shown on any map extracts is based on the latest OS mapping and is not necessarily the same as that used in the original compilation of the BGS geological map, and to which the geological linework available at that time was fitted.
- Note that for some sites, the latest available records may be historical in nature, and while every effort is made to place the analysis in a modern geological context, it is possible in some cases that the detailed geology at a site may differ from that described.

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