Maps by email Plant Information Reply

IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.

openreach

CLICK BEFORE YOU DIG

FOR PROFESSIONAL FREE ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING LOCATE AND MARKING SERVICE

email cbyd@openreach.co.uk

ADVANCE NOTICE REQUIRED
(Office hours: Monday - Friday 08.00 to 17.00)
www.openreach.co.uk/cbyd

KEY TO BT SYMBOLS

	Planned	Live
PCP		
Pole		
Box		
Manhole		
Cabinet		

Change Of State	+	Hatchings	
Split Coupling	×	Built	
Duct Tee	▲	Planned	
Building		Inferred	
Kiosk	K	Duct	

Other proposed plant is shown using dashed lines. BT Symbols not listed above may be disregarded. Existing BT Plant may not be recorded. Information valid at time of preparation. Maps are only valid for 90 days after the date of publication.

	Pending Add	In Place	Pending Remove	Not In Use
Power Cable				
Power Duct				N/A

BT Ref : IJQ02397Y
Map Reference : (centre) TQ2116275679
Easting/Northing : (centre) 521162,175679
Issued : 18/02/2019 14:40:08

WARNING: IF PLANNED WORKS FALL INSIDE HATCHED AREA IT IS ESSENTIAL BEFORE PROCEEDING THAT YOU CONTACT THE NATIONAL NOTICE HANDLING CENTRE. PLEASE SEND E-MAIL TO: nnhc@openreach.co.uk

Jessica Western

From: Plantenquiries <plantenquiries@catelecomuk.com>
Sent: 26 February 2019 11:23
To: Jessica Western
Subject: RE: URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

Please Note: Our search criteria has changed. We previously searched for Colt Network which was within 200 metres, this has now changed to 50 metres. The negative response will be for all enquiries that the network is 50 metres or more away from the place of enquiry.

Dear Sir/Madam,

Thank you for your enquiry for the above reference.

We can confirm that Colt Technology Services do not have apparatus near the above location as presented on your submitted plan, if any development or scheme amendments fall outside the 50 metre perimeter new plans must be submitted for review.

Search is based on Overseeing Organisation Agent data supplied; we do not accept responsibility for O.O. Agent inaccurate data.

If we can be of any further assistance please do not hesitate to contact us.

Kind regards,

Plant Enquiry Team

C.A. TELECOM UK LIMITED

Please consider the environment before printing this email.

From: Jessica Western [mailto:JWestern@rsk.co.uk]
Sent: 18 February 2019 14:34
To: 'plantenquiries@instalcom.co.uk' <plantenquiries@instalcom.co.uk>; 'asset.team@cityfibre.com' <asset.team@cityfibre.com>; Plantenquiries <plantenquiries@catelecomuk.com>; 'plantenquiries@energetics-uk.com' <plantenquiries@energetics-uk.com>; 'nrswa@cofely-gdfsuez.com' <nrswa@cofely-gdfsuez.com>;

'interoute.enquiries@plancast.co.uk' <interoute.enquiries@plancast.co.uk>; 'kpn.plantenquiries@instalcom.co.uk' <kpn.plantenquiries@instalcom.co.uk>; 'mbnl.plant.enquiries@turntown.com' <mbnl.plant.enquiries@turntown.com>; 'OPBuriedServicesEnquiries@networkrail.co.uk' <OPBuriedServicesEnquiries@networkrail.co.uk>; 'highwaysandtransport@richmond.gov.uk' <highwaysandtransport@richmond.gov.uk>; 'nrswa@sky.uk' <nrswa@sky.uk>; 'SOTA.plantenquiries@instalcom.co.uk' <SOTA.plantenquiries@instalcom.co.uk>; 'Gavin Clifton' <gavin.clifton-CT@telent.com>; 'assetrecords@utilityassets.co.uk' <assetrecords@utilityassets.co.uk>; 'osp-team@uk.verizonbusiness.com' <osp-team@uk.verizonbusiness.com>; '>Plant Enquiries Team' <PlantEnquiriesTeam@virginmedia.co.uk>; 'National Plant Enquiry's' <OSM.enquiries@atkinsglobal.com>
Subject: URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

Good Afternoon,

Our company is currently undertaking an intrusive site investigation of the area detailed below.

Our reference: 28836
Location of works: Barnes Hospital, South Worple Way, London
O.S. Grid Ref.: 521162, 175679
Address/Nearest Postcode: SW14 8SU
Expected Start Date:
Expected Completion Date:

A plan of the site has been enclosed, please cover the entire area shown within the boundary on the attached map.

In order that all reasonable precautions may be taken to avoid the risk to health and safety through contacts with any of your existing apparatus during execution of the proposed works, please indicate the position and depth of all main statutory services and wayleaves on site and in the adjoining roads where applicable. In addition, please highlight any likely special problems that could arise in connection with your apparatus as a result of the proposed works.

We therefore request that you supply us with relevant plan information or written confirmation to declare that no apparatus is affected at your earliest convenience.

Should you encounter any problems or require any further information, please contact me on the above address or by telephoning 01442 416626, any costs will be accepted with approval first.

Many Thanks,

Jessica Western
Utility Report Co-ordinator

I work part-time Mondays (until 3.00pm), Tuesdays (all day), Wednesdays (until 3.00pm), Thursdays (all day) Friday (until 3.00pm) I will respond to your e mail as soon as I am back in the office.

RSK
18 Frogmore Road, Hemel Hempstead, Hertfordshire, HP3 9RT, UK
Switchboard: +44 (0)1442 437500 · Fax: +44 (0)1442 437550 · Direct dial: +44 01442 416626 (0) · Mobile: +44 (0) 7471 354 928 jwestern@rsk.co.uk

http://www.rsk.co.uk | RSK Geophysics Download Geophysics Guide Follow @RSK_Geophysics

Jessica Western

From: Plant Enquiries <plantenquiries@energetics-uk.com>
Sent: 19 February 2019 09:35
To: Jessica Western
Subject: RE: URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

Dear Sir/Madam,

Thank you for submitting your recent plant enquiry.

Based on the information provided, I can confirm that Energetics **does not** have any plant within the area(s) specified in your request.

If you require further assistance with outstanding enquiries, please call 03300 587 443.

Please ensure all plant enquiries are sent to plantenquiries@energetics-uk.com

Regards

energetics

Plant Enquiries

|
e: plantenquiries@energetics-uk.com | w: www.energetics-uk.com
a: Fenick House, Lister Way, Hamilton International Technology Park

From: Jessica Western <JWestern@rsk.co.uk>
Sent: 18 February 2019 14:34
To: 'plantenquiries@instalcom.co.uk' <plantenquiries@instalcom.co.uk>; 'asset.team@cityfibre.com' <asset.team@cityfibre.com>; 'plantenquiries@catelecomuk.com' <plantenquiries@catelecomuk.com>; Plant Enquiries <plantenquiries@energetics-uk.com>; 'nrswa@cofely-gdfsuez.com' <nrswa@cofely-gdfsuez.com>; 'interoute.enquiries@plancast.co.uk' <interoute.enquiries@plancast.co.uk>; 'kpn.plantenquiries@instalcom.co.uk' <kpn.plantenquiries@instalcom.co.uk>; 'mbnl.plant.enquiries@turntown.com' <mbnl.plant.enquiries@turntown.com>; 'OPBuriedServicesEnquiries@networkrail.co.uk' <OPBuriedServicesEnquiries@networkrail.co.uk>; 'highwaysandtransport@richmond.gov.uk' <highwaysandtransport@richmond.gov.uk>; 'nrswa@sky.uk' <nrswa@sky.uk>; 'SOTA.plantenquiries@instalcom.co.uk' <SOTA.plantenquiries@instalcom.co.uk>; 'Gavin Clifton' <gavin.clifton-CT@telent.com>; 'assetrecords@utilityassets.co.uk' <assetrecords@utilityassets.co.uk>; 'osp-team@uk.verizonbusiness.com' <osp-team@uk.verizonbusiness.com>; '>Plant Enquiries Team' <PlantEnquiriesTeam@virginmedia.co.uk>; 'National Plant Enquiry's' <OSM.enquiries@atkinsglobal.com>
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We therefore request that you supply us with relevant plan information or written confirmation to declare that no apparatus is affected at your earliest convenience.

Should you encounter any problems or require any further information, please contact me on the above address or by telephoning 01442 416626, any costs will be accepted with approval first.

Many Thanks,

Jessica Western
Utility Report Co-ordinator

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Switchboard: +44 (0)1442 437500 · Fax: +44 (0)1442 437550 · Direct dial: +44 01442 416626 (0) · Mobile: +44 (0) 7471 354 928 jwestern@rsk.co.uk

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Jessica Western

From: Plantenquiries <Plantenquiries@instalcom.co.uk>
Sent: 18 February 2019 15:05
To: Jessica Western
Subject: E02-19-3437 RE: URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

Dear Sir or Madam,

Thank you for your plant enquiry below.

We can confirm that CenturyLink Communications UK Limited (formerly Level 3), Global Crossing (Uk) Ltd, Global Crossing PEC, Fibernet UK Ltd and Fibrespan Ltd do not have any apparatus within the indicated works area.

Instalcom responds to plant enquiries for all of the above and therefore you only need send one plant enquiry to cover all of these companies.

Please note that this response is only valid for 3 months. If your works do not commence within this time period, please resubmit your plant enquiry for assessment before any works commence.

Regards

Plant Enquiries Dept
Instalcom Limited
Borehamwood Ind. Park
Rowley Lane
Borehamwood
WD6 5PZ

Office: +44 (0)208 731 4613
Fax: +44 (0)208 731 4601
Email: plantenquiries@instalcom.co.uk
Web: http://www.instalcom.co.uk

From: Jessica Western [mailto:JWestern@rsk.co.uk]
Sent: 18 February 2019 14:34
To: Plantenquiries <Plantenquiries@instalcom.co.uk>; 'asset.team@cityfibre.com' <asset.team@cityfibre.com>; 'plantenquiries@catelecomuk.com' <plantenquiries@catelecomuk.com>; 'plantenquiries@energetics-uk.com' <plantenquiries@energetics-uk.com>; 'nrswa@cofely-gdfsuez.com' <nrswa@cofely-gdfsuez.com>; 'interoute.enquiries@plancast.co.uk' <interoute.enquiries@plancast.co.uk>; KPN Plant Enquiries <kpn.plantenquiries@instalcom.co.uk>; 'mbnl.plant.enquiries@turntown.com'

<mbnl.plant.enquiries@turntown.com>; 'OPBuriedServicesEnquiries@networkrail.co.uk' <OPBuriedServicesEnquiries@networkrail.co.uk>; 'highwaysandtransport@richmond.gov.uk' <highwaysandtransport@richmond.gov.uk>; 'nrswa@sky.uk' <nrswa@sky.uk>; SOTA Plant Enquiries <SOTA.PlantEnquiries@instalcom.co.uk>; 'Gavin Clifton' <gavin.clifton-CT@telent.com>; 'assetrecords@utilityassets.co.uk' <assetrecords@utilityassets.co.uk>; 'osp-team@uk.verizonbusiness.com' <osp-team@uk.verizonbusiness.com>; '>Plant Enquiries Team' <PlantEnquiriesTeam@virginmedia.co.uk>; 'National Plant Enquiry's' <OSM.enquiries@atkinsglobal.com>
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A plan of the site has been enclosed, please cover the entire area shown within the boundary on the attached map.

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We therefore request that you supply us with relevant plan information or written confirmation to declare that no apparatus is affected at your earliest convenience.

Should you encounter any problems or require any further information, please contact me on the above address or by telephoning 01442 416626, any costs will be accepted with approval first.

Many Thanks,

Jessica Western
Utility Report Co-ordinator

I work part-time Mondays (until 3.00pm), Tuesdays (all day), Wednesdays (until 3.00pm), Thursdays (all day) Friday (until 3.00pm) I will respond to your e mail as soon as I am back in the office.

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Switchboard: +44 (0)1442 437500 · Fax: +44 (0)1442 437550 · Direct dial: +44 01442 416626 (0) · Mobile: +44 (0) 7471 354 928 jwestern@rsk.co.uk

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Disclaimer

Jessica Western

From: Interoute Enquiries <interoute.enquiries@plancast.co.uk>
Sent: 19 February 2019 07:19
To: Jessica Western
Subject: RE: URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

This response does not include Vtesse or Easynet plant, please continue to use Vtesse or Easynet details for their enquiries

To whom it may concern

Thank you for your enquiry regarding the above proposals at the above location

We would advise that we are unaware of any Interoute plant or services in this Location as indicated in your enquiry.

We bring to your attention the fact that whilst we try to ensure the information we provide is accurate, the information is provided Without Prejudice and Interoute and its Agents accept no liability for claims arising from any inaccuracy, omissions or errors contained in this response.

All responses are only vaild for 28 days

Yours faithfully

PLANCAST Plant Enquiry Department

The Old Haybarn
Rosebery Mews, Mentmore
Bedfordshire LU7 0UE

T: 01296 662647

www.plancast.co.uk

From: Jessica Western <JWestern@rsk.co.uk>
Sent: 18 February 2019 14:34
To: 'plantenquiries@instalcom.co.uk' <plantenquiries@instalcom.co.uk>; 'asset.team@cityfibre.com' <asset.team@cityfibre.com>; 'plantenquiries@catelecomuk.com' <plantenquiries@catelecomuk.com>; 'plantenquiries@energetics-uk.com' <plantenquiries@energetics-uk.com>; 'nrswa@cofely-gdfsuez.com' <nrswa@cofely-gdfsuez.com>; Interoute Enquiries <interoute.enquiries@plancast.co.uk>; 'kpn.plantenquiries@instalcom.co.uk' <kpn.plantenquiries@instalcom.co.uk>; 'mbnl.plant.enquiries@turntown.com' <mbnl.plant.enquiries@turntown.com>; 'OPBuriedServicesEnquiries@networkrail.co.uk' <OPBuriedServicesEnquiries@networkrail.co.uk>; 'highwaysandtransport@richmond.gov.uk' <highwaysandtransport@richmond.gov.uk>; 'nrswa@sky.uk' <nrswa@sky.uk>; 'SOTA.plantenquiries@instalcom.co.uk' <SOTA.plantenquiries@instalcom.co.uk>; 'Gavin Clifton' <gavin.clifton-CT@telent.com>; 'assetrecords@utilityassets.co.uk' <assetrecords@utilityassets.co.uk>; 'osp-team@uk.verizonbusiness.com' <osp-team@uk.verizonbusiness.com>; '>Plant Enquiries Team' <PlantEnquiriesTeam@virginmedia.co.uk>; 'National Plant Enquiry's' <OSM.enquiries@atkinsglobal.com>
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We therefore request that you supply us with relevant plan information or written confirmation to declare that no apparatus is affected at your earliest convenience.

Should you encounter any problems or require any further information, please contact me on the above address or by telephoning 01442 416626, any costs will be accepted with approval first.

Many Thanks,

Jessica Western
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Jessica Western

From: KPN Plant Enquiries <kpn.plantenquiries@instalcom.co.uk>
Sent: 19 February 2019 10:24
To: Jessica Western
Subject: RE:K02-19- 2142 URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

Dear Sir or Madam,

With reference to your plant enquiry below, we can confirm that KPN do not have any apparatus within the immediate proximity of your proposed works.

If you require any further information, please do not hesitate to contact us.

Please note that this response is only valid for 3 months. If your works do not commence within this time period, please resubmit your plant enquiry for assessment before any works commence.

Regards

Plant Enquiries Dept
Instalcom Limited
Borehamwood Ind. Park
Rowley Lane
Borehamwood
WD6 5PZ

Office: +44 (0)208 731 4613
Fax: +44 (0)208 731 4601
Email: kpn.plantenquiries@instalcom.co.uk
Web: http://www.instalcom.co.uk

From: Jessica Western [mailto:JWestern@rsk.co.uk]
Sent: 18 February 2019 14:34
To: Plantenquiries <Plantenquiries@instalcom.co.uk>; 'asset.team@cityfibre.com' <asset.team@cityfibre.com>; 'plantenquiries@catelecomuk.com' <plantenquiries@catelecomuk.com>; 'plantenquiries@energetics-uk.com'

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We therefore request that you supply us with relevant plan information or written confirmation to declare that no apparatus is affected at your earliest convenience.

Should you encounter any problems or require any further information, please contact me on the above address or by telephoning 01442 416626, any costs will be accepted with approval first.

Many Thanks,

Jessica Western
Utility Report Co-ordinator

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Plant Protection
Cadent
Block 1; Floor 1
Brick Kiln Street
Hinckley
LE10 0NA
E-mail: plantprotection@cadentgas.com
Telephone: +44 (0)800 688588

National Gas Emergency Number:
0800 111 999*

National Grid Electricity Emergency Number:
0800 40 40 90*
* Available 24 hours, 7 days/week.
Calls may be recorded and monitored.

www.cadentgas.com

Jessica Western
RSK
18 Frogmore Road

Hemel Hempstead

Hertfordshire

Date: 28/02/2019
Our Ref: NL_TE_Z5_3WWP_887308
Your Ref: 28836 Barnes Hospital (LH)
RE: Scheduled Works, SW14 8SU, Barnes Hospital, South Worple Way, London

Thank you for your enquiry which was received on 27/02/2019.
Please note this response and any attached map(s) are valid for 28 days.

An assessment has been carried out with respect to Cadent Gas Limited, National Grid Electricity Transmission plc's and National Grid Gas Transmission plc's apparatus. Please note it does not cover the items listed in the section "Your Responsibilities and Obligations", including gas service pipes and related apparatus.
For details of Network areas please see the Cadent website (http://cadentgas.com/Digging-safely/Dial-before-you-dig) or the enclosed documentation.

Are My Works Affected?

Your proposal **is in proximity to the Cadent and/or National Grid apparatus** specified within the "Assessment" section, which may impact, and possibly prevent, your proposed activities for safety and/or legal reasons.

You must not commence any work until you have complied with all of the guidance provided and been contacted by all of the teams (if any) listed in the Contact Requirements section.

As set out in the table in the "Assessment" section of this response; in respect of **all** the apparatus listed you must read and follow all the guidance provided when planning or undertaking any activities at this location. Additionally, for apparatus assessed as having a high potential to be affected, a member of the respective team will contact you within **7** working days.

The details contained within this enquiry are valid for 28 days. If the scheduled work is not completed within this time, or should the location, date or nature of your activities change, you must submit another enquiry.

Your Responsibilities and Obligations

The "Assessment" Section below outlines the detailed requirements that must be followed when planning or undertaking your scheduled activities at this location.

It is your responsibility to ensure that the information you have submitted is accurate and that all relevant documents including links are provided to all persons (either direct labour or contractors) working for you near Cadent and/or National Grid's apparatus, e.g. as contained within the Construction (Design and Management) Regulations.

This assessment solely relates to Cadent Gas Limited, National Grid Electricity Transmission plc (NGET) and National Grid Gas Transmission plc (NGGT) and apparatus. This assessment does **NOT** include:

- Cadent and/or National Grid's legal interest (easements or wayleaves) in the land which restricts activity in proximity to Cadent and/or National Grid's assets in private land. You must obtain details of any such restrictions from the landowner in the first instance and if in doubt contact Plant Protection.
- Gas service pipes and related apparatus
- Recently installed apparatus
- Apparatus owned by other organisations, e.g. other gas distribution operators, local electricity companies, other utilities, etc.

It is **YOUR** responsibility to take into account whether the items listed above may be present and if they could be affected by your proposed activities. Further "Essential Guidance" in respect of these items can be found on either the National Grid or Cadent website.

This communication does not constitute any formal agreement or consent for any proposed development work; either generally or with regard to Cadent and/or National Grid's easements or wayleaves nor any planning or building regulations applications.

Cadent Gas Limited, NGGT and NGET or their agents, servants or contractors do not accept any liability for any losses arising under or in connection with this information. This limit on liability applies to all and any claims in contract, tort (including negligence), misrepresentation (excluding fraudulent misrepresentation), breach of statutory duty or otherwise. This limit on liability does not exclude or restrict liability where prohibited by the law nor does it supersede the express terms of any related agreements.

If you require further assistance please contact the Plant Protection team via e-mail (click here) or via the contact details at the top of this response.

Yours faithfully

Plant Protection Team

ASSESSMENT

Affected Apparatus
The apparatus that has been identified as being in the vicinity of your proposed works is:

- Low or Medium pressure (below 2 bar) gas pipes and associated equipment. (As a result it is highly likely that there are gas services and associated apparatus in the vicinity)

Requirements

BEFORE carrying out any work you must:
(N.B. Works only to be undertaken when contact has been made as per the Contact Requirements section)

- Carefully read these requirements including the attached guidance documents and maps showing the location of apparatus.
- Contact the landowner and ensure any proposed works in private land do not infringe Cadent and/or National Grid's legal rights (i.e. easements or wayleaves). If the works are in the road or footpath the relevant local authority should be contacted.
- Ensure that all persons, including direct labour and contractors, working for you on or near Cadent and/or National Grid's apparatus follow the requirements of the HSE Guidance Notes HSG47 - 'Avoiding Danger from Underground Services' and GS6 – 'Avoidance of danger from overhead electric power lines'. This guidance can be downloaded free of charge at http://www.hse.gov.uk
- In line with the above guidance, verify and establish the actual position of mains, pipes, cables, services and other apparatus on site before any activities are undertaken.
- Ensure that you have been in contact with **all** of the teams listed in the **Contact Requirements** section and complied with any additional guidance provided.

DURING any work you must:

- Ensure that no mechanical excavation takes place above or within 0.5m of the Cadent buried medium and low pressure gas pipes and associated equipment.
- Comply with all guidance relating to general activities and any specific guidance for each asset type as specified in the Guidance Section below.
- Ensure that access to Cadent and/or National Grid apparatus is maintained at all times.
- Prevent the placing of heavy construction plant, equipment, materials or the passage of heavy vehicles over Cadent and/or National Grid apparatus unless specifically agreed with Cadent and/or National Grid in advance.
- Exercise extreme caution if slab (mass) concrete is encountered during excavation works as this may be protecting or supporting Cadent and/or National Grid apparatus.
- Maintain appropriate clearances between gas apparatus and the position of other buried plant.

Please refer to the "General Guidance" or contact the Plant Protection Team for further information regarding the above.

Contact Requirements

Searches based on your enquiry have identified that the following apparatus types may be affected by your enquiry and further consultation may be required. Please use the boxes provided to record the details of the consultation (where applicable).

Apparatus	Team or Guidance	Contact Details and Ref	Date of Contact
Low or Medium pressure gas pipes	Cadent Maintenance Team	>	>

Each team will endeavour to contact you directly within **7** working days from the date of this response to undertake a more detailed assessment. Please contact Plant Protection if you have not had a response within this period. This may also have an impact on any preparatory works.

GUIDANCE

Excavating Safely - Avoiding injury when working near gas pipes:
http://www.nationalgrid.com/NR/rdonlyres/2D2EEA97-B213-459C-9A26-18361C6E0B0D/25249/Digsafe_leaflet3e2finalamends061207.pdf

Standard Guidance

Essential Guidance document:
http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589934982

General Guidance document:
http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=35103

Excavating Safely in the vicinity of gas pipes guidance (Credit card):
http://www.nationalgrid.com/NR/rdonlyres/A3D37677-6641-476C-9DDA-E89949052829/44257/ExcavatingSafelyCreditCard.pdf

Excavating Safely in the vicinity of electricity cables guidance (Credit card):
http://www.nationalgrid.com/NR/rdonlyres/35DDEC6D-D754-4BA5-AF3C-D607D05A25C2/44858/ExcavatingSafelyCreditCardelectricitycables.pdf

Copies of all the Guidance Documents can also be downloaded from the National Grid and Cadent websites.

ID: NL_TE_Z5_3WWP_687308	View extent: 361m, 196m
USER: lee.hardwell	LP MAINS MP MAINS IP MAINS LHP MAINS NHP MAINS
DATE: 28/02/2019	
DATA DATE: 27/02/2019	
REF: 28836 Barnes Hospital (LH)	
MAP REF: TQ2175 CENTRE: 521176, 175683	0m 25m Approximate scale 1:1250 on A4 Colour Landscape

Some examples of Plant Items:

Valve | Depth of Cover | Syphon | Diameter Change | Material Change | Out of Standard Service

Do not proceed without further consultation

This plan shows those pipes owned by Cadent Gas Limited in its role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc., are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Cadent Gas Limited or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

Map 1 of 1 (GAS)

MAPS Plot Server Version 1.11.0

Cadent

Your Gas Network

Requested by: RSK

ENQUIRY SUMMARY

Received Date
27/02/2019

Your Reference
28836 Barnes Hospital (LH)

Location
Centre Point: 521176, 175683
X Extent: 108
Y Extent: 114
Location Description: SW14 8SU, Barnes Hospital, South Worple Way, London

Map Options
Paper Size: A4
Orientation: LANDSCAPE
Requested Scale: 1250
Actual Scale: 1:1250 (GAS)
Real World Extents: 361m x 196m (GAS)

Start Date
11/03/2019

Recipients
pprsteam@cadentgas.com

Enquirer Details
Organisation Name: RSK
Contact Name: Jessica Western
Email Address: jwestern@rsk.co.uk
Telephone: 01442 416626 (07471 354 928)
Address: 18 Frogmore Road, , Hemel Hempstead, , Hertfordshire, , HP3 9RT

Description of Works
(E) Intrusive site investigation which involve drilling 4 shallow boreholes (up to a maximum depth of 3m below ground level)

Enquiry Type
Scheduled Works

Activity Type
General Excavation

Work Types
Work Type: Boring/Moling/Horizontal Drilling greater than 300mm

Jessica Western

From: NRSWA <nrswa.nrswa@sky.uk>
Sent: 18 February 2019 17:03
To: Jessica Western
Subject: URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

Thank you for your enquiry.

Please be advised that Sky Telecommunications Services Ltd will not be affected by your proposal.

Best endeavours have been made to ensure accuracy, however if you require further information, please contact us by email at nrswa@sky.uk.

Regards

NRSWA Department
Tech UK - Implementation
sky | TECHNOLOGY
nrswa@sky.uk +44 20703232234

Kind Regards,

Tabitha Harris
NRSWA Administrator
Tech UK Operations

NRSWA@sky.uk

70 Buckingham Avenue
Slough
SL1 4PN

From: Jessica Western <JWestern@rsk.co.uk>
Sent: 18 February 2019 14:34
To: 'plantenquiries@instalcom.co.uk' <plantenquiries@instalcom.co.uk>; 'asset.team@cityfibre.com' <asset.team@cityfibre.com>; 'plantenquiries@catelecomuk.com' <plantenquiries@catelecomuk.com>; 'plantenquiries@energetics-uk.com' <plantenquiries@energetics-uk.com>; 'nrswa@cofely-gdfsuez.com' <nrswa@cofely-gdfsuez.com>; 'interoute.enquiries@plancast.co.uk' <interoute.enquiries@plancast.co.uk>; 'kpn.plantenquiries@instalcom.co.uk' <kpn.plantenquiries@instalcom.co.uk>; 'mbnl.plant.enquiries@turntown.com' <mbnl.plant.enquiries@turntown.com>; 'OPBuriedServicesEnquiries@networkrail.co.uk' <OPBuriedServicesEnquiries@networkrail.co.uk>; 'highwaysandtransport@richmond.gov.uk' <highwaysandtransport@richmond.gov.uk>; NRSWA <nrswa.nrswa@sky.uk>; 'SOTA.plantenquiries@instalcom.co.uk' <SOTA.plantenquiries@instalcom.co.uk>; 'Gavin Clifton' <gavin.clifton-CT@telent.com>; 'assetrecords@utilityassets.co.uk' <assetrecords@utilityassets.co.uk>; 'osp-team@uk.verizonbusiness.com' <osp-team@uk.verizonbusiness.com>; '>Plant Enquiries Team' <PlantEnquiriesTeam@virginmedia.co.uk>; 'National Plant Enquiry's' <OSM.enquiries@atkinsglobal.com>
Subject: [EXTERNAL] URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

Good Afternoon,

Our company is currently undertaking an intrusive site investigation of the area detailed below.

Our reference: 28836
Location of works: Barnes Hospital, South Worple Way, London
O.S. Grid Ref.: 521162, 175679
Address/Nearest Postcode: SW14 8SU
Expected Start Date:
Expected Completion Date:

A plan of the site has been enclosed, please cover the entire area shown within the boundary on the attached map.

In order that all reasonable precautions may be taken to avoid the risk to health and safety through contacts with any of your existing apparatus during execution of the proposed works, please indicate the position and depth of all main statutory services and wayleaves on site and in the adjoining roads where applicable. In addition, please highlight any likely special problems that could arise in connection with your apparatus as a result of the proposed works.

We therefore request that you supply us with relevant plan information or written confirmation to declare that no apparatus is affected at your earliest convenience.

Should you encounter any problems or require any further information, please contact me on the above address or by telephoning 01442 416626, any costs will be accepted with approval first.

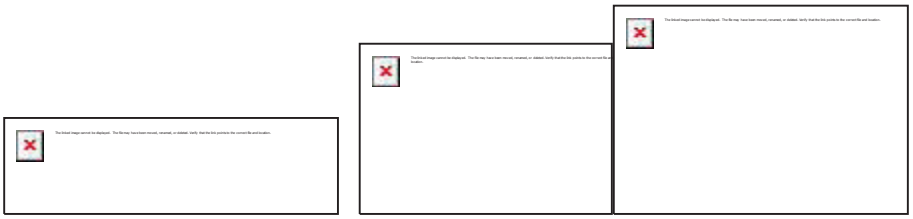
Many Thanks,

Jessica Western
Utility Report Co-ordinator

I work part-time Mondays (until 3.00pm), Tuesdays (all day), Wednesdays (until 3.00pm), Thursdays (all day) Friday (until 3.00pm) I will respond to your e mail as soon as I am back in the office.

RSK
18 Frogmore Road, Hemel Hempstead, Hertfordshire, HP3 9RT, UK
Switchboard: +44 (0)1442 437500 · Fax: +44 (0)1442 437550 · Direct dial: +44 01442 416626 (0) · Mobile: +44 (0) 7471 354 928 jwestern@rsk.co.uk

http://www.rsk.co.uk | RSK Geophysics Download Geophysics Guide Follow @RSK_Geophysics



Jessica Western

From: SOTA Plant Enquiries <SOTA.PlantEnquiries@instalcom.co.uk>
Sent: 19 February 2019 13:09
To: Jessica Western
Subject: RE: S02-19- 0760 URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

Dear Sir or Madam,

With reference to your plant enquiry below, we can confirm that SOTA do not have any apparatus within the immediate proximity of your proposed works.

If you require any further information, please do not hesitate to contact us.

Please note that this response is only valid for 3 months. If your works do not commence within this time period, please resubmit your plant enquiry for assessment before any works commence.

Regards

Plant Enquiries Dept.
Instalcom Limited
Borehamwood Ind. Park
Rowley Lane
Borehamwood
WD6 5PZ

Office: +44 (0)208 731 4613
Fax: +44 (0)208 731 4601
Email: sota.plantenquiries@instalcom.co.uk
Web: http://www.instalcom.co.uk

From: Jessica Western [mailto:JWestern@rsk.co.uk]
Sent: 18 February 2019 14:34
To: Plantenquiries <Plantenquiries@instalcom.co.uk>; 'asset.team@cityfibre.com' <asset.team@cityfibre.com>; 'plantenquiries@catelecomuk.com' <plantenquiries@catelecomuk.com>; 'plantenquiries@energetics-uk.com' <plantenquiries@energetics-uk.com>; 'nrswa@cofely-gdfsuez.com' <nrswa@cofely-gdfsuez.com>; 'interoute.enquiries@plancast.co.uk' <interoute.enquiries@plancast.co.uk>; KPN Plant Enquiries

<kpn.plantenquiries@instalcom.co.uk>; 'mbnl.plant.enquiries@turntown.com' <mbnl.plant.enquiries@turntown.com>; 'OPBuriedServicesEnquiries@networkrail.co.uk' <OPBuriedServicesEnquiries@networkrail.co.uk>; 'highwaysandtransport@richmond.gov.uk' <highwaysandtransport@richmond.gov.uk>; 'nrswa@sky.uk' <nrswa@sky.uk>; SOTA Plant Enquiries <SOTA.PlantEnquiries@instalcom.co.uk>; 'Gavin Clifton' <gavin.clifton-CT@telent.com>; 'assetrecords@utilityassets.co.uk' <assetrecords@utilityassets.co.uk>; 'osp-team@uk.verizonbusiness.com' <osp-team@uk.verizonbusiness.com>; '>Plant Enquiries Team' <PlantEnquiriesTeam@virginmedia.co.uk>; 'National Plant Enquiry's' <OSM.enquiries@atkinsglobal.com>
Subject: URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

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Location of works: Barnes Hospital, South Worple Way, London
O.S. Grid Ref.: 521162, 175679
Address/Nearest Postcode: SW14 8SU
Expected Start Date:
Expected Completion Date:

A plan of the site has been enclosed, please cover the entire area shown within the boundary on the attached map.

In order that all reasonable precautions may be taken to avoid the risk to health and safety through contacts with any of your existing apparatus during execution of the proposed works, please indicate the position and depth of all main statutory services and wayleaves on site and in the adjoining roads where applicable. In addition, please highlight any likely special problems that could arise in connection with your apparatus as a result of the proposed works.

We therefore request that you supply us with relevant plan information or written confirmation to declare that no apparatus is affected at your earliest convenience.

Should you encounter any problems or require any further information, please contact me on the above address or by telephoning 01442 416626, any costs will be accepted with approval first.

Many Thanks,

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Disclaimer

telent
Mayne House
Fenton Way
Basildon
Essex
SS15 6TD
United Kingdom

www.**telent**.com

Date 18/02/2019
Our Ref LPENQ0000109618

Dear Sir/Madam

Teliasonera Line Plant Enquiry.

Thank you for your correspondence enclosing details of your proposals as per your reference below.

28836 Barnes Hospital, South Worple Way, London

Our client's apparatus, Teliasonera, is not located within the vicinity of the above reference and we therefore have no further interest in this current location.

Please note that all enquiries relating to the Teliasonera line plant should be forwarded to:

By post – to, telent,

Teliasonera line plant enquiries,

Mayne House,

Fenton Way,

Basildon,

Essex

SS15 6TD

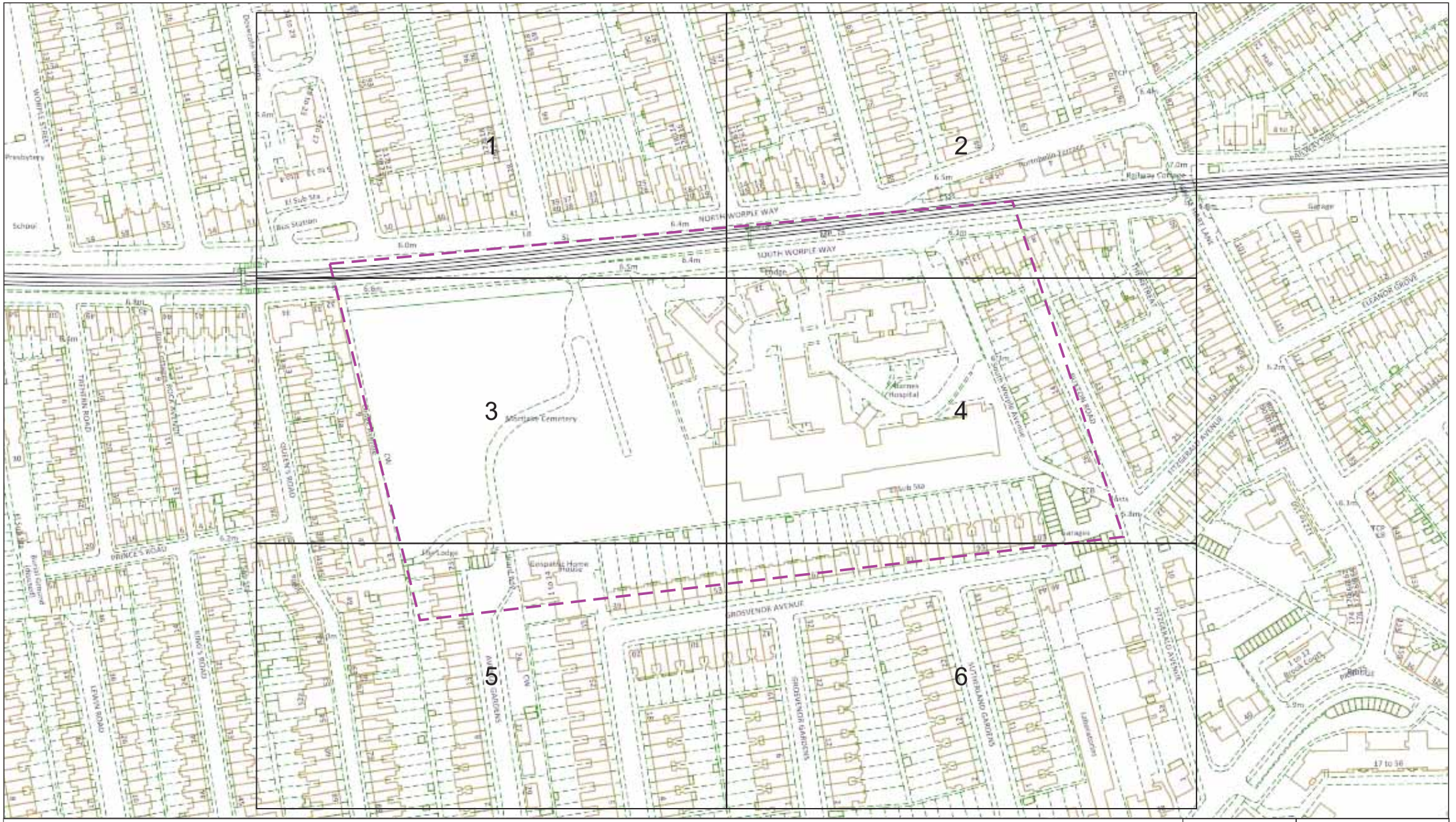
By email - to, telenttelia.plantenquiries@telent.com

By phone – to, 01268 269096

Yours faithfully

Telent CCO

Basildon



Dig Sites Area: Line:

The quality and accuracy of any print will depend on your printer, your computer and its print settings. Measurements scaled from this plan may not match measurements between the same points on the ground.

This plan must be used with the attached 'Symbols' document.

Date Requested: 18/02/2019
Job Reference: 14871202
Site Location: 520915 175488
Requested by:
Mrs Jessica Western
Your Scheme/Reference: 28836

Scale: 1:1538 (When plotted at A3)

1. The position of the apparatus shown on this drawing is believed to be correct but the original landmarks may have been altered since the apparatus was installed.
2. The exact position of the apparatus should be verified - use approved cable avoidance tools prior to excavation using suitable hand tools.
3. It is essential that trial holes are carefully made avoiding the use of mechanical tools or picks until the exact location of all the cables have been determined.
4. It must be assumed that there is a service cable into each property, lamp column and street sign, etc.
5. All cables must be treated as being live unless proved otherwise by UK Power Networks.
6. The information proved must be given to all people working near UK Power Networks plant and equipment. Do not use plans more than 3 months after the issue date for excavation purposes.
7. Please be aware that electric cables/lines belonging to other owners of licensed electricity distribution systems may be present and it is your responsibility to identify their location.

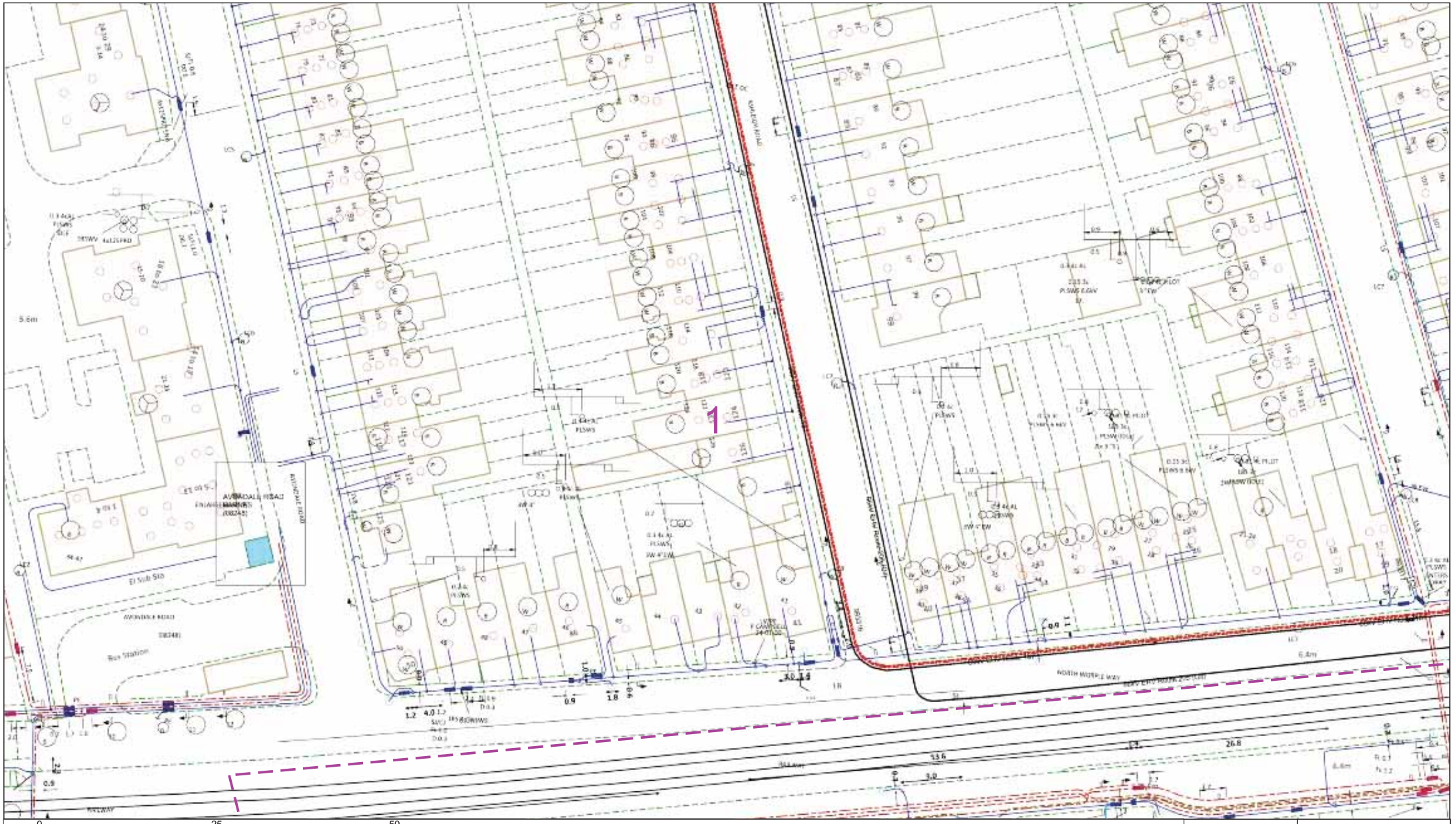
1. UK Power Networks does not warrant that the information provided to you is correct. You rely upon it at your own risk.
2. UK Power Networks does not exclude or limit its liability if it causes the death of any persons or causes personal injury to a person.
3. Subject to paragraph 2 UK Power Networks has no liability to you in contract, in tort (including negligence), for breach of statutory duty or otherwise for any loss, damage, cost, claims, demands, or expenses that you or any third party may suffer or incur as a result of using the information provided whether for physical damage to property or for any economic loss (including without limitation loss of profit, loss of opportunity, loss of savings, loss of goodwill, loss of business, loss of use) or any special or consequential loss or damage whatsoever.
4. This plan has been provided to you on the basis of the terms of use set out in the covering letter that accompanies this plan. If you do not accept and/or do not understand the terms of use set out in the covering letter you must not use the plan and must return it to the sender of the letter.
5. You are responsible for the security of the information provided to you. It must not be given, sold or made available upon payment of a fee to a third party.

UK Power Networks

IF IN DOUBT - ASK!
PHONE 0800 056 5866
EMERGENCY - If you damage a cable or line
Phone 0800 783 8838
(24hrs) URGENTLY

ALWAYS LOOK UP BEFORE YOU START WORK
Refer to HSE Guidance note GS6

Maps produced at 1:2500 scale are Geo-Schematics which show LV mains cables and overhead lines (in some cases all voltages). Prior to carrying out excavations you must refer to the 1:500 records to determine the location of all known underground plant and equipment.



0 25 50
metres

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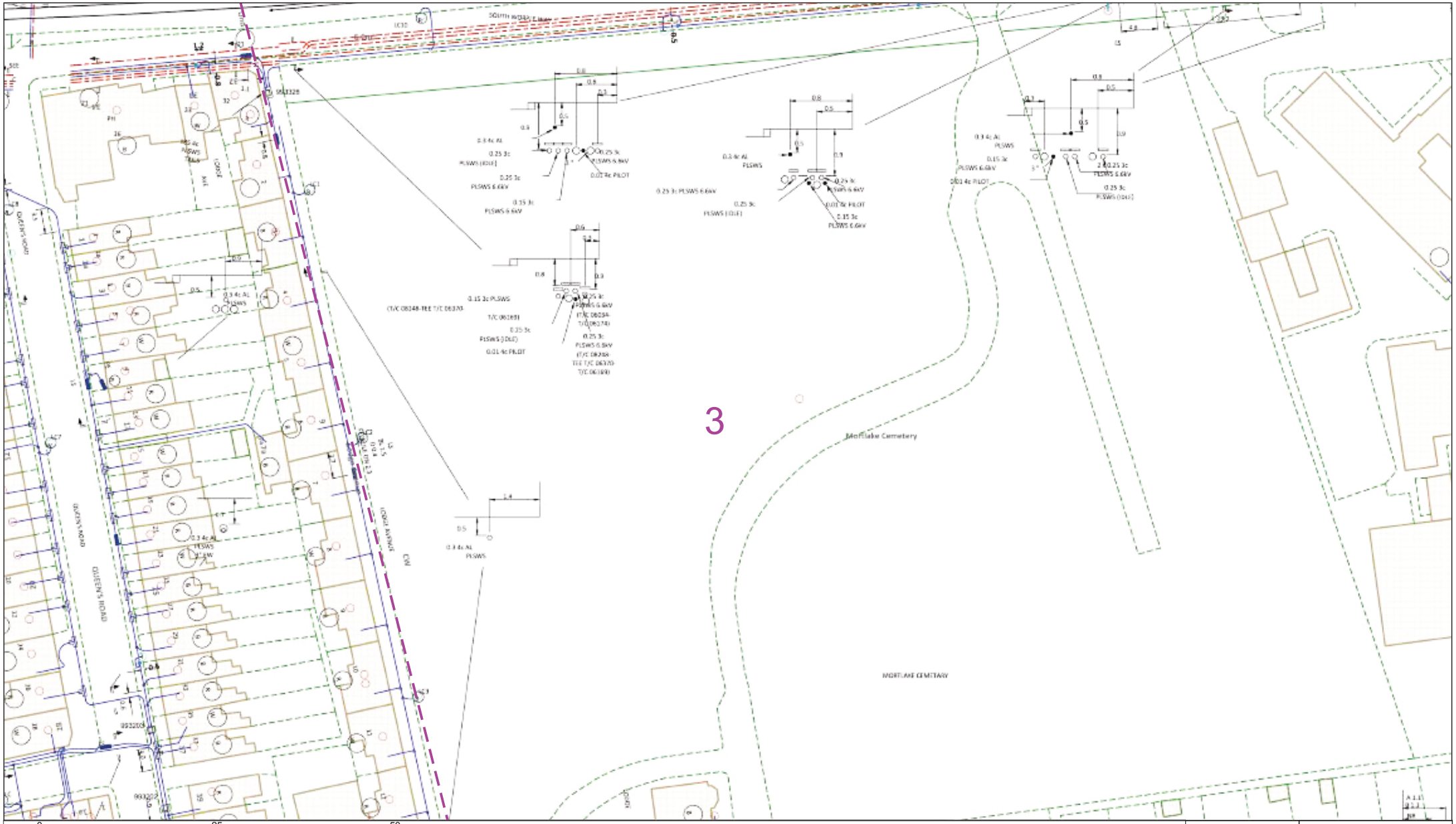

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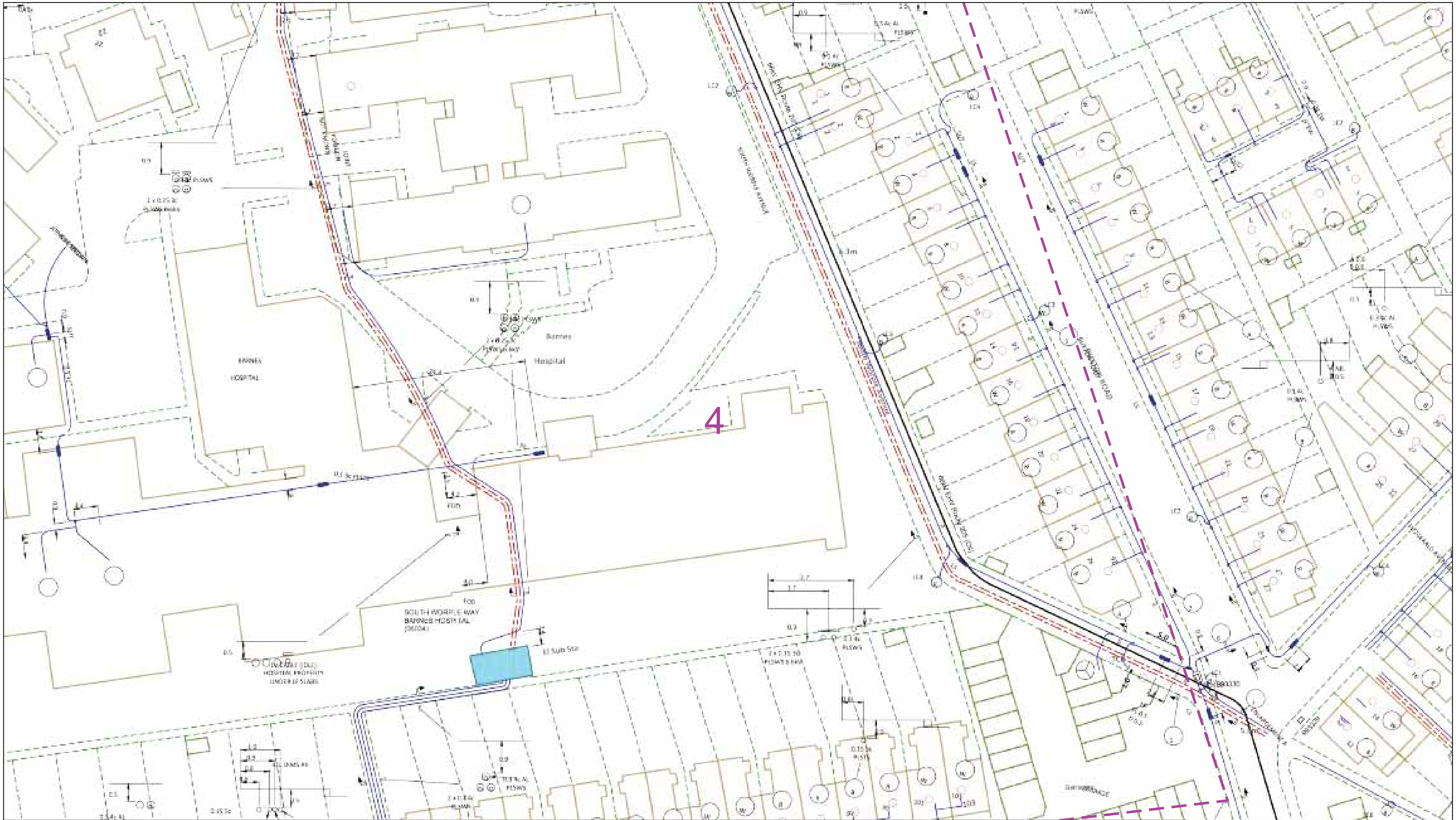

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6. The information proved must be given to all people working near UK Power Networks plant and equipment. Do not use plans more than 3 months after the issue date for excavation purposes.
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2. UK Power Networks does not exclude or limit its liability if it causes the death of any persons or causes personal injury to a person.
3. Subject to paragraph 2 UK Power Networks has no liability to you in contract, in tort (including negligence), for breach of statutory duty or otherwise for any loss, damage, cost, claims, demands, or expenses that you or any third party may suffer or incur as a result of using the information provided whether for physical damage to property or for any economic loss (including without limitation loss of profit, loss of opportunity, loss of savings, loss of goodwill, loss of business, loss of use) or any special or consequential loss or damage whatsoever.
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IF IN DOUBT - ASK!
PHONE 0800 056 5866
EMERGENCY - If you damage a cable or line
Phone 0800 783 8838 (24hrs) URGENTLY

ALWAYS LOOK UP BEFORE YOU START WORK
Refer to HSE Guidance note GS6

Maps produced at 1:2500 scale are Geo-Schematics which show LV mains cables and overhead lines (in some cases all voltages). Prior to carrying out excavations you must refer to the 1:500 records to determine the location of all known underground plant and equipment.

0 25 50
metres

Dig Sites Area: Line:

The quality and accuracy of any print will depend on your printer, your computer and its print settings. Measurements scaled from this plan may not match measurements between the same points on the ground.

This plan must be used with the attached 'Symbols' document.

Date Requested: 18/02/2019
Job Reference: 14871202
Site Location: 520915 175488
Requested by:
Mrs Jessica Western
Your Scheme/Reference: 28836

Scale: 1:500 (When plotted at A3)

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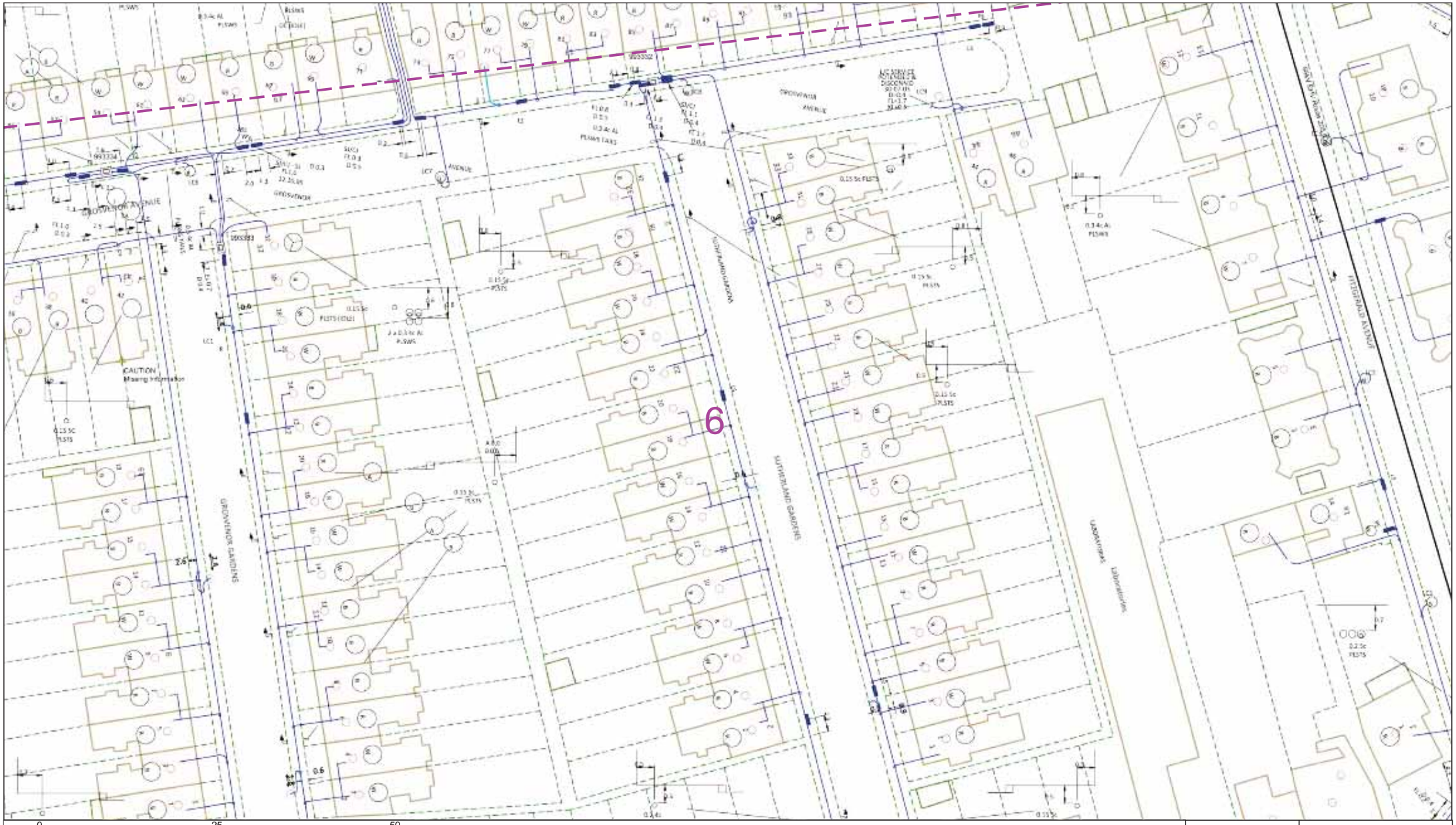

0 25 50
metres

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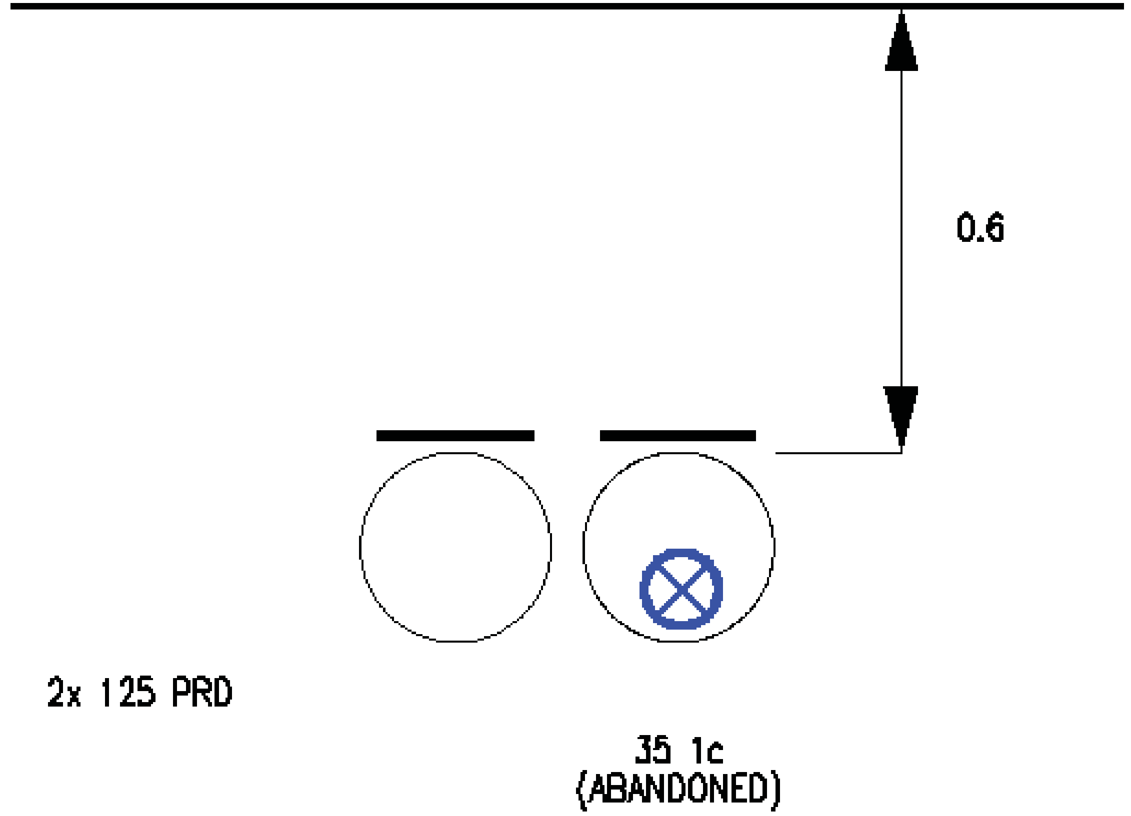
Cross Section : 2778621



Cross Section
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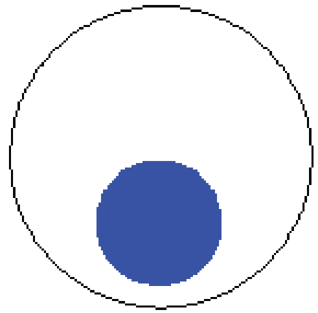
EMERGENCY - If you damage a cable or line
Phone [illegible] (24hrs)
URGENTLY

UK Power Networks

ALWAYS LOOK UP BEFORE YOU START WORK
Refer to HSE Guidance note GS6

Maps produced at 1:2500 scale are less schematic which show only main cables and overhead lines (in some cases all voltages). Prior to carrying out excavations you must refer to the 1:500 records to determine the location of all known underground plant and equipment.

Cross Section : 2743948



.0225 2c
4" E.W.D

Cross Section
2743948

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URGENTLY

UK Power Networks

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Maps produced at 1:2500 scale are base schematics which show LV mains cables and overhead lines (no service cables at all voltages). Prior to carrying out excavations you must refer to the 1:500 records to determine the location of all known underground plant and equipment.

Jessica Western

From: UK OSP-Team <osp-team@uk.verizon.com>
Sent: 18 February 2019 18:52
To: Jessica Western
Cc: UK OSP-Team
Subject: RE: URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

Dear Sir/Madam

Verizon is a licensed Statutory Undertaker.

We have reviewed your plans and have determined that Verizon (Formally known as MCI WorldCom, MFS) has no apparatus in the areas concerned.

If you have any further queries please do not hesitate to get in touch.

Yours faithfully

Plant Protection Officer E.mail osp-team@uk.verizon.com

From: Jessica Western [mailto:JWestern@rsk.co.uk]
Sent: Monday, February 18, 2019 2:34 PM
To: 'plantenquiries@instalcom.co.uk'; 'asset.team@cityfibre.com'; 'plantenquiries@catelecomuk.com'; 'plantenquiries@energetics-uk.com'; 'nrswa@cofely-gdfsuez.com'; 'interoute.enquiries@plancast.co.uk'; 'kpn.plantenquiries@instalcom.co.uk'; 'mbnl.plant.enquiries@turntown.com'; 'OPBuriedServicesEnquiries@networkrail.co.uk'; 'highwaysandtransport@richmond.gov.uk'; 'nrswa@sky.uk'; 'SOTA.plantenquiries@instalcom.co.uk'; 'Gavin Clifton'; 'assetrecords@utilityassets.co.uk'; UK OSP-Team; '>Plant Enquiries Team'; 'National Plant Enquiry's'
Subject: [E] URGENT 28836 Barnes Hospital, South Worple Way, London SW14 8SU

Good Afternoon,

Our company is currently undertaking an intrusive site investigation of the area detailed below.

Our reference: 28836
Location of works: Barnes Hospital, South Worple Way, London
O.S. Grid Ref.: 521162, 175679
Address/Nearest Postcode: SW14 8SU
Expected Start Date:
Expected Completion Date:

A plan of the site has been enclosed, please cover the entire area shown within the boundary on the attached map.

In order that all reasonable precautions may be taken to avoid the risk to health and safety through contacts with any of your existing apparatus during execution of the proposed works, please indicate the position and depth of all main statutory services and wayleaves on site and in the adjoining roads where applicable. In addition, please highlight any likely special problems that could arise in connection with your apparatus as a result of the proposed works.

We therefore request that you supply us with relevant plan information or written confirmation to declare that no apparatus is affected at your earliest convenience.

Should you encounter any problems or require any further information, please contact me on the above address or by telephoning 01442 416626, any costs will be accepted with approval first.

Many Thanks,

Jessica Western
Utility Report Co-ordinator

I work part-time Mondays (until 3.00pm), Tuesdays (all day), Wednesdays (until 3.00pm), Thursdays (all day) Friday (until 3.00pm) I will respond to your e mail as soon as I am back in the office.

RSK
18 Frogmore Road, Hemel Hempstead, Hertfordshire, HP3 9RT, UK
Switchboard: +44 (0)1442 437500 · Fax: +44 (0)1442 437550 · Direct dial: +44 01442 416626 (0) · Mobile: +44 (0) 7471 354 928 jwestern@rsk.co.uk

http://www.rsk.co.uk | RSK Geophysics Download Geophysics Guide Follow @RSK_Geophysics

(c) Crown copyright and database rights 2019 Ordnance Survey 100019209 | Date: 19/02/19 | Scale: 1:2496 | Map Centre: 521162,175679 | Data updated: 11/01/19 | Telecoms Plan A4

Important Information - please read The purpose of this plan is to identify Virgin Media apparatus. We have tried to make it as accurate as possible but we cannot warrant its accuracy. In addition, we caution that within Virgin Media apparatus there may be instances where mains voltage power cables have been placed inside green, rather than black ducting. Further details can be found using the "Affected Postcodes.pdf", which can be downloaded from this website. Therefore, you must not rely solely on this plan if you are carrying out any excavation or other works in the vicinity of Virgin Media apparatus. The actual position of any underground service must be verified by cable detection equipment, etc. and established on site before any mechanical plant is used. Accordingly, unless it is due to the negligence of Virgin Media, its employees or agents, Virgin Media will not have any liability for any omissions or inaccuracies in the plan or for any loss or damage caused or arising from the use of and/or any reliance on this plan. This plan is produced by Virgin Media Limited (c) Crown copyright and database rights 2019 Ordnance Survey 100019209.

Duct, Trench | Chamber | Cabinet

jagannathan.thiruvengadam@virginme

VM.1128222

APPENDIX F
TECHNICAL BACKGROUND

H1 Desk Study

Aquifer designation and Source protection zones

Principal aquifer: layers of rock or drift deposit that have high intergranular and/or fracture permeability (usually providing a high level of water storage). They may support water supply and/or river base flow on a strategic scale.

Secondary A aquifer: permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

Secondary B aquifer: predominantly lower permeability layers that may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.

Secondary undifferentiated aquifer: it has not been possible to attribute either a category A or B to a rock type. In most cases this means that it was previously designated as both a minor and non-aquifer in different locations owing to the variable characteristics.

Unproductive' strata: low permeability with negligible significance for water supply or river base flow.

The EA generally adopts a three-fold classification of source protection zones (SPZ) surround abstractions for public water supply. The Site is situated in an area defined as follows:

- Zone 1 or the 'inner protection zone' is located immediately adjacent to the groundwater source and is based on a 50-day travel time from any point below the water table to the source. It is designed to protect against the effects of human activity and biological/chemical contaminants that may have an immediate effect on the source
- Zone 2 or the 'outer protection zone' is defined by a 400-day travel time from a point below the water table to the source. The travel time is designed to provide delay and attenuation of slowly degrading pollutants
- Zone 3 or the 'total catchment' is the area around the source within which all groundwater recharge is presumed to be discharged at the source.

Preliminary risk assessment methodology

CLR11 outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. Under CLR11, three stages of risk assessment exist: preliminary, generic quantitative and detailed quantitative. An outline conceptual model should be formed at the preliminary risk assessment stage that collates all the existing information pertaining to a site in text, tabular or diagrammatic form. The outline conceptual model identifies potentially complete (termed possible) contaminant linkages (contaminant–pathway–receptor) and is used as the basis for the design of the site investigation. The outline conceptual model is updated as further information becomes available, for example as a result of the site investigation.

Production of a conceptual model requires an assessment of risk to be made. Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk. RSK has adopted guidance provided in CIRIA C552 for use in the production of conceptual models.

The likelihood of an event can be classified on a four-point system using the following terms and definitions based on CIRIA C552:

- highly likely: the event appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution
- likely: it is probable that an event will occur or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term
- low likelihood: circumstances are possible under which an event could occur, but it is not certain even in the long term that an event would occur and it is less likely in the short term
- unlikely: circumstances are such that it is improbable the event would occur even in the long term.

The severity can be classified using a similar system also based on CIRIA C552. The terms and definitions relating to severity are:

- severe: short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. Short-term risk to an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000)
- medium: chronic damage to human health ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000), pollution of sensitive water resources, significant change in an ecosystem or organism forming part of that ecosystem
- mild: pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures or the environment
- minor: harm, not necessarily significant, but that could result in financial loss or expenditure to resolve. Non-permanent human health effects easily prevented by use of personal protective clothing. Easily repairable damage to buildings, structures and services.

Once the probability of an event occurring and its consequences have been classified, a risk category can be assigned according to the table below.

		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

Definitions of these risk categories are as follows together with an assessment of the further work that may be required:

- very high: there is a high probability that severe harm could occur or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability; urgent investigation and remediation are likely to be required
- high: harm is likely to occur. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required. Remedial works may be necessary in the short term and are likely over the long term
- moderate: it is possible that harm could arise, but it is unlikely that the harm would be severe and it is more likely that the harm would be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term
- low: it is possible that harm could occur, but it is likely that if realised this harm would at worst normally be mild
- very low: there is a low possibility that harm could occur and if realised the harm is unlikely to be severe.

H2 Site Investigation Methodology

Ground gas monitoring

An infrared gas meter was used to measure gas flow, concentrations of carbon dioxide (CO_2), methane (CH_4) and oxygen (O_2) in percentage by volume, while hydrogen sulphide (H_2S) and carbon monoxide (CO) were recorded in parts per million. Initial and steady state concentrations were recorded. In addition, during the first monitoring round, all wells were screened with a PID to establish if there are any interferences and cross-sensitivity of other hydrocarbons with the infrared gas meter.

Low flow groundwater sampling

Groundwater samples were retrieved using a United States Environment Protection Agency (USEPA) approved low-flow purging and sampling methodology.

The low-flow method relies on moving groundwater through the well screen at approximately the same rate as it flows through the geological formation. This results in a significant reduction in the volume of water extracted before sampling and significantly reduces the amount of disturbance of the water in the monitoring well during purging and sampling. Drawdown levels in the monitoring well and water quality indicator parameters (pH, temperature, electrical conductivity, redox potential and dissolved oxygen) are monitored during low-flow purging and sampling, with stabilisation indicating that purging is complete and sampling can begin. As the flow rate used for purging, in most cases, is the same or only slightly higher than the flow rate used for sampling, and because purging and sampling are conducted as one continuous operation in the field, the process is referred to as low-flow purging and sampling.

H3 Site Investigation Methodology

Statistical assessment

Statistical analysis of the results has been conducted in accordance with *Guidance on Comparing Soil Contamination Data with a Critical Concentration* (CIEH and CL:AIRE, 2008) as detailed in Appendix D.

Statistical analysis is utilised to establish whether the land is suitable for the proposed use under the land use planning system by attempting to answer a key question. For a site being developed the key question is: '*can we confidently say that the level of contamination on this land is low relative to some appropriate measure of risk?*' More specifically, this is expressed as '*Is there sufficient evidence that the true mean concentration of the contaminant (μ) is less than the critical concentration (C_c)?*', where the critical concentration could be the GAC or a site-specific assessment criterion (SSAC). The true mean (μ) is unknown and therefore a conservative estimate, termed the upper confidence limit (UCL), of this value is derived from the data. The UCL is then compared against the GAC.

In statistical terms the question above is handled through the use of a formal hypothesis – the null hypothesis and the alternate hypothesis. The statistical tests are structured to show (with a defined level of confidence, in this case 95%) which of the two hypotheses is most likely to be true, by determining whether the null hypothesis can be rejected.

For consideration under the planning regime, the null (H_0) and alternative (H_1) hypotheses are presented below.

Null and alternative hypotheses

Hypothesis	Equation	Description
Null (H_0)	$\mu \geq C_c$	The true mean concentration is equal to, or greater than, the critical concentration
Alternative (H_1)	$\mu < C_c$	The true mean concentration is less than the critical concentration

Therefore, if the null hypothesis is accepted for a certain contaminant it can be concluded that its concentration is high relative to the critical concentration, which in the case of this assessment is taken to be the GAC/SSAC and as such the whole site may be classed as being contaminated by a particular substance.

In addition, the statistical guidance provides an outlier test (Grubbs' test) that has been used within this assessment for the identification of 'outliers' or 'hotspots'. The 'outlier' test is conducted before undertaking statistical analysis (and 'outliers' may be removed from the dataset) but **only** where the conceptual model supports this.

The statistical tests applied to the dataset are selected based on whether the data is normally or non-normally distributed. The distribution of the dataset has been assessed using the Shapiro-Wilks normality test. Where the dataset has been found to be normally distributed the one sample t-test is undertaken. Where data has been found to be non-normally distributed Chebyshev's theorem is utilised.

Reuse of suitable materials

The Definition of Waste: Development Industry Code of Practice (CL:AIRE, 2011) (CoP) was developed in cons**u**ltation with the Environment Agency and development industry to enable the re-use of materials under certain scenarios and subject to demonstrating that specific criteria are met. The current reuse scenarios covered by the CoP comprise

- reuse on the site of origin (with or without treatment)
- direct transfer of clean and natural soils between sites
- use in the development of land other than the site of origin following treatment at an authorised Hub site (including a fixed soil treatment facility).

The importation of made ground soils (irrespective of contamination status) or crushed demolition materials is not permitted currently under the CoP and requires either a standard rules environmental permit or a U1 waste exemption (see below).

In the context of excavated materials used on-sites undergoing development, four factors are considered to be of particular relevance in determining if the material is a waste or when it ceases to be waste:

- the aim of the Waste Framework Directive is not undermined, i.e. if the use of the material will create an unacceptable risk of pollution of the environment or harm to human health it is likely to be waste
- the material is certain to be used
- the material is suitable for use both chemically and geotechnically
- only the required quantity of material will be used.

The CoP requires the preparation of a materials management plan (MMP) that confirms the above factors will be met. This plan needs to be reviewed by a 'Qualified Person' (QP) who will then issue a declaration form to the EA. As the project progresses, data must be collated and on completion a verification report produced that shows the MMP was followed and describes any changes.

The MMP establishes whether specific materials are classified as waste and how excavated materials will be treated and/or reused in line with the CoP. The MMP is likely to form part of the site waste management plan.

APPENDIX G
FIELD RECORDS

DRAFT

BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**10.12.19** End: **11.12.19**	**6.29**	**E:521156.2 N:175719.3**	**1** of **4**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.30	1	B				MADE GROUND: Dark brown slightly organic sandy silty GRAVEL of angular coarse brick. (MADE GROUND)	0.15	
1.20-1.65	1	SPT(c)	N=9			MADE GROUND: Dark brown and dark grey gravelly medium to coarse SAND of possible ash. Gravel is angular coarse of concrete, brick. With occasional pieces of metal wire and fragments of glass. (MADE GROUND)	(1.45)	
1.60	2	B					1.60	
2.00-2.45	2	SPT(c)	N=20			Medium dense (locally very dense) orangish brown sandy to very sandy slightly clayey subangular to subrounded fine to coarse GRAVEL of flint. Sand is predominantly medium to coarse. (KEMPTON PARK GRAVEL)		
2.00	3	B						
3.00-3.25	3	SPT(c)	N=158*					
3.00	4	B						
4.00-4.45	4	SPT(c)	N=24	▽1				
4.00	5	B						
4.50	6	B					(6.30)	
5.00-5.45	5	SPT(c)	N=23	▼1				
5.00	7	B						
6.00-6.45	6	SPT(c)	N=24					
6.00	8	B						
7.00	9	B						
7.50-7.95	7	SPT(c)	N=22				7.90	
8.00	10	B				Firm to very stiff medium to high strength brown mottled slightly sandy CLAY with occasional phosphate nodules and rare gravel sized claystones. (LONDON CLAY FORMATION)		
9.00-9.45	8	SPT	N=21					
9.00	11	D						
9.50	12	B						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

1. Borehole position cleared using non intrusive geophysical methods.
2. Inspection pit excavated to 1.2m below ground level.
3. Borehole cased to 8.5m bgl.
4. Groundwater strike at 5.2m bgl rising to 4.25m bgl after 20 minutes (borehole cased at

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**Adrian Hopwood**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**10.12.19** End: **11.12.19**	**6.29**	**E:521156.2 N:175719.3**	**2** of **4**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
10.50	13	U				Firm to very stiff medium to high strength brown mottled slightly sandy CLAY with occasional phosphate nodules and rare gravel sized claystones. (LONDON CLAY FORMATION) *(stratum copied from 7.90m from previous sheet)*	(6.20)	
11.00	14	B						
12.00-12.45	9	SPT	N=33					
12.00	15	D						
12.50	16	B						
13.50	17	U						
14.00	18	B				...between 13.80 and 14.10m bgl claystone band.	14.10	
						Stiff very stiff high to very high strength thinly laminated fissured dark grey/dark brown CLAY with rare crystals of selenite. (LONDON CLAY FORMATION)		
15.00-15.45	10	SPT	N=41					
15.00	19	D						
15.50	20	B						
16.50	21	U						
17.00	22	B						
18.00-18.45	11	SPT	N=43					
18.00	23	D						
18.50	24	B						
19.50	25	U						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

4.65m)
5. Borehole sealed at 8.5m bgl.
6. Chiselled between 13.80m and 14.10m for 30 mins.
7. SPT hammer CJA.63 (E_r = 67.00%) used.

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**Adrian Hopwood**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**10.12.19** End: **11.12.19**	**6.29**	**E:521156.2 N:175719.3**	**3** of **4**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
20.00	26	B				Stiff very stiff high to very high strength thinly laminated fissured dark grey/dark brown CLAY with rare crystals of selenite. (LONDON CLAY FORMATION) *(stratum copied from 14.10m from previous sheet)*		
21.00-21.45	12	SPT	N=38					
21.00	27	D						
21.50	28	B						
							(16.34)	
22.50	29	U						
23.00	30	B						
24.00-24.45	13	SPT	N=50					
24.00	31	D						
24.50	32	B						
25.50	33	U						
26.00	34	B						
27.00-27.45	14	SPT	N=50					
27.00	35	D						
27.50	36	B						
28.50-28.94	15	SPT	N=53*					
28.50	37	D						
29.00	38	B						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**Adrian Hopwood**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**10.12.19** End: **11.12.19**	**6.29**	**E:521156.2 N:175719.3**	**4** of **4**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
30.00-30.44 30.00	16 39	SPT D	N=52*				30.44	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**Adrian Hopwood**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**12.12.19** End: **12.12.19**	**6.21**	**E:521203.6 N:175697.0**	**1** of **3**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						MADE GROUND: Black bound asphalt surface layer.	0.20	
						MADE GROUND: Grey/brown fine to coarse sandy GRAVEL. Gravel is angular coarse of concrete, brick, limestone and sandstone (SUB-BASE MATERIAL).	0.30	
0.50	1	B				MADE GROUND: Reddish brown sandy clayey GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of sandstone, brick and concrete. With occasional pieces of plastic. (MADE GROUND)	(1.40)	
1.20-1.65	1	SPT(c)	N=12					
1.20	2	B					1.70	
2.00-2.45	2	SPT(c)	N=50			Dense brown/orange-brown slightly silty slightly clayey sandy to very sandy fine to coarse subangular GRAVEL of flint. Sand is predominantly medium to coarse. (KEMPTON PARK GRAVEL)		
2.00	3	B				reduction in sand content, becoming sandy slightly clayey gravel.		
3.00-3.45	3	SPT(c)	N=50					
3.00	4	B						
4.00-4.45	4	SPT(c)	N=35					
4.00	5	B				grading into very sandy slightly clayey gravel.	(6.10)	
5.00-5.45	5	SPT(c)	N=44					
5.00	6	B						
6.00-6.45	6	SPT(c)	N=42					
6.00	7	B				grading into very gravelly sand.		
7.50-7.95	7	SPT(c)	N=38				7.80	
7.50	8	B						
8.00	9	B				Firm becoming stiff to very stiff light brown with pale grey mottling slightly sandy CLAY with occasional gravel sized claystones. Sands are orange fine localised lenses. (LONDON CLAY FORMATION)		
9.00	10	U						
9.45	11	D						

Water: 1 ▽ 1 ▼

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

1. Borehole position cleared using non intrusive geophysical methods.
2. Inspection pit excavated to 1.2m below ground level.
3. Borehole cased to 9.0m bgl.
4. Groundwater strike at 5.5m bgl rising to 4.90m bgl after 20 minutes (borehole cased at 5.0m)

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**Andy Norris**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**12.12.19** End: **12.12.19**	**6.21**	**E:521203.6 N:175697.0**	**2** of **3**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
10.50-10.95	8	SPT	N=23			Firm becoming stiff to very stiff light brown with pale grey mottling slightly sandy CLAY with occasional gravel sized claystones. Sands are orange fine localised lenses. (LONDON CLAY FORMATION) *(stratum copied from 7.80m from previous sheet)*	(6.10)	
11.50	12	B						
12.00	13	U						
12.45	14	D				... at 12m becomes fissured with occasional grey silt partings		
13.50-13.95	9	SPT	N=32				13.90	
14.00	16	B				... between 13.70m and 13.90m claystone band. Stiff to very stiff very high strength thinly laminated closely fissured dark grey/dark brown silty CLAY. Occasional crystals of selenite. (LONDON CLAY FORMATION)		
15.00	17	U						
15.45	18	D						
16.50-16.95	10	SPT	N=42				(6.15)	
17.00	19	B						
18.00	20	U						
18.45	21	D						
19.60-20.05	11	SPT	N=48					

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

5. Borehole sealed at 8.50m bgl.
6. Borehole falling head test performed between 3-4m.
7. SPT hammer CJA.63 (E_r = 67.00%) used.

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**Andy Norris**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**12.12.19** End: **12.12.19**	**6.21**	**E:521203.6 N:175697.0**	**3** of **3**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results					
							20.05	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**Andy Norris**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH03**

Contract Ref:	Start: **10.12.19**	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	End: **11.12.19**	**5.90**	**E:521177.0 N:175676.4**	**1** of **3**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results					
						MADE GROUND: Bituminous bound layer.	0.20	
0.50	1	B				MADE GROUND: Reddish brown sandy clayey GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of sandstone, brick and concrete. With frequent pieces of plastic and rare pieces of wood. (MADE GROUND).	(1.50)	
1.20-1.65	1	SPT(c)	N=32					
1.20	2	B					1.70	
						MADE GROUND: Dark brown and dark grey gravelly medium to coarse SAND with high cobble content. Gravel is angular coarse of concrete, brick, limestone and sandstone. Cobbles are angular, maximum size of 200mm of concrete . With occasional pieces of metal wire and fragments of glass. (MADE GROUND)	2.00	
2.00-2.45	2	SPT(c)	N=21					
2.00	4	D						
2.00	5	B						
						Medium dense to dense brown/orange-brown slightly silty slightly clayey sandy to very sandy fine to coarse subangular GRAVEL of flint. (KEMPTON PARK GRAVEL)		
3.00-3.45	3	SPT(c)	N=23					
3.00	6	B		1				
4.00-4.45	4	SPT(c)	N=26	1			(4.80)	
4.00	7	B						
5.00-5.45	5	SPT(c)	N=21					
5.00	8	B				reduction in gravel content.		
6.00-6.45	6	SPT(c)	N=31					
6.00	9	B				grading into very gravelly sand.		
							6.80	
7.00	10	B				Stiff to very stiff high strength light brown slightly sandy CLAY with occasional gravel sized claystones. (LONDON CLAY FORMATION)		
7.50	11	U		2				
7.95	12	D						
8.50	13	B						
9.00-9.45	7	SPT	N=23				(5.60)	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)
11.60	11.90	00:50
12.20	12.40	01:50

General Remarks

1. Borehole position cleared using non intrusive geophysical methods.
2. Inspection pit excavated to 1.2m below ground level.
3. Borehole cased to 7.30m bgl.
4. Groundwater strike at 4.30m bgl rising to 3.90m bgl after 20 minutes (borehole cased at

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**Adrian Hopwood**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**10.12.19** End: **11.12.19**	**5.90**	**E:521177.0 N:175676.4**	**2** of **3**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
10.00	14	B				Stiff to very stiff high strength light brown slightly sandy CLAY with occasional gravel sized claystones. (LONDON CLAY FORMATION) *(stratum copied from 6.80m from previous sheet)*		
10.50	15	U						
10.95	16	D						
11.60	17	D						
12.00-12.45	8	SPT	N=28	2		... between 11.60m and 11.90m claystone band.		
						... between 12.20m and 12.40m claystone band.	12.40	
						Stiff thinly laminated fissured dark grey/dark brown CLAY. Occasional crystals of selenite. (LONDON CLAY FORMATION)	12.50	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

7.3m)
5. Groundwater strike at 12.20m bgl rising to 7.50m bgl after 20 minutes.
6. Borehole falling head test performed between 2-3m.
7. Borehole terminated at 12.50m due to the claystone band.

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**Adrian Hopwood**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**10.12.19** End: **11.12.19**	**5.90**	**E:521177.0 N:175676.4**	**3** of **3**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results					

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

8. SPT hammer CJA.63 (E_r = 67.00%) used.

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**Adrian Hopwood**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**19.12.19** End: **19.12.19**	**6.34**	**E:521148.8 N:175667.6**	**1** of **2**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results					
						MADE GROUND: Bituminous bound layer.	0.15	
						MADE GROUND: Brown slightly silty sandy subangular to subrounded fine to coarse GRAVEL of quartzute, brick and conrete.	0.50	
0.50	1	B				Firm brown mottled orangish brown slightly silty sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium quartzite. (KEMPTON PARK GRAVEL)	(0.70)	
1.00	2	D				becoming gravelly clayey sand.	1.20	
1.50-1.95	1	SPT	N=32			Medium dense to dense orangish brown slightly silty sandy subangular to subrounded fine to medium GRAVEL of quartzite. Sand is medium to coarse. (KEMPTON PARK GRAVEL)		
1.50-2.00	3	B						
2.00	4	D						
2.50-2.95	1	SPT	N=41			becoming very gravelly clayey sand.		
2.50-3.00	5	B						
3.00	6	D						
3.50-3.95	1	SPT	N=38					
3.50-4.00	7	B		1		becoming very sandy slightly clayey gravel.	(5.40)	
4.00	8	D						
4.50-4.95	1	SPT	N=44					
4.50-5.00	9	B		1				
5.00	10	D						
5.50-5.95	1	SPT	N=34					
5.50-6.00	11	B						
6.50	12	D					6.60	
						Firm brown slightly silty CLAY with rare fine lenses of fine sand. (LONDON CLAY FORMATION)	6.80	
7.00-7.45	1	SPT	N=19			Very stiff dark grey brown thinly lamintaed closely fissured silty CLAY. (LONDON CLAY FORMATION)	(1.20)	
8.00	14	D				Borehole terminated at 8.00m depth.	8.00	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
19/12/19	09:00	0.00	0.00	0	0.00
19/12/19	10:00	5.00	5.00	150	5.00
19/12/19	14:20	8.00	7.00	150	4.00

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

1. Borehole position cleared using non intrusive geophysical methods.
2. Inspection pit excavated to 1.2m below ground level.
3. Borehole cased to 7.00m bgl.
4. Groundwater strike at 5.00m bgl rising to 4.00m bgl after 20 minutes (borehole cased at

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 4000**	**Adrian Hopwood**	**HAbayatilaka**	ST

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BOREHOLE LOG

Contract:	Client:	Borehole:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**BH04**

Contract Ref:	Start: **19.12.19**	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	End: **19.12.19**	**6.34**	**E:521148.8 N:175667.6**	**2** of **2**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results					

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

5.00m)
5. Borehole sealed at 7.50m bgl.
6. Borehole terminated at 8.00m bgl.
7. SPT hammer CJA.63 (E_r = 67.00%) used.

All dimensions in metres | Scale: **1:56**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 4000**	**Adrian Hopwood**	**HAbayatilaka**	ST

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WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS201**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**11.12.19** End: **11.12.19**	**6.38**	**E:521130.3 N:175718.6**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.20 0.20	1	ES PID	 0.0ppm			MADE GROUND: Dark brown/brown slightly gravelly silty SAND. Gravel is angular to subangular fine to coarse brick fragments and flint. (MADE GROUND)	(0.95) 0.95	
	1.00-1.45 1.00 1.00 1.00	1 2	SPT(c) ES V PID	N=9 c_u=48 0.0ppm			Firm medium strength brown mottled orangish brown slightly gravelly sandy CLAY with occasional rootlets and silt lenses. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse quartzite. (KEMPTON PARK GRAVEL) . . . Increase in silt content with depth.	(1.50) 2.45	
	1.90 2.00-2.45 2.00	 1 1	V SPT B	c_u=70 N=15 			Medium dense brown/light brown gravelly slightly silty fine to coarse SAND. Gravel is subangular to subrounded fine to coarse quartzite. (KEMPTON PARK GRAVEL)	(2.00) 4.45	
	3.00-3.45 3.00	1 2	SPT B	N=23 					
	4.00-4.45 4.00	1 3	SPT(c) B	N=22 			Window sample hole terminated at 4.45m depth.		

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
3. No visual or olfactory evidence of contamination.
4. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS202**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**13.12.19** End: **13.12.19**	**6.19**	**E:521163.3 N:175728.9**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
							MADE GROUND: Bituminous bound layer. (MADE GROUND)	0.15	
	0.40 0.40	1	ES PID	0.0ppm			MADE GROUND: Dark brown/brown gravelly slightly silty fine to coarse SAND. Gravel is angular to subangular fine to coarse brick, concrete, glass and plastic fragments. (MADE GROUND)	(0.80)	
	0.80 0.80	2	ES PID	0.0ppm				0.95	
	1.20-1.65	1	SPT(c)	N=20			Medium dense to dense brown/orangish brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is subangular to subrounded fine to coarse quartzite. (KEMPTON PARK GRAVEL)		
	1.50-1.80	1	B					(1.50)	
	2.00-2.45	1	SPT(c)	N=96			. . . increase in gravel content and grading into very sandy fine to coarse gravel.	2.45	
							Borehole refused at 2.45m bgl due to the density of the drift deposits.		

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
4. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

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WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS203**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**11.12.19** End: **11.12.19**	**6.39**	**E:521172.7 N:175717.8**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.20 0.20	1	ES PID	 0.1ppm			MADE GROUND: Grass over dark brown slightly gravelly silty fine to coarse SAND with low cobble content. Sand includes occasional bituminous material. Gravel is subangular to subrounded fine to coarse brick, concrete and ceramic fragments. Gravel is subangular to subrounded fine to medium flint. Cobbles are angular concrete. (MADE GROUND)	(0.95) 0.95	
	0.80 0.80	2	ES PID	 0.0ppm					
	1.00 1.00	3	ES PID	 0.0ppm			Medium dense to dense brown mottled orangish brown gravelly slightly clayey fine to coarse SAND. Gravel is subangular to subrounded fine to coarse quartzite. (KEMPTON PARK GRAVEL)	(1.65) 2.60	
	1.20-1.65	1	SPT(c)	N=21					
	2.00-2.45 2.00	1 1	SPT(c) B	N=92			Borehole refused at 2.60m bgl due to density of the drift deposits.		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
3. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS204**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**11.12.19** End: **11.12.19**	**6.17**	**E:521198.7 N:175717.5**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
							MADE GROUND: Bituminous bound layer. (MADE GROUND)	0.15	
							MADE GROUND: Brown silty fine to coarse SAND with occasional brick fragments. (MADE GROUND)	(0.35)	
	0.40	1	ES					0.50	
	0.40		PID	0.0ppm			Firm medium strength brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium quartzite. (KEMPTON PARK GRAVEL)	(0.60)	
	0.70		V	c_u=44					
							. . . Soil becomes light brown in colour at 0.90m depth.	1.10	
	1.00	2	ES						
	1.00		PID	0.0ppm			Brown orangish brown gravelly slightly silty fine to coarse SAND. Gravel is subangular to subrounded fine to coarse quartzite. (KEMPTON PARK GRAVEL)		
	1.20-1.65	1	SPT(c)	N=19					
	1.50-2.00	1	B					(1.35)	
	2.00-2.45	1	SPT(c)	N=109					
								2.45	
							Borehole refused at 2.45m bgl due to density of the drift deposits.		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
3. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS205**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**11.12.19** End: **11.12.19**	**6.03**	**E:521153.4 N:175693.3**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
							MADE GROUND: Bituminous bound layer. (MADE GROUND)	0.15	
	0.20 0.20	1	ES PID	 0.1ppm			MADE GROUND: Multicoloured (reddish brown black grey) sandy clayey angular to subrounded fine to coarse GRAVEL of sandstone, concrete, brick, glass, bituminous material. (MADE GROUND)	(1.05)	
	0.80 0.80	2	ES PID	 0.0ppm			. . . rare pockets of ash.	1.20	
	1.20-1.65 1.30	1	SPT(c) V	N=12 c_u=75			Firm medium strength brown slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to medium quartzite. (KEMPTON PARK GRAVEL) . . . soil becomes lighter in colour with depth.	(0.90)	
	1.90-2.10 2.00-2.45	1 1	B SPT(c)	 N=16			. . . decrease in clay content with depth.	2.10	
	2.50-3.00	2	B				Medium dense to very dense brown gravelly slightly clayey fine to coarse SAND. Gravel is subangular to subrounded fine to coarse quartzite. (KEMPTON PARK GRAVEL) . . . lense of flint gravel at 2.50m depth.		
	3.00-3.45	1	SPT(c)	N=113			. . . increase in gravel content with depth.	(1.90)	
	3.50-4.00	3	B					4.00	

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
3. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS206**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**13.12.19** End: **13.12.19**	**6.20**	**E:521193.1 N:175705.9**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.50 0.50	1	ES PID	0.0ppm			MADE GROUND: Bituminous bound layer. (MADE GROUND)	0.15	
							MADE GROUND: Multicoloured (pinkish reddish brown brown) sandy subangular to subrounded fine to coarse GRAVEL of flint, sandstone and rare concrete fragments. (MADE GROUND)	(0.85) 1.00	
	1.00-1.50	1	B				Medium dense to very dense brown gravelly slightly clayey fine to coarse SAND. Gravel is subangular to subrounded fine to medium quartzite. (KEMPTON PARK GRAVEL)		
	1.20-1.65	1	SPT(c)	N=21					
							. . . Decrease in clay content with depth.	(2.00)	
	2.00-2.45	1	SPT(c)	N=72					
	2.50-3.00	2	B						
							Borehole refused at 3.00m bgl due to the density of the drift deposits.	3.00	

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
3. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS207**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**11.12.19**	**5.96**	**E:521175.7 N:175684.9**	**1** of **1**
	End: **11.12.19**			

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.40 0.40	1	ES PID	0.1ppm			MADE GROUND: Bituminous bound layer. (MADE GROUND)	0.15	
							MADE GROUND: Multicoloured (pinkish reddish brown brown) sandy subangular to subrounded fine to coarse GRAVEL of flint, sandstone and rare concrete fragments. (MADE GROUND)	(0.40) 0.55	
	1.00 1.00	2	ES PID	0.0ppm			Medium dense to very dense brown orangish brown clayey to slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse quartzite. (KEMPTON PARK GRAVEL)		
	1.20-1.65	1	SPT(c)	N=22					
	1.50-2.00	1	B					(1.90)	
	2.00-2.45	1	SPT(c)	N=88					
								2.45	
							Window sample hole refused at 2.45m depth.		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
3. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS208**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**11.12.19** End: **11.12.19**	**6.57**	**E:521164.9 N:175665.9**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.30 0.30	1	ES PID	0.1ppm			MADE GROUND: Bituminous bound layer. (MADE GROUND)	0.15	
							MADE GROUND: Brown gravelly slightly clayey fine to coarse SAND with low cobble content and occaisonal pieces of metal. Sand contains some ash. Gravel is angular to subangular fine to coarse of concrete and sandstone. Cobbles are angular concrete. (MADE GROUND)	(0.35) 0.50	
	0.80 0.80	2	ES PID	0.0ppm			Firm brown slightly sandy CLAY. (KEMPTON PARK GRAVEL) . . . Change in colour to light brown at 0.80m depth.		
	1.00 1.00	3	ES PID	0.0ppm				(1.15)	
	1.20-1.65	1	SPT(c)	N=12				1.65	
	2.00-2.45	1	SPT(c)	N=20			Medium dense brown slightly gravelly clayey fine to coarse SAND. Gravel is subangular to subrounded fine to coarse quartzite. (KEMPTON PARK GRAVEL)		
	2.50-3.00	1	B						
	3.00-3.45	1	SPT(c)	N=23				(2.80)	
	3.50-4.00	2	B						
	4.00-4.45	1	SPT(c)	N=24				4.45	
							Window sample hole terminated at 4.45m depth.		

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
3. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS209**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**13.12.19** End: **13.12.19**	**6.33**	**E:521186.3 N:175670.9**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.15 0.15	1	ES PID	0.1ppm			MADE GROUND: Grey brown slightly silty sandy subangular to subrounded fine to coarse GRAVEL of concrete, brick and flint. (MADE GROUND)	0.15 0.20	
	0.50 0.50	2	ES PID	0.0ppm			MADE GROUND: Brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse quartzite, concrete, ceramic fragments. (MADE GROUND)	(0.60)	
							MADE GROUND: Dark brown sandy SILT with rare subangular to subrounded fine gravel of flint, concrete, brick. (MADE GROUND)	0.80	
	1.20-1.65	1	SPT(c)	N=22			Medium dense brown orangish brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse quartzite. (KEMPTON PARK GRAVEL)		
	1.50-2.00	1	B					(1.65)	
	2.00-2.45	1	SPT(c)	N=96					
								2.45	
							Borehole refused at 2.45m bgl due to the density of the drift deposits.		

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
3. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS210**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**13.12.19** End: **13.12.19**	**5.71**	**E:521157.8 N:175638.6**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.20 0.20	1	ES PID	 0.0ppm			MADE GROUND: Dark brown sandy lightly silty angular to subangular gravel of sandstone, concrete and brick with low cobble content. Gravel is angular fine to coarse brick. Cobbles are angular concrete. (MADE GROUND)	(1.40)	
	1.00-1.45 1.00 1.00	1 2	SPT(c) ES PID	N=6 0.0ppm			. . . pockets of rare bituminous material.	1.40	
	2.00-2.45	1	SPT(c)	N=21			Medium dense orangish brown slightly silty gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse quartzite. (KEMPTON PARK GRAVEL)	(3.05)	
	3.00-3.45 3.00-4.00	1 1	SPT(c) B	N=27					
	4.00-4.45	1	SPT(c)	N=29				4.45	
							Window sample hole terminated at 4.45m depth.		

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
3. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Barnes Hospital (Plot A)	**Star Land Realty UK Limited c/o LS Estates Limited**	**WS211**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
1920884	**13.12.19** End: **13.12.19**	**6.58**	**E:521225.5 N:175642.5**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.40 0.40	1	ES PID	 0.1ppm			MADE GROUND: Dark brown very silty SAND with frequent rootlets and occasional brick and concrete fragments. (MADE GROUND)	(0.60) 0.60	
	0.80 0.80	2	ES PID	 0.0ppm			Medium dense to very dense brown slightly gravelly silty fine to medium SAND. Gravel is subangular to subrounded fine to medium flint.		
	1.00-1.45 1.00-1.50	1 1	SPT(c) B	N=20			. . . sandy clay band between 1.0 and 1.50m		
							. . . reduction in clay content and grading into a very dense sandy gravel.		
	2.00-2.45 2.00-3.00	1 2	SPT(c) B	N=57				(2.85)	
	3.00-3.45	1	SPT(c)	N=78					
							Borehole refused at 3.45m bgl due to the density of the drift deposits.	3.45	

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Inspection pit hand dug to 1.20m depth.
3. No groundwater encountered.

All dimensions in metres | Scale: **1:28**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Premier 100**	**Darren Ypey**	**HAbayatilaka**	ST

IN-SITU GAS MONITORING RESULTS

	Start Date	End Date	[Pressures]	Previous	During	Start	End	Equipment Used & Remarks
Round 1	19/12/2019	19/12/2019		-	Falling	1000	999	GA5000 + Weather: Overcast + Ground: Damp + Air Temp: 10DegC
Round 2	06/01/2020	06/01/2020		-	Falling	1022	1020	GA5000 + Weather: Overcast + Ground: Dry + Air Temp: 11DegC
Round 3	20/01/2020	20/01/2020		-	Rising	1041	1040	Ground: Dry + Air Temp: 10DegC

Exploratory Position ID	Monitoring Round	Measured Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
BH01	1	5.77	19/12/2019 09:07:00	1000	1000	$0.0_{(I)}$	3.79	0.1	0.0	20.9	0.0	-	0	0	
BH01	1	---	15 secs	-	-	$0.0_{(SS)}$	-	2.2	0.0	19.0	0.0	-	1	0	
BH01	1	---	30 secs	-	-	-	-	2.3	0.0	18.1	0.0	-	1	0	
BH01	1	---	60 secs	-	-	-	-	2.3	0.0	18.1	0.0	-	1	0	
BH01	1	---	90 secs	-	-	-	-	2.3	0.0	18.1	0.0	-	1	0	
BH01	1	---	120 secs	-	-	-	-	2.3	0.0	18.1	0.0	-	1	0	
BH01	1	---	180 secs	-	-	-	-	2.3	0.0	18.1	0.0	-	1	0	
BH01	1	---	240 secs	-	-	-	-	2.3	0.0	18.1	0.0	-	1	0	
BH01	1	---	300 secs	-	-	-	-	2.3	0.0	18.2	0.0	-	0	0	
BH01	2	5.76	06/01/2020 11:23:00	1021	1021	$0.0_{(I)}$	3.72	0.2	0.0	20.9	0.0	-	0	0	
BH01	2	---	15 secs	-	-	$0.0_{(SS)}$	-	0.1	0.0	20.8	0.0	-	2	0	
BH01	2	---	30 secs	-	-	-	-	0.2	0.0	20.8	0.0	-	2	0	
BH01	2	---	60 secs	-	-	-	-	0.3	0.0	20.6	0.0	-	1	0	
BH01	2	---	90 secs	-	-	-	-	0.8	0.0	19.9	0.0	-	0	0	
BH01	2	---	120 secs	-	-	-	-	1.6	0.0	18.8	0.0	-	0	0	
BH01	2	---	180 secs	-	-	-	-	2.0	0.0	18.2	0.0	-	0	0	
BH01	2	---	240 secs	-	-	-	-	2.1	0.0	18.0	0.0	-	0	0	
BH01	2	---	300 secs	-	-	-	-	2.2	0.0	18.0	0.0	-	0	0	

Key: I = Initial, Min = Minimum, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By	Date	Checked By	Date
	24/1/20		

Contract Ref: 1920884

Contract: **Barnes Hospital (Plot A)**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
BH02	1	5.18	19/12/2019 10:39:00	999	999	$0.0_{(I)}$	3.64	0.1	0.0	20.9	0.0	-	0	0	
BH02	1	---	15 secs	-	-	$0.0_{(SS)}$	-	1.1	0.0	19.1	0.0	-	0	0	
BH02	1	---	30 secs	-	-	-	-	1.1	0.0	18.7	0.0	-	0	0	
BH02	1	---	60 secs	-	-	-	-	1.1	0.0	18.7	0.0	-	0	0	
BH02	1	---	90 secs	-	-	-	-	1.1	0.0	18.7	0.0	-	0	0	
BH02	1	---	120 secs	-	-	-	-	1.1	0.0	18.7	0.0	-	0	0	
BH02	1	---	180 secs	-	-	-	-	1.2	0.0	18.7	0.0	-	0	0	
BH02	1	---	240 secs	-	-	-	-	1.2	0.0	18.7	0.0	-	0	0	
BH02	1	---	300 secs	-	-	-	-	1.2	0.0	18.7	0.0	-	0	0	
BH02	2	5.19	06/01/2020 10:12:00	1022	1022	$0.1_{(I)}$	3.58	0.1	0.0	20.9	0.0	-	0	0	
BH02	2	---	15 secs	-	-	$0.2_{(SS)}$	-	1.5	0.0	19.4	0.0	-	0	0	
BH02	2	---	30 secs	-	-	-	-	1.5	0.0	19.1	0.0	-	0	0	
BH02	2	---	60 secs	-	-	-	-	1.5	0.0	19.0	0.0	-	0	0	
BH02	2	---	90 secs	-	-	-	-	1.5	0.0	19.1	0.0	-	0	0	
BH02	2	---	120 secs	-	-	-	-	1.5	0.0	19.1	0.0	-	0	0	
BH02	2	---	180 secs	-	-	-	-	1.5	0.0	19.1	0.0	-	0	0	
BH02	2	---	240 secs	-	-	-	-	1.5	0.0	19.1	0.0	-	0	0	
BH02	2	---	300 secs	-	-	-	-	1.5	0.0	19.2	0.0	-	0	0	
BH03	1	6.90	19/12/2019 09:30:00	1000	1000	$0.0_{(I)}$	3.40	0.2	0.0	20.9	0.0	-	0	0	
BH03	1	---	15 secs	-	-	$0.0_{(SS)}$	-	0.1	0.0	20.3	0.0	-	7	0	
BH03	1	---	30 secs	-	-	-	-	0.1	0.0	20.1	0.0	-	8	0	
BH03	1	---	60 secs	-	-	-	-	0.1	0.0	18.9	0.0	-	5	0	
BH03	1	---	90 secs	-	-	-	-	0.1	0.0	18.4	0.0	-	3	0	

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HP3 9RT

Compiled By	Date	Checked By	Date	Contract Ref:
	**24/1/20**			**1920884**

Contract: **Barnes Hospital (Plot A)**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
BH03	1	---	120 secs	-	-	-	-	0.2	0.0	18.1	0.0	-	2	0	
BH03	1	---	180 secs	-	-	-	-	0.3	0.0	18.0	0.0	-	2	0	
BH03	1	---	240 secs	-	-	-	-	0.3	0.0	18.0	0.0	-	2	0	
BH03	1	---	300 secs	-	-	-	-	0.4	0.0	18.0	0.0	-	2	0	
BH03	2	6.87	06/01/2020 10:52:00	1021	1021	$0.0_{(I)}$	3.30	0.1	0.0	20.9	0.0	-	0	0	
BH03	2	---	15 secs	-	-	$0.0_{(SS)}$	-	0.1	0.0	20.1	0.0	-	2	0	
BH03	2	---	30 secs	-	-	-	-	0.2	0.0	19.4	0.0	-	2	0	
BH03	2	---	60 secs	-	-	-	-	0.4	0.0	18.4	0.0	-	1	0	
BH03	2	---	90 secs	-	-	-	-	0.5	0.0	18.0	0.0	-	1	0	
BH03	2	---	120 secs	-	-	-	-	0.6	0.0	17.9	0.0	-	1	0	
BH03	2	---	180 secs	-	-	-	-	0.7	0.0	17.9	0.0	-	1	0	
BH03	2	---	240 secs	-	-	-	-	0.7	0.0	18.0	0.0	-	1	0	
BH03	2	---	300 secs	-	-	-	-	0.8	0.0	18.0	0.0	-	0	0	
WS201	1	3.99	19/12/2019 08:37:00	1000	1000	$0.0_{(I)}$	DRY	0.2	0.0	20.9	0.0	0.0	0	0	
WS201	1	---	15 secs	-	-	$0.0_{(SS)}$	-	1.3	0.0	20.1	0.0	0.0	0	0	
WS201	1	---	30 secs	-	-	-	-	1.2	0.0	19.9	0.0	0.0	0	0	
WS201	1	---	60 secs	-	-	-	-	1.0	0.0	20.1	0.0	0.0	0	0	
WS201	1	---	90 secs	-	-	-	-	0.8	0.0	20.3	0.0	0.0	0	0	
WS201	1	---	120 secs	-	-	-	-	0.8	0.0	20.3	0.0	0.0	0	0	
WS201	1	---	180 secs	-	-	-	-	0.7	0.0	20.5	0.0	0.0	0	0	
WS201	1	---	240 secs	-	-	-	-	0.6	0.0	20.6	0.0	0.0	0	0	
WS201	1	---	300 secs	-	-	-	-	0.6	0.0	20.6	0.0	0.0	0	0	
WS201	2	3.98	06/01/2020 11:09:00	1021	1021	$0.0_{(I)}$	DRY	0.2	0.0	20.9	0.0	0.0	0	0	
WS201	2	---	15 secs	-	-	$0.0_{(SS)}$	-	1.8	0.0	19.5	0.0	0.0	0	0	

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Compiled By	Date	Checked By	Date	Contract Ref:
	**24/1/20**			**1920884**

Contract: **Barnes Hospital (Plot A)**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
WS201	2	---	30 secs	-	-	-	-	1.7	0.0	19.2	0.0	0.0	0	0	
WS201	2	---	60 secs	-	-	-	-	1.2	0.0	19.7	0.0	0.0	0	0	
WS201	2	---	90 secs	-	-	-	-	1.1	0.0	19.9	0.0	0.0	0	0	
WS201	2	---	120 secs	-	-	-	-	0.9	0.0	20.1	0.0	0.0	0	0	
WS201	2	---	180 secs	-	-	-	-	0.8	0.0	20.2	0.0	0.0	0	0	
WS201	2	---	240 secs	-	-	-	-	0.8	0.0	20.2	0.0	0.0	0	0	
WS201	2	---	300 secs	-	-	-	-	0.9	0.0	20.1	0.0	0.0	0	0	
WS201	3	3.98	20/01/2020 10:09:15	1041	1041	$0.0_{(SS)}$	DRY	0.8	0.0	20.1	0.0	0.0	0	0	
WS201	3	---	15 secs	-	-	-	-	1.1	0.0	19.9	0.0	0.0	0	0	
WS201	3	---	45 secs	-	-	-	-	1.2	0.0	19.9	0.0	0.0	0	0	
WS201	3	---	75 secs	-	-	-	-	1.2	0.0	19.9	0.0	0.0	0	0	
WS201	3	---	105 secs	-	-	-	-	1.3	0.0	19.8	0.0	0.0	0	0	
WS201	3	---	165 secs	-	-	-	-	1.3	0.0	19.8	0.0	0.0	0	0	
WS201	3	---	225 secs	-	-	-	-	1.3	0.0	19.8	0.0	0.0	0	0	
WS201	3	---	285 secs	-	-	-	-	1.3	0.0	19.8	0.0	0.0	0	0	
WS201	3	---	3585 secs	-	-	$0.0_{(I)}$	-	0.1	0.0	20.9	0.0	0.0	0	0	
WS202	1	2.05	19/12/2019 08:51:00	1000	1000	$0.0_{(I)}$	DRY	0.1	0.0	20.9	0.0	0.0	0	0	
WS202	1	---	15 secs	-	-	$0.2_{(SS)}$	-	0.1	0.0	20.9	0.0	0.0	2	0	
WS202	1	---	30 secs	-	-	-	-	0.1	0.0	21.0	0.0	0.0	0	0	
WS202	1	---	60 secs	-	-	-	-	0.1	0.0	21.0	0.0	0.0	0	0	
WS202	1	---	90 secs	-	-	-	-	0.1	0.0	21.0	0.0	0.0	0	0	
WS202	1	---	120 secs	-	-	-	-	0.1	0.0	21.0	0.0	0.0	0	0	
WS202	1	---	180 secs	-	-	-	-	0.1	0.0	21.0	0.0	0.0	0	0	
WS202	1	---	240 secs	-	-	-	-	0.1	0.0	21.0	0.0	0.0	0	0	

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Compiled By	Date	Checked By	Date	Contract Ref:
	**24/1/20**			**1920884**

Contract: **Barnes Hospital (Plot A)**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
WS202	1	---	300 secs	-	-	-	-	0.1	0.0	21.0	0.0	0.0	0	0	
WS202	2	2.07	06/01/2020 11:37:00	1020	1020	$0.0_{(I)}$	DRY	0.2	0.0	20.9	0.0	0.0	0	0	
WS202	2	---	15 secs	-	-	$0.0_{(SS)}$	-	0.7	0.0	20.2	0.0	0.0	0	0	
WS202	2	---	30 secs	-	-	-	-	0.9	0.0	20.0	0.0	0.0	0	0	
WS202	2	---	60 secs	-	-	-	-	0.9	0.0	19.9	0.0	0.0	0	0	
WS202	2	---	90 secs	-	-	-	-	0.9	0.0	19.8	0.0	0.0	0	0	
WS202	2	---	120 secs	-	-	-	-	1.1	0.0	19.6	0.0	0.0	0	0	
WS202	2	---	180 secs	-	-	-	-	0.8	0.0	20.1	0.0	0.0	0	0	
WS202	2	---	240 secs	-	-	-	-	0.9	0.0	20.0	0.0	0.0	0	0	
WS202	2	---	300 secs	-	-	-	-	0.9	0.0	20.0	0.0	0.0	0	0	
WS202	3	2.07	20/01/2020 09:00:00	1041	1041	$0.0_{(I)}$	DRY	0.1	0.0	20.1	0.0	0.0	0	0	
WS202	3	---	15 secs	-	-	$0.1_{(SS)}$	-	0.1	0.0	20.0	0.0	0.0	0	0	
WS202	3	---	30 secs	-	-	-	-	0.4	0.0	20.0	0.0	0.0	0	0	
WS202	3	---	60 secs	-	-	-	-	0.4	0.0	19.9	0.0	0.0	0	0	
WS202	3	---	90 secs	-	-	-	-	0.9	0.0	19.9	0.0	0.0	0	0	
WS202	3	---	120 secs	-	-	-	-	0.9	0.0	19.9	0.0	0.0	0	0	
WS202	3	---	180 secs	-	-	-	-	0.9	0.0	19.9	0.0	0.0	0	0	
WS202	3	---	240 secs	-	-	-	-	0.9	0.0	19.9	0.0	0.0	0	0	
WS202	3	---	300 secs	-	-	-	-	0.9	0.0	19.9	0.0	0.0	0	0	
WS204	1	2.03	19/12/2019 08:21:00	1000	1000	$0.0_{(I)}$	DRY	0.1	0.0	20.9	0.0	0.0	0	0	
WS204	1	---	15 secs	-	-	$0.0_{(SS)}$	-	1.1	0.0	18.9	0.0	0.0	1	0	
WS204	1	---	30 secs	-	-	-	-	1.2	0.0	18.4	0.0	0.0	1	0	
WS204	1	---	60 secs	-	-	-	-	1.1	0.0	18.7	0.0	0.0	1	0	
WS204	1	---	90 secs	-	-	-	-	1.2	0.0	18.6	0.0	0.0	1	0	

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Compiled By	Date	Checked By	Date	Contract Ref:
	**24/1/20**			**1920884**

Contract: **Barnes Hospital (Plot A)**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
WS204	1	---	120 secs	-	-	-	-	1.1	0.0	18.7	0.0	0.0	1	0	
WS204	1	---	180 secs	-	-	-	-	1.2	0.0	18.7	0.0	0.0	1	0	
WS204	1	---	240 secs	-	-	-	-	1.1	0.0	18.7	0.0	0.0	1	0	
WS204	1	---	300 secs	-	-	-	-	1.1	0.0	18.7	0.0	0.0	1	0	
WS204	2	2.04	06/01/2020 10:27:00	1021	1021	$0.0_{(I)}$	DRY	0.1	0.0	20.9	0.0	0.0	0	0	
WS204	2	---	15 secs	-	-	$0.0_{(SS)}$	-	1.1	0.0	20.1	0.0	0.0	0	0	
WS204	2	---	30 secs	-	-	-	-	1.1	0.0	19.8	0.0	0.0	0	0	
WS204	2	---	60 secs	-	-	-	-	1.0	0.0	19.9	0.0	0.0	0	0	
WS204	2	---	90 secs	-	-	-	-	1.1	0.0	19.9	0.0	0.0	0	0	
WS204	2	---	120 secs	-	-	-	-	0.9	0.0	20.1	0.0	0.0	0	0	
WS204	2	---	180 secs	-	-	-	-	0.9	0.0	20.2	0.0	0.0	0	0	
WS204	2	---	240 secs	-	-	-	-	0.8	0.0	20.3	0.0	0.0	0	0	
WS204	2	---	300 secs	-	-	-	-	0.8	0.0	20.2	0.0	0.0	0	0	
WS204	3	2.04	20/01/2020 10:00:00	1041	1041	$0.0_{(I)}$	DRY	0.1	0.0	20.9	0.0	0.0	0	0	
WS204	3	---	15 secs	-	-	$0.0_{(SS)}$	-	0.7	0.0	20.5	0.0	0.0	0	0	
WS204	3	---	30 secs	-	-	-	-	1.1	0.0	20.1	0.0	0.0	0	0	
WS204	3	---	60 secs	-	-	-	-	1.1	0.0	20.1	0.0	0.0	0	0	
WS204	3	---	90 secs	-	-	-	-	1.0	0.0	20.0	0.0	0.0	0	0	
WS204	3	---	120 secs	-	-	-	-	1.0	0.0	20.0	0.0	0.0	0	0	
WS204	3	---	180 secs	-	-	-	-	1.0	0.0	20.0	0.0	0.0	0	0	
WS204	3	---	240 secs	-	-	-	-	1.0	0.0	20.0	0.0	0.0	0	0	
WS204	3	---	300 secs	-	-	-	-	1.0	0.0	20.0	0.0	0.0	0	0	
WS207	1	1.99	19/12/2019 09:44:00	999	999	$0.0_{(I)}$	DRY	0.1	0.0	20.9	0.0	0.0	0	0	
WS207	1	---	15 secs	-	-	$0.0_{(SS)}$	-	0.1	0.0	20.2	0.0	0.0	0	0	

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Compiled By	Date	Checked By	Date	Contract Ref:
	24/1/20			1920884

Contract: **Barnes Hospital (Plot A)**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
WS207	1	---	30 secs	-	-	-	-	0.1	0.0	20.8	0.0	0.0	0	0	
WS207	1	---	60 secs	-	-	-	-	0.1	0.0	20.5	0.0	0.0	0	0	
WS207	1	---	90 secs	-	-	-	-	0.1	0.0	20.7	0.0	0.0	0	0	
WS207	1	---	120 secs	-	-	-	-	0.1	0.0	20.3	0.0	0.0	0	0	
WS207	1	---	180 secs	-	-	-	-	0.1	0.0	20.8	0.0	0.0	0	0	
WS207	1	---	240 secs	-	-	-	-	0.1	0.0	20.7	0.0	0.0	0	0	
WS207	1	---	300 secs	-	-	-	-	0.1	0.0	19.7	0.0	0.0	0	0	
WS207	2	2.01	06/01/2020 10:39:00	1021	1021	$0.0_{(I)}$	DRY	0.2	0.0	20.9	0.0	0.0	0	0	
WS207	2	---	15 secs	-	-	$0.0_{(SS)}$	-	0.1	0.0	21.2	0.0	0.0	1	0	
WS207	2	---	30 secs	-	-	-	-	0.1	0.0	21.2	0.0	0.0	0	0	
WS207	2	---	60 secs	-	-	-	-	0.1	0.0	21.1	0.0	0.0	0	0	
WS207	2	---	90 secs	-	-	-	-	0.2	0.0	21.0	0.0	0.0	0	0	
WS207	2	---	120 secs	-	-	-	-	0.1	0.0	21.1	0.0	0.0	0	0	
WS207	2	---	180 secs	-	-	-	-	0.2	0.0	21.1	0.0	0.0	0	0	
WS207	2	---	240 secs	-	-	-	-	0.1	0.0	21.1	0.0	0.0	0	0	
WS207	2	---	300 secs	-	-	-	-	0.1	0.0	21.2	0.0	0.0	0	0	
WS207	3	2.01	20/01/2020 12:00:00	1040	1040	$0.1_{(I)}$	DRY	0.1	0.0	20.9	0.0	0.0	0	0	
WS207	3	---	15 secs	-	-	$0.0_{(SS)}$	-	0.1	0.0	20.4	0.0	0.0	0	0	
WS207	3	---	30 secs	-	-	-	-	0.2	0.0	20.4	0.0	0.0	0	0	
WS207	3	---	60 secs	-	-	-	-	0.2	0.0	19.9	0.0	0.0	0	0	
WS207	3	---	90 secs	-	-	-	-	0.2	0.0	19.7	0.0	0.0	0	0	
WS207	3	---	120 secs	-	-	-	-	0.2	0.0	19.7	0.0	0.0	0	0	
WS207	3	---	180 secs	-	-	-	-	0.2	0.0	19.7	0.0	0.0	0	0	
WS207	3	---	240 secs	-	-	-	-	0.2	0.0	19.7	0.0	0.0	0	0	
WS207	3	---	300 secs	-	-	-	-	0.2	0.0	19.7	0.0	0.0	0	0	

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Contract: **Barnes Hospital (Plot A)**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
WS210	1	2.49	19/12/2019 10:06:00	999	999	$0.0_{(I)}$	DRY	0.1	0.0	20.9	0.0	0.0	0	0	
WS210	1	---	15 secs	-	-	$0.1_{(SS)}$	-	0.9	0.0	20.3	0.0	0.0	0	0	
WS210	1	---	30 secs	-	-	-	-	0.9	0.0	20.0	0.0	0.0	0	0	
WS210	1	---	60 secs	-	-	-	-	1.0	0.0	20.0	0.0	0.0	0	0	
WS210	1	---	90 secs	-	-	-	-	0.2	0.0	20.4	0.0	0.0	0	0	
WS210	1	---	120 secs	-	-	-	-	1.0	0.0	20.0	0.0	0.0	0	0	
WS210	1	---	180 secs	-	-	-	-	0.8	0.0	20.0	0.0	0.0	0	0	
WS210	1	---	240 secs	-	-	-	-	0.9	0.0	20.1	0.0	0.0	0	0	
WS210	1	---	300 secs	-	-	-	-	0.9	0.0	20.0	0.0	0.0	0	0	
WS210	2	2.51	06/01/2020 11:55:00	1020	1020	$0.0_{(I)}$	DRY	0.1	0.0	20.9	0.0	0.0	0	0	
WS210	2	---	15 secs	-	-	$0.0_{(SS)}$	-	1.0	0.0	20.5	0.0	0.0	0	0	
WS210	2	---	30 secs	-	-	-	-	0.1	0.0	20.8	0.0	0.0	0	0	
WS210	2	---	60 secs	-	-	-	-	1.7	0.0	19.3	0.0	0.0	0	0	
WS210	2	---	90 secs	-	-	-	-	0.2	0.0	20.5	0.0	0.0	0	0	
WS210	2	---	120 secs	-	-	-	-	0.3	0.0	20.8	0.0	0.0	0	0	
WS210	2	---	180 secs	-	-	-	-	0.1	0.0	20.9	0.0	0.0	0	0	
WS210	2	---	240 secs	-	-	-	-	0.2	0.0	20.7	0.0	0.0	0	0	
WS210	2	---	300 secs	-	-	-	-	0.1	0.0	20.8	0.0	0.0	0	0	
WS210	3	---	20/01/2020 12:30:00	-	-	$0.1_{(I)}$	-	0.1	0.0	20.9	0.0	0.0	0	0	
WS210	3	2.51	15 secs	1040	1040	$0.1_{(SS)}$	DRY	0.6	0.0	20.4	0.0	0.0	0	0	
WS210	3	---	30 secs	-	-	-	-	1.3	0.0	20.1	0.0	0.0	0	0	
WS210	3	---	60 secs	-	-	-	-	1.8	0.0	20.1	0.0	0.0	0	0	
WS210	3	---	90 secs	-	-	-	-	1.8	0.0	20.2	0.0	0.0	0	0	
WS210	3	---	120 secs	-	-	-	-	1.8	0.0	20.2	0.0	0.0	0	0	

Key: I = Initial, Min = Minimum, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By	Date	Checked By	Date	Contract Ref:
	**24/1/20**			**1920884**

Contract: **Barnes Hospital (Plot A)**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
WS210	3	---	180 secs	-	-	-	-	1.8	0.0	20.2	0.0	0.0	0	0	
WS210	3	---	240 secs	-	-	-	-	1.8	0.0	20.2	0.0	0.0	0	0	
WS210	3	---	300 secs	-	-	-	-	1.8	0.0	20.2	0.0	0.0	0	0	
WS211	1	2.07	19/12/2019 10:21:00	999	999	$0.0_{(I)}$	DRY	0.1	0.0	20.9	0.0	0.0	0	0	
WS211	1	---	15 secs	-	-	$0.0_{(SS)}$	-	0.2	0.0	20.2	0.0	0.0	1	0	
WS211	1	---	30 secs	-	-	-	-	0.3	0.0	20.0	0.0	0.0	0	0	
WS211	1	---	60 secs	-	-	-	-	0.4	0.0	19.9	0.0	0.0	0	0	
WS211	1	---	90 secs	-	-	-	-	0.3	0.0	20.0	0.0	0.0	0	0	
WS211	1	---	120 secs	-	-	-	-	0.3	0.0	20.1	0.0	0.0	0	0	
WS211	1	---	180 secs	-	-	-	-	0.3	0.0	20.0	0.0	0.0	0	0	
WS211	1	---	240 secs	-	-	-	-	0.3	0.0	20.1	0.0	0.0	0	0	
WS211	1	---	300 secs	-	-	-	-	0.4	0.0	20.0	0.0	0.0	0	0	
WS211	2	2.09	06/01/2020 12:09:00	1020	1020	$0.0_{(I)}$	DRY	0.2	0.0	20.9	0.0	0.0	0	0	
WS211	2	---	15 secs	-	-	$0.0_{(SS)}$	-	0.2	0.0	20.7	0.0	0.0	0	0	
WS211	2	---	30 secs	-	-	-	-	0.2	0.0	20.7	0.0	0.0	0	0	
WS211	2	---	60 secs	-	-	-	-	0.2	0.0	20.7	0.0	0.0	0	0	
WS211	2	---	90 secs	-	-	-	-	0.2	0.0	20.7	0.0	0.0	0	0	
WS211	2	---	120 secs	-	-	-	-	0.2	0.0	20.6	0.0	0.0	0	0	
WS211	2	---	180 secs	-	-	-	-	0.2	0.0	20.7	0.0	0.0	0	0	
WS211	2	---	240 secs	-	-	-	-	0.2	0.0	20.7	0.0	0.0	0	0	
WS211	2	---	300 secs	-	-	-	-	0.2	0.0	20.6	0.0	0.0	0	0	
WS211	3	2.09	20/01/2020 13:30:00	1041	1041	$0.0_{(I)}$	DRY	0.1	0.0	20.9	0.0	0.0	0	0	
WS211	3	---	15 secs	-	-	$0.1_{(SS)}$	-	0.3	0.0	20.5	0.0	0.0	0	0	
WS211	3	---	30 secs	-	-	-	-	0.3	0.0	20.5	0.0	0.0	0	0	

Key: I = Initial, Min = Minimum, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By	Date	Checked By	Date	Contract Ref:
	24/1/20			1920884

Contract: **Barnes Hospital (Plot A)**

Page: **9** of **10**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
WS211	3	---	60 secs	-	-	-	-	0.6	0.0	20.0	0.0	0.0	0	0	
WS211	3	---	90 secs	-	-	-	-	0.6	0.0	20.0	0.0	0.0	0	0	
WS211	3	---	120 secs	-	-	-	-	0.3	0.0	20.0	0.0	0.0	0	0	
WS211	3	---	180 secs	-	-	-	-	0.3	0.0	20.0	0.0	0.0	0	0	
WS211	3	---	240 secs	-	-	-	-	0.3	0.0	20.0	0.0	0.0	0	0	
WS211	3	---	300 secs	-	-	-	-	0.3	0.0	20.0	0.0	0.0	0	0	

Key: I = Initial, Min = Minimum, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By	Date	Checked By	Date	Contract Ref:
	24/1/20			1920884

Contract: **Barnes Hospital (Plot A)**

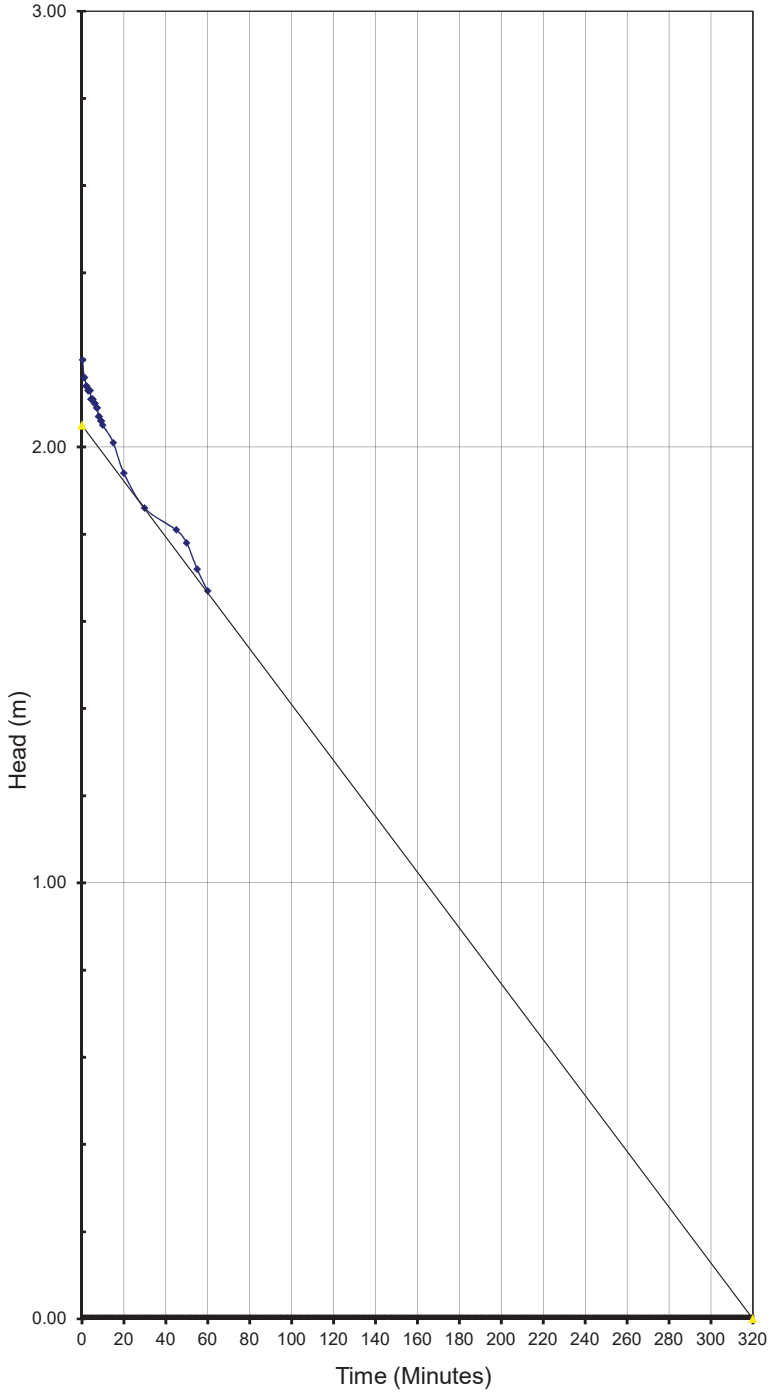
Borehole Soakaway - Falling Head Test

Based on Roads in Hertfordshire A Design Guide

Location	Barnes Hospital (Plot A)	**Diameter of casing (m)**	0.15
Client	LS Estates	**Diameter of test zone (m)**	0.15
Soakaway	BH2	**Casing depth (m)**	1.7
Date	12-Dec-19	**Depth to base of hole (m)**	2.7
Operator	HA	**Job Number**	1920884

Time (Minutes)	Water level (mbgl)	Head (m)
0.30	0.00	2.20
1.00	0.04	2.16
1.30	0.04	2.16
2.00	0.06	2.14
2.30	0.06	2.14
3.00	0.07	2.13
3.30	0.07	2.13
4.00	0.07	2.13
4.30	0.09	2.11
5.00	0.09	2.11
5.30	0.09	2.11
6.00	0.10	2.10
6.30	0.10	2.10
7.00	0.11	2.09
7.30	0.11	2.09
8.00	0.13	2.07
8.30	0.13	2.07
9.00	0.14	2.06
9.30	0.14	2.06
10.00	0.15	2.05
15.00	0.19	2.01
20.00	0.26	1.94
30.00	0.34	1.86
45.00	0.39	1.81
50.00	0.42	1.78
55.00	0.48	1.72
60.00	0.53	1.67

Falling Head Test Results



Results

th (mins)	320.00
Hp (m)	2.05
Infiltration Rate (l/m^2/min)	0.24
Infiltration Rate (m/s)	4.00E-06

Comments:

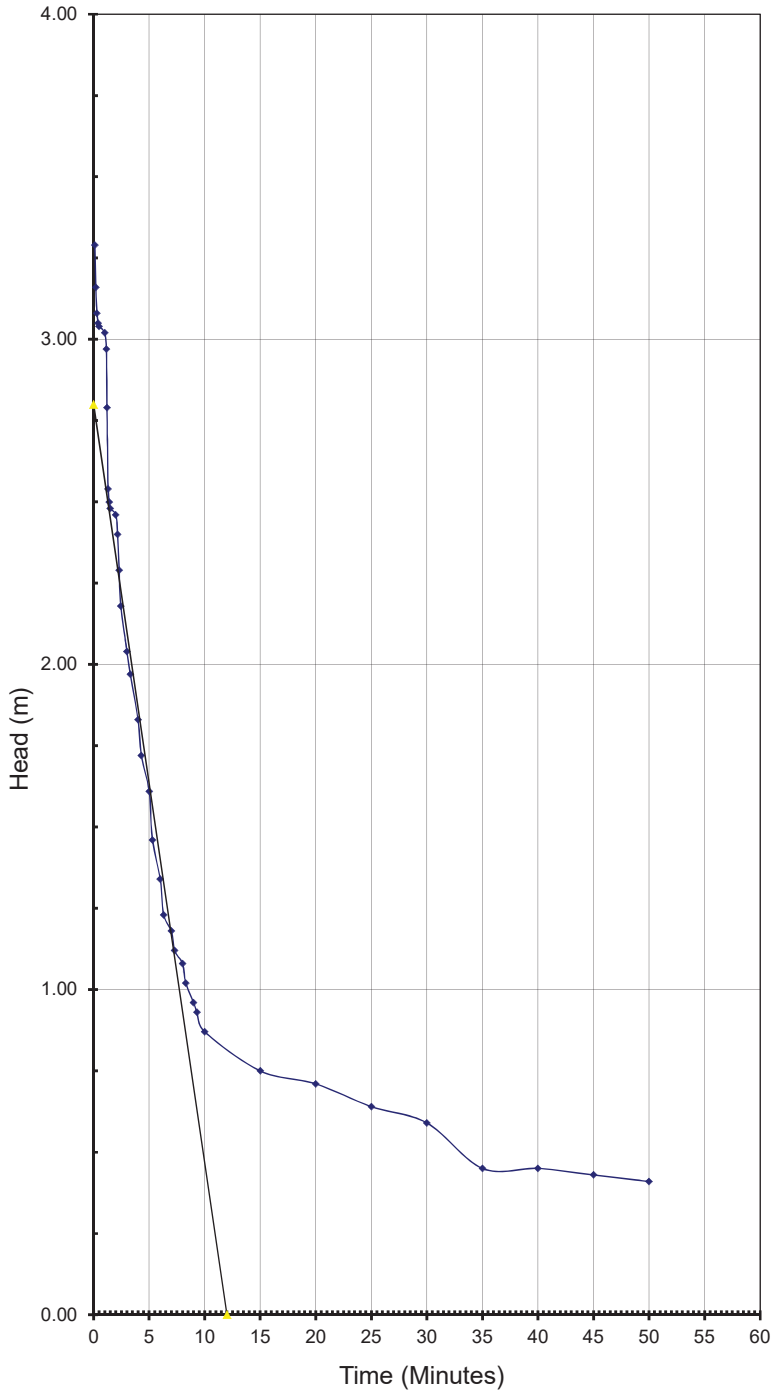
Borehole Soakaway - Falling Head Test

Based on Roads in Hertfordshire A Design Guide

Location	Barnes Hospital (Plot A)	**Diameter of casing (m)**	0.15
Client	LS Estates	**Diameter of test zone (m)**	0.15
Soakaway	BH3	**Casing depth (m)**	3
Date	10-Dec-19	**Depth to base of hole (m)**	4
Operator	HA	**Job Number**	1920884

Time (Minutes)	Water level (mbgl)	Head (m)
0.10	0.21	3.29
0.20	0.34	3.16
0.30	0.42	3.08
0.40	0.45	3.05
0.50	0.46	3.04
1.00	0.48	3.02
1.15	0.53	2.97
1.20	0.71	2.79
1.30	0.96	2.54
1.40	1.00	2.50
1.50	1.02	2.48
2.00	1.04	2.46
2.15	1.10	2.40
2.30	1.21	2.29
2.45	1.32	2.18
3.00	1.46	2.04
3.30	1.53	1.97
4.00	1.67	1.83
4.30	1.78	1.72
5.00	1.89	1.61
5.30	2.04	1.46
6.00	2.16	1.34
6.30	2.27	1.23
7.00	2.32	1.18
7.30	2.38	1.12
8.00	2.42	1.08
8.30	2.48	1.02
9.00	2.54	0.96
9.30	2.57	0.93
10.00	2.63	0.87
15.00	2.75	0.75
20.00	2.79	0.71
25.00	2.86	0.64
30.00	2.91	0.59
35.00	3.05	0.45
40.00	3.05	0.45
45.00	3.07	0.43
50.00	3.09	0.41

Falling Head Test Results



Results

th (mins)	12.00
Hp (m)	2.80
Infiltration Rate (l/m^2/min)	8.75
Infiltration Rate (m/s)	1.46E-04

Comments:

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Keeble House
Stuart Way
East Grinstead
West Sussex
RH19 4QA

SPT Hammer Ref:	DART379
Test Date:	24/05/2019
Report Date:	24/05/2019
File Name:	DART379.spt
Test Operator:	NPB

Instrumented Rod Data

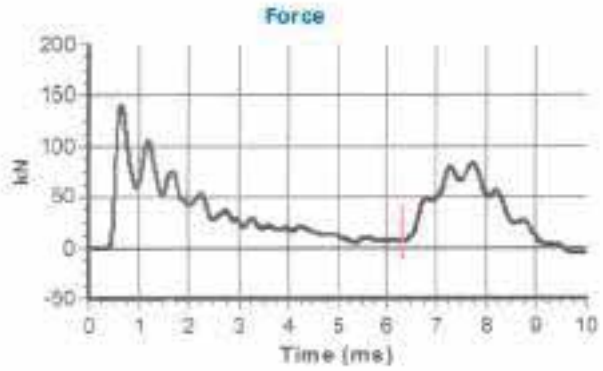
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	6458
Accelerometer No.2:	9607

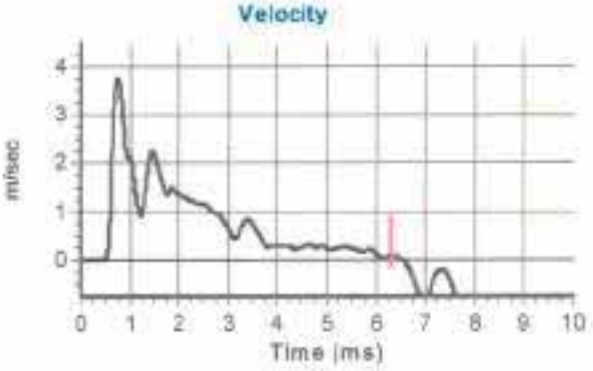
SPT Hammer Information

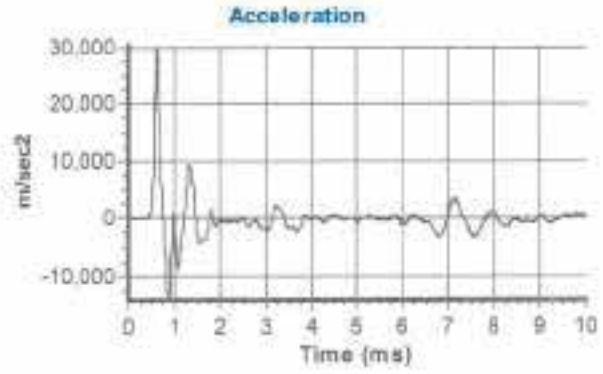
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	14.5

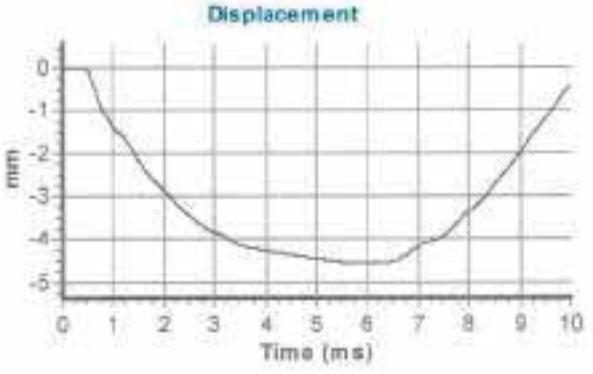
Comments / Location

CHARLWOODS









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	273

Energy Ratio E_r (%): 58

Signed: Neil Burrows

Title: Field Operations Manager

The recommended calibration interval is 12 months

Hammer Energy Test Report

In accordance with BSEN ISO 22476-3:2005

Dynamic sampling uk ltd
5-8 victory parkway
victory road
Derby
DE24 8ZF

Hammer Ref:	CJ.63
Test Date:	31/05/2019
Report Date:	31/05/2019
File Name:	CJ.63.spt
Test Operator:	TP

Instrumented Rod Data

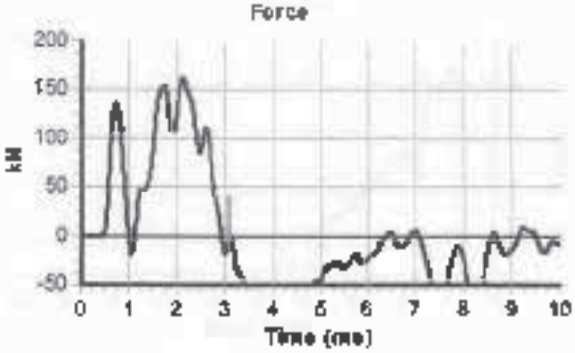
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	9603
Accelerometer No.2:	6457

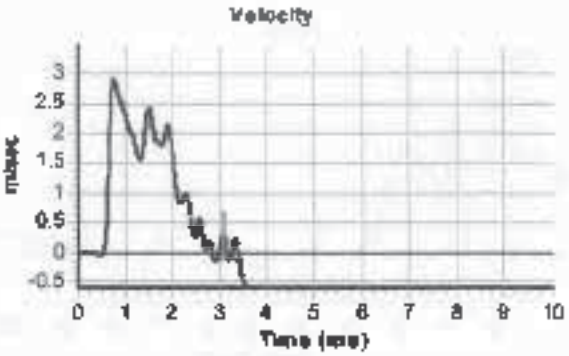
Hammer Information

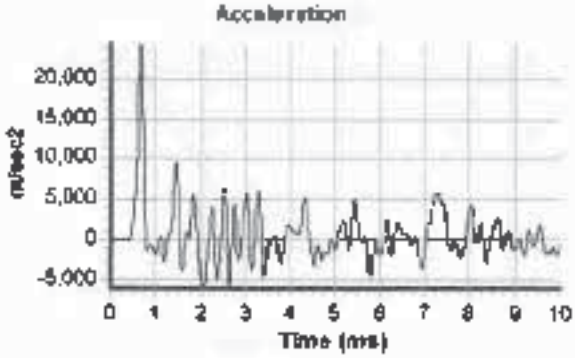
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
String Length L (m):	15.0

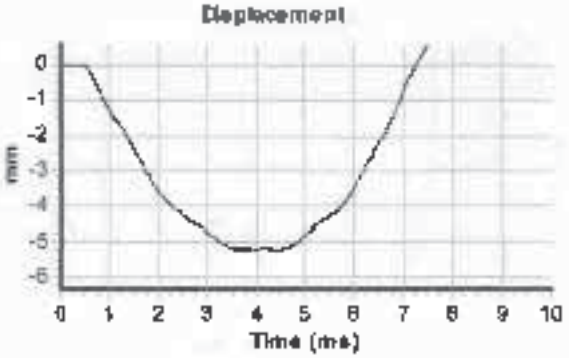
Comments / Location

CJ associates hammer tested at Dynamic samplings yard.





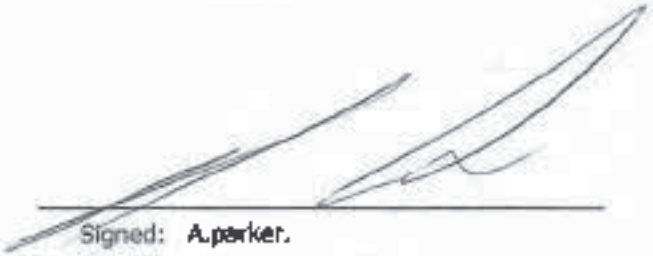




Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	320

Energy Ratio E_r (%): **68**



Signed: A.parker.

Title: Associate Director.

The recommended calibration interval is 12 months

Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Dynamic sampling uk ltd
5-8 victory parkway
victory road
Derby
DE24 8ZF

Hammer Ref:	CJ08
Test Date:	07/06/2019
Report Date:	07/06/2019
File Name:	CJ08.spt
Test Operator:	TP

Instrumented Rod Data

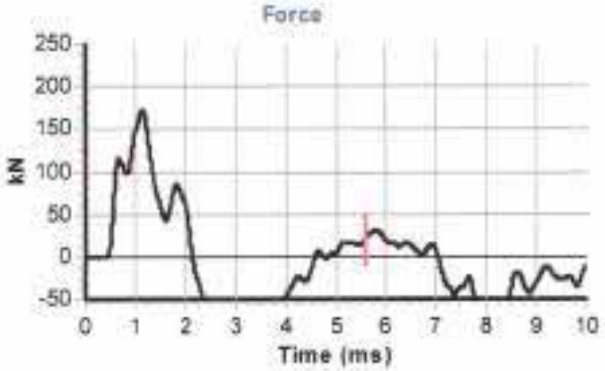
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	9603
Accelerometer No.2:	6457

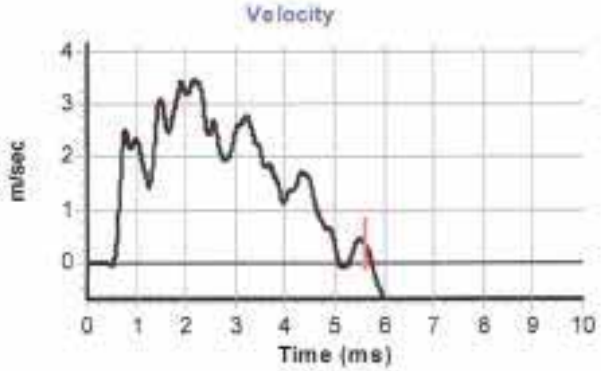
Hammer Information

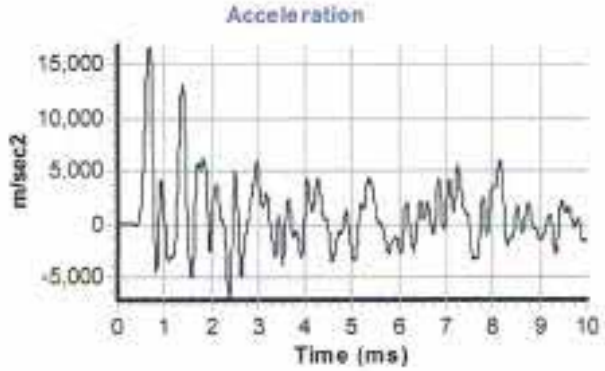
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
String Length L (m):	15.0

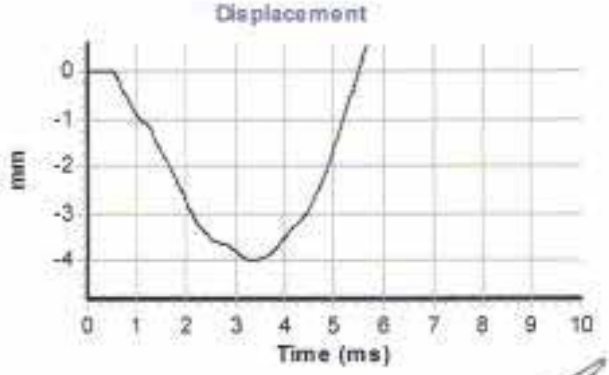
Comments / Location

CJ associates hammer tested at Dynamic samplings yard.





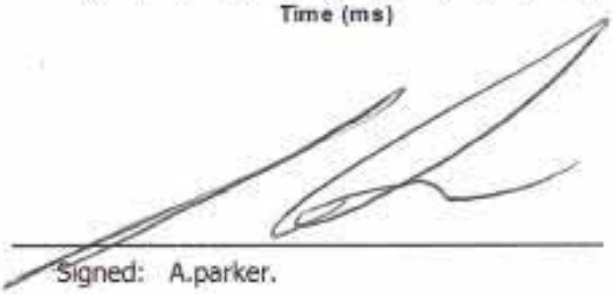




Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	317

Energy Ratio E_r (%): **67**



Signed: A.parker.

Title: Associate Director.

The recommended calibration interval is 12 months

APPENDIX H
LABORATORY CERTIFICATES FOR SOIL ANALYSIS

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT
SUPPLEMENT TO TEST REPORT 19/11914/1

Amendments: Request for Additional Analysis

Envirolab Job Number: 19/11914
Issue Number: 2 **Date:** 16 January, 2020

Client:
RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Ziaul Hoque
Project Name: Barnes Hospital
Project Ref: 1920884
Order No: N/A
Date Samples Received: 13/12/19
Date Instructions Received: 16/12/19
Date Analysis Completed: 15/01/20

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 19/11914

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11914/1	19/11914/2	19/11914/3	19/11914/4	19/11914/6	19/11914/8	19/11914/9	Units	Limit of Detection	Method ref
Client Sample No	MG	N	MG	MG	MG	MG	MG			
Client Sample ID	WS201	WS201	WS203	WS203	WS204	WS205	WS205			
Depth to Top	0.20	1.00	0.20	0.80	0.40	0.20	0.80			
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4AE	5A	4AE	45AB	4AE	4AE	7			
% Stones >10mm$_A$	9.2	<0.1	-	3.0	31.8	-	<0.1	% w/w	0.1	A-T-044
pH$_D^{M\#}$	7.52	7.63	-	8.09	9.35	-	9.04	pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	0.03	-	<0.01	0.02	-	0.01	g/l	0.01	A-T-026s
Sulphate (acid soluble)$_D^{M\#}$	510	250	-	500	430	-	400	mg/kg	200	A-T-028s
Total Organic Carbon$_D^{M\#}$	3.03	0.94	-	2.82	1.20	-	-	% w/w	0.03	A-T-032s
Arsenic$_D^{M\#}$	12	11	-	13	9	-	<1	mg/kg	1	A-T-024s
Cadmium$_D^{M\#}$	2.1	0.8	-	0.9	<0.5	-	<0.5	mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	86	20	-	52	16	-	6	mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	25	21	-	19	12	-	10	mg/kg	1	A-T-024s
Lead$_D^{M\#}$	350	69	-	288	87	-	13	mg/kg	1	A-T-024s
Mercury$_D$	1.85	0.49	-	1.21	0.50	-	0.89	mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	20	14	-	18	10	-	7	mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	<1	1	-	<1	<1	-	1	mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	135	40	-	81	34	-	46	mg/kg	5	A-T-024s
Leachate Prep BS EN 12457-2 (10:1)$_A$	*	-	-	*	-	-	-			A-T-001
Arsenic (leachable)$_A^{\#}$	23	-	-	8	-	-	-	µg/l	1	A-T-025w
Cadmium (leachable)$_A^{\#}$	<1	-	-	<1	-	-	-	µg/l	1	A-T-025w
Copper (leachable)$_A^{\#}$	43	-	-	35	-	-	-	µg/l	1	A-T-025w
Chromium (leachable)$_A^{\#}$	2	-	-	<1	-	-	-	µg/l	1	A-T-025w
Lead (leachable)$_A^{\#}$	203	-	-	76	-	-	-	µg/l	1	A-T-025w
Mercury (leachable)$_A^{\#}$	<0.1	-	-	<0.1	-	-	-	µg/l	0.1	A-T-025w
Nickel (leachable)$_A^{\#}$	4	-	-	<1	-	-	-	µg/l	1	A-T-025w
Selenium (leachable)$_A^{\#}$	<1	-	-	<1	-	-	-	µg/l	1	A-T-025w
Zinc (leachable)$_A^{\#}$	52	-	-	12	-	-	-	µg/l	1	A-T-025w

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Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11914/1	19/11914/2	19/11914/3	19/11914/4	19/11914/6	19/11914/8	19/11914/9	Units	Limit of Detection	Method ref
Client Sample No	MG	N	MG	MG	MG	MG	MG			
Client Sample ID	WS201	WS201	WS203	WS203	WS204	WS205	WS205			
Depth to Top	0.20	1.00	0.20	0.80	0.40	0.20	0.80			
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4AE	5A	4AE	45AB	4AE	4AE	7			
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_D^{\#}$	NAD	-	NAD	-	NAD	NAD	NAD			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	-	N/A	-	N/A	N/A	N/A			A-T-045

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Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11914/1	19/11914/2	19/11914/3	19/11914/4	19/11914/6	19/11914/8	19/11914/9	Units	Limit of Detection	Method ref
Client Sample No	MG	N	MG	MG	MG	MG	MG			
Client Sample ID	WS201	WS201	WS203	WS203	WS204	WS205	WS205			
Depth to Top	0.20	1.00	0.20	0.80	0.40	0.20	0.80			
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4AE	5A	4AE	45AB	4AE	4AE	7			
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.02	<0.01	-	0.10	0.12	-	0.02	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	0.04	<0.01	-	0.29	0.17	-	<0.01	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	0.15	<0.02	-	0.66	0.45	-	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.66	<0.04	-	2.83	3.44	-	0.05	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.59	<0.04	-	2.90	3.71	-	0.06	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.75	<0.05	-	3.60	4.11	-	0.08	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.26	<0.05	-	1.45	2.04	-	0.09	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.28	<0.07	-	1.31	1.45	-	<0.07	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	0.70	<0.06	-	2.96	3.12	-	0.17	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.05	<0.04	-	0.31	0.40	-	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	1.63	<0.08	-	6.03	5.55	-	<0.08	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	0.03	<0.01	-	0.22	0.15	-	0.09	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.31	<0.03	-	1.75	2.31	-	<0.03	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03	-	0.08	0.04	-	0.05	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	0.64	<0.03	-	2.82	1.50	-	0.22	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	1.40	<0.07	-	5.22	5.38	-	0.12	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	7.51	<0.08	-	32.5	33.9	-	0.95	mg/kg	0.01	A-T-019s

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Client Project Name: Barnes Hospital

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Lab Sample ID	19/11914/1	19/11914/2	19/11914/3	19/11914/4	19/11914/6	19/11914/8	19/11914/9	Units	Limit of Detection	Method ref
Client Sample No	MG	N	MG	MG	MG	MG	MG			
Client Sample ID	WS201	WS201	WS203	WS203	WS204	WS205	WS205			
Depth to Top	0.20	1.00	0.20	0.80	0.40	0.20	0.80			
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4AE	5A	4AE	45AB	4AE	4AE	7			
VOC										
Dichlorodifluoromethane$_A$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Chloromethane$_A$	<10	-	-	-	-	-	<10	µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene)$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromomethane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Chloroethane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Trichlorofluoromethane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloroethene$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Carbon Disulphide$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Dichloromethane$_A$	<5	-	-	-	-	-	<5	µg/kg	5	A-T-006s
trans 1,2-Dichloroethene$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloroethane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
cis 1,2-Dichloroethene$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
2,2-Dichloropropane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromochloromethane$_A$#	<5	-	-	-	-	-	<5	µg/kg	5	A-T-006s
Chloroform$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,1-Trichloroethane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloropropene$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Carbon Tetrachloride$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichloroethane$_A$#	<2	-	-	-	-	-	<2	µg/kg	2	A-T-006s
Benzene$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Trichloroethene$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichloropropane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Dibromomethane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromodichloromethane$_A$#	<10	-	-	-	-	-	<10	µg/kg	10	A-T-006s
cis 1,3-Dichloropropene$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Toluene$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
trans 1,3-Dichloropropene$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,2-Trichloroethane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3-Dichloropropane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Tetrachloroethene$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Dibromochloromethane$_A$#	<3	-	-	-	-	-	<3	µg/kg	3	A-T-006s
1,2-Dibromoethane$_A$#	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s

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Client Project Name: Barnes Hospital

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Lab Sample ID	19/11914/1	19/11914/2	19/11914/3	19/11914/4	19/11914/6	19/11914/8	19/11914/9	Units	Limit of Detection	Method ref
Client Sample No	MG	N	MG	MG	MG	MG	MG			
Client Sample ID	WS201	WS201	WS203	WS203	WS204	WS205	WS205			
Depth to Top	0.20	1.00	0.20	0.80	0.40	0.20	0.80			
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4AE	5A	4AE	45AB	4AE	4AE	7			
Chlorobenzene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane$_A$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Ethylbenzene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
m & p Xylene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
o-Xylene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Styrene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromoform$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Isopropylbenzene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane$_A$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2,3-Trichloropropane$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromobenzene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
n-Propylbenzene$_A^\#$	<1	-	-	-	-	-	3	µg/kg	1	A-T-006s
2-Chlorotoluene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene$_A^\#$	<1	-	-	-	-	-	10	µg/kg	1	A-T-006s
4-Chlorotoluene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
tert-Butylbenzene$_A^\#$	<2	-	-	-	-	-	<2	µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene$_A^\#$	1	-	-	-	-	-	41	µg/kg	1	A-T-006s
sec-Butylbenzene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
4-Isopropyltoluene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3-Dichlorobenzene$_A$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,4-Dichlorobenzene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
n-Butylbenzene$_A^\#$	<1	-	-	-	-	-	1	µg/kg	1	A-T-006s
1,2-Dichlorobenzene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP)$_A$	<2	-	-	-	-	-	<2	µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene$_A$	<3	-	-	-	-	-	<3	µg/kg	3	A-T-006s
Hexachlorobutadiene$_A^\#$	<1	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene$_A$	<3	-	-	-	-	-	<3	µg/kg	3	A-T-006s

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Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11914/1	19/11914/2	19/11914/3	19/11914/4	19/11914/6	19/11914/8	19/11914/9	Units	Limit of Detection	Method ref
Client Sample No	MG	N	MG	MG	MG	MG	MG			
Client Sample ID	WS201	WS201	WS203	WS203	WS204	WS205	WS205			
Depth to Top	0.20	1.00	0.20	0.80	0.40	0.20	0.80			
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19	11-Dec-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4AE	5A	4AE	45AB	4AE	4AE	7			
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1	<1	-	1	<1	-	<5	mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	-	1	7	-	18	mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	2	<1	-	1	20	-	100	mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	3	<1	-	2	17	-	103	mg/kg	1	A-T-055s
Ali >C21-C35$_A$	18	<1	-	5	47	-	770	mg/kg	1	A-T-055s
Total Aliphatics$_A$	22	<1	-	10	92	-	992	mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	2	<1	-	9	1	-	24	mg/kg	1	A-T-055s
Aro >C10-C12$_A^{M\#}$	1	<1	-	3	7	-	21	mg/kg	1	A-T-055s
Aro >C12-C16$_A$	4	<1	-	10	21	-	56	mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	17	<1	-	61	56	-	61	mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	53	<1	-	212	211	-	445	mg/kg	1	A-T-055s
Total Aromatics$_A$	77	<1	-	296	296	-	608	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	100	<1	-	306	389	-	1600	mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	mg/kg	0.01	A-T-022s

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Client Project Ref: 1920884

Lab Sample ID	19/11914/10	19/11914/12	19/11914/13					Units	Limit of Detection	Method ref
Client Sample No	MG	MG	N							
Client Sample ID	WS207	WS208	WS208							
Depth to Top	0.40	0.20	0.80							
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19							
Sample Type	Soil - ES	Solid	Soil - ES							
Sample Matrix Code	4AE	7	4ABE							
% Stones >10mm$_A$	28.1	<0.1	3.1					% w/w	0.1	A-T-044
pH$_D$$^{M\#}$	8.93	13.05	-					pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	<0.01	<0.01	-					g/l	0.01	A-T-026s
Sulphate (acid soluble)$_D$$^{M\#}$	230	2200	-					mg/kg	200	A-T-028s
Total Organic Carbon$_D$$^{M\#}$	3.57	-	3.51					% w/w	0.03	A-T-032s
Arsenic$_D$$^{M\#}$	4	10	-					mg/kg	1	A-T-024s
Cadmium$_D$$^{M\#}$	1.7	0.8	-					mg/kg	0.5	A-T-024s
Copper$_D$$^{M\#}$	5	17	-					mg/kg	1	A-T-024s
Chromium$_D$$^{M\#}$	5	15	-					mg/kg	1	A-T-024s
Lead$_D$$^{M\#}$	102	107	-					mg/kg	1	A-T-024s
Mercury$_D$	0.63	0.29	-					mg/kg	0.17	A-T-024s
Nickel$_D$$^{M\#}$	4	13	-					mg/kg	1	A-T-024s
Selenium$_D$$^{M\#}$	<1	1	-					mg/kg	1	A-T-024s
Zinc$_D$$^{M\#}$	142	63	-					mg/kg	5	A-T-024s
Leachate Prep BS EN 12457-2 (10:1)$_A$	-	*	-							A-T-001

Envirolab Job Number: 19/11914

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11914/10	19/11914/12	19/11914/13					Units	Limit of Detection	Method ref
Client Sample No	MG	MG	N							
Client Sample ID	WS207	WS208	WS208							
Depth to Top	0.40	0.20	0.80							
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19							
Sample Type	Soil - ES	Solid	Soil - ES							
Sample Matrix Code	4AE	7	4ABE							
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_D^{\#}$	NAD	NAD	-							A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	N/A	-							A-T-045

Envirolab Job Number: 19/11914

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11914/10	19/11914/12	19/11914/13					Units	Limit of Detection	Method ref
Client Sample No	MG	MG	N							
Client Sample ID	WS207	WS208	WS208							
Depth to Top	0.40	0.20	0.80							
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19							
Sample Type	Soil - ES	Solid	Soil - ES							
Sample Matrix Code	4AE	7	4ABE							
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	2.85	-					mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	10.1	-					mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02	15.5	-					mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	27.2	-					mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	18.5	-					mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	20.1	-					mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	7.73	-					mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	9.03	-					mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06	29.2	-					mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	2.00	-					mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	64.6	-					mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	8.99	-					mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	9.86	-					mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	1.73	-					mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	90.2	-					mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	<0.07	54.9	-					mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	372	-					mg/kg	0.01	A-T-019s

Lab Sample ID	19/11914/10	19/11914/12	19/11914/13					Units	Limit of Detection	Method ref
Client Sample No	MG	MG	N							
Client Sample ID	WS207	WS208	WS208							
Depth to Top	0.40	0.20	0.80							
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19							
Sample Type	Soil - ES	Solid	Soil - ES							
Sample Matrix Code	4AE	7	4ABE							
PAH 16MS (leachable)										
Acenaphthene (leachable)$_A$	-	1.35	-					µg/l	0.02	A-T-019w
Acenaphthylene (leachable)$_A$	-	8.47	-					µg/l	0.02	A-T-019w
Anthracene (leachable)$_A$	-	0.80	-					µg/l	0.02	A-T-019w
Benzo(a)anthracene (leachable)$_A$	-	1.37	-					µg/l	0.02	A-T-019w
Benzo(a)pyrene (leachable) $_A$	-	1.13	-					µg/l	0.02	A-T-019w
Benzo(b)fluoranthene (leachable)$_A$	-	1.23	-					µg/l	0.02	A-T-019w
Benzo(ghi)perylene (leachable)$_A$	-	0.65	-					µg/l	0.02	A-T-019w
Benzo(k)fluoranthene (leachable)$_A$	-	0.45	-					µg/l	0.02	A-T-019w
Chrysene (leachable)$_A$	-	1.37	-					µg/l	0.02	A-T-019w
Dibenzo(ah)anthracene (leachable)$_A$	-	0.16	-					µg/l	0.02	A-T-019w
Fluoranthene (leachable)$_A$	-	3.29	-					µg/l	0.02	A-T-019w
Fluorene (leachable)$_A$	-	1.96	-					µg/l	0.02	A-T-019w
Indeno(123-cd)pyrene (leachable)$_A$	-	0.74	-					µg/l	0.02	A-T-019w
Naphthalene (leachable) $_A$	-	5.39	-					µg/l	0.02	A-T-019w
Phenanthrene (leachable)$_A$	-	4.22	-					µg/l	0.02	A-T-019w
Pyrene (leachable)$_A$	-	2.69	-					µg/l	0.02	A-T-019w
Total PAH 16MS (leachable)$_A$	-	35.3	-					µg/l	0.02	A-T-019w

Envirolab Job Number: 19/11914

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11914/10	19/11914/12	19/11914/13					Units	Limit of Detection	Method ref
Client Sample No	MG	MG	N							
Client Sample ID	WS207	WS208	WS208							
Depth to Top	0.40	0.20	0.80							
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19							
Sample Type	Soil - ES	Solid	Soil - ES							
Sample Matrix Code	4AE	7	4ABE							
VOC										
Dichlorodifluoromethane$_A$	<1	-	-					µg/kg	1	A-T-006s
Chloromethane$_A$	<10	-	-					µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene)$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Bromomethane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Chloroethane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Trichlorofluoromethane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,1-Dichloroethene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Carbon Disulphide$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Dichloromethane$_A$	<5	-	-					µg/kg	5	A-T-006s
trans 1,2-Dichloroethene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,1-Dichloroethane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
cis 1,2-Dichloroethene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
2,2-Dichloropropane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Bromochloromethane$_A^\#$	<5	-	-					µg/kg	5	A-T-006s
Chloroform$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,1,1-Trichloroethane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,1-Dichloropropene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Carbon Tetrachloride$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,2-Dichloroethane$_A^\#$	<2	-	-					µg/kg	2	A-T-006s
Benzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Trichloroethene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,2-Dichloropropane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Dibromomethane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Bromodichloromethane$_A^\#$	<10	-	-					µg/kg	10	A-T-006s
cis 1,3-Dichloropropene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Toluene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
trans 1,3-Dichloropropene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,1,2-Trichloroethane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,3-Dichloropropane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Tetrachloroethene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Dibromochloromethane$_A^\#$	<3	-	-					µg/kg	3	A-T-006s
1,2-Dibromoethane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s

Lab Sample ID	19/11914/10	19/11914/12	19/11914/13					Units	Limit of Detection	Method ref
Client Sample No	MG	MG	N							
Client Sample ID	WS207	WS208	WS208							
Depth to Top	0.40	0.20	0.80							
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19							
Sample Type	Soil - ES	Solid	Soil - ES							
Sample Matrix Code	4AE	7	4ABE							
Chlorobenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane$_A$	<1	-	-					µg/kg	1	A-T-006s
Ethylbenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
m & p Xylene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
o-Xylene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Styrene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Bromoform$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Isopropylbenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane$_A$	<1	-	-					µg/kg	1	A-T-006s
1,2,3-Trichloropropane$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
Bromobenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
n-Propylbenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
2-Chlorotoluene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
4-Chlorotoluene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
tert-Butylbenzene$_A^\#$	<2	-	-					µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
sec-Butylbenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
4-Isopropyltoluene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,3-Dichlorobenzene$_A$	<1	-	-					µg/kg	1	A-T-006s
1,4-Dichlorobenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
n-Butylbenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,2-Dichlorobenzene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP)$_A$	<2	-	-					µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene$_A$	<3	-	-					µg/kg	3	A-T-006s
Hexachlorobutadiene$_A^\#$	<1	-	-					µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene$_A$	<3	-	-					µg/kg	3	A-T-006s

Envirolab Job Number: 19/11914

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11914/10	19/11914/12	19/11914/13					Units	Limit of Detection	Method ref
Client Sample No	MG	MG	N							
Client Sample ID	WS207	WS208	WS208							
Depth to Top	0.40	0.20	0.80							
Depth To Bottom										
Date Sampled	11-Dec-19	11-Dec-19	11-Dec-19							
Sample Type	Soil - ES	Solid	Soil - ES							
Sample Matrix Code	4AE	7	4ABE							
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	-					mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	-					mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1	<5	-					mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<5	-					mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<5	-					mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	9	-					mg/kg	1	A-T-055s
Ali >C21-C35$_A$	19	68	-					mg/kg	1	A-T-055s
Total Aliphatics$_A$	21	78	-					mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	-					mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	-					mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	<1	226	-					mg/kg	1	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	7	-					mg/kg	1	A-T-055s
Aro >C12-C16$_A$	2	104	-					mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	1	626	-					mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	13	1640	-					mg/kg	1	A-T-055s
Total Aromatics$_A$	18	2590	-					mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	38	2680	-					mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	-					mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	-					mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	-					mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	-					mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	-					mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	-					mg/kg	0.01	A-T-022s

REPORT NOTES

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.
Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: RSK Environment Ltd Hemel, 18 Frogmore Road, Hemel Hempstead, Hertfordshire, UK, HP3 9RT

Project: Barnes Hospital

Clients Project No: 1920884

Project No: 19/11914

Date Received: 16/12/2019 (am)

Cool Box Temperatures (°C): 8.4, 8.5

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/11968
Issue Number: 1 **Date:** 03 January, 2020

Client:
RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Heshawa Abayatilaka/Nigel Austin/Ziaul Hoque
Project Name: Barnes Hospital
Project Ref: 1920884
Order No: N/A
Date Samples Received: 17/12/19
Date Instructions Received: 17/12/19
Date Analysis Completed: 03/01/20

Prepared by:

Sophie France
Admin Assistant

Approved by:

Iain Haslock
Analytical Consultant

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
% Stones >10mm$_A$	10.3	21.3	7.6	22.4	1.3			% w/w	0.1	A-T-044
pH$_D$$^{M\#}$	8.00	8.49	6.73	8.27	8.03			pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.04	<0.01	0.28	0.02	<0.01			g/l	0.01	A-T-026s
Sulphate (acid soluble)$_D$$^{M\#}$	430	390	1700	610	<200			mg/kg	200	A-T-028s
Total Organic Carbon$_D$$^{M\#}$	4.27	-	10.2	-	0.62			% w/w	0.03	A-T-032s
Arsenic$_D$$^{M\#}$	15	18	52	9	8			mg/kg	1	A-T-024s
Cadmium$_D$$^{M\#}$	0.5	0.6	1.5	<0.5	<0.5			mg/kg	0.5	A-T-024s
Copper$_D$$^{M\#}$	88	24	119	26	8			mg/kg	1	A-T-024s
Chromium$_D$$^{M\#}$	17	18	26	16	15			mg/kg	1	A-T-024s
Lead$_D$$^{M\#}$	295	78	268	323	32			mg/kg	1	A-T-024s
Mercury$_D$	1.61	0.31	0.84	0.53	<0.17			mg/kg	0.17	A-T-024s
Nickel$_D$$^{M\#}$	18	14	79	11	9			mg/kg	1	A-T-024s
Selenium$_D$$^{M\#}$	<1	<1	2	<1	<1			mg/kg	1	A-T-024s
Zinc$_D$$^{M\#}$	78	75	120	50	25			mg/kg	5	A-T-024s

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_D^{\#}$	NAD	NAD	NAD	NAD	-					A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	N/A	N/A	N/A	-					A-T-045

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.02	0.04	<0.01	0.02	<0.01			mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	0.07	0.04	<0.01	0.04	<0.01			mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	0.59	0.22	<0.02	0.09	0.02			mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	1.44	0.86	<0.04	0.55	0.10			mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	1.07	0.76	<0.04	0.62	0.11			mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	1.02	0.73	<0.05	0.57	0.11			mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.58	0.56	<0.05	0.40	0.09			mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.46	0.30	<0.07	0.22	<0.07			mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	1.21	0.79	<0.06	0.60	0.12			mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.17	0.11	<0.04	0.09	<0.04			mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	2.73	1.71	<0.08	1.09	0.20			mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	0.06	0.04	<0.01	0.02	<0.01			mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.78	0.67	<0.03	0.48	0.10			mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	0.03	<0.03	<0.03	<0.03			mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	1.08	0.72	0.08	0.41	0.10			mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	2.24	1.48	<0.07	0.95	0.18			mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	13.5	9.06	0.08	6.15	1.13			mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
VOC										
Dichlorodifluoromethane$_A$	-	<1	-	-	-			µg/kg	1	A-T-006s
Chloromethane$_A$	-	<10	-	-	-			µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene)$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Bromomethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Chloroethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Trichlorofluoromethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1-Dichloroethene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Carbon Disulphide$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Dichloromethane$_A$	-	<5	-	-	-			µg/kg	5	A-T-006s
trans 1,2-Dichloroethene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1-Dichloroethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
cis 1,2-Dichloroethene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
2,2-Dichloropropane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Bromochloromethane$_A^\#$	-	<5	-	-	-			µg/kg	5	A-T-006s
Chloroform$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1,1-Trichloroethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1-Dichloropropene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Carbon Tetrachloride$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2-Dichloroethane$_A^\#$	-	<2	-	-	-			µg/kg	2	A-T-006s
Benzene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Trichloroethene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2-Dichloropropane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Dibromomethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Bromodichloromethane$_A^\#$	-	<10	-	-	-			µg/kg	10	A-T-006s
cis 1,3-Dichloropropene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Toluene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
trans 1,3-Dichloropropene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1,2-Trichloroethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,3-Dichloropropane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Tetrachloroethene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Dibromochloromethane$_A^\#$	-	<3	-	-	-			µg/kg	3	A-T-006s
1,2-Dibromoethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
Chlorobenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane$_{A}$	-	<1	-	-	-			µg/kg	1	A-T-006s
Ethylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
m & p Xylene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
o-Xylene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
Styrene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
Bromoform$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
Isopropylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane$_{A}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2,3-Trichloropropane$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
Bromobenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
n-Propylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
2-Chlorotoluene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
4-Chlorotoluene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
tert-Butylbenzene$_{A}^{\#}$	-	<2	-	-	-			µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
sec-Butylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
4-Isopropyltoluene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,3-Dichlorobenzene$_{A}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,4-Dichlorobenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
n-Butylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2-Dichlorobenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP)$_{A}$	-	<2	-	-	-			µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene$_{A}$	-	<3	-	-	-			µg/kg	3	A-T-006s
Hexachlorobutadiene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene$_{A}$	-	<3	-	-	-			µg/kg	3	A-T-006s

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	1	<1	2	<1	<1			mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	1	<1	2	<1	<1			mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	1	2	10	<1	<1			mg/kg	1	A-T-055s
Ali >C21-C35$_A$	6	13	38	4	<1			mg/kg	1	A-T-055s
Total Aliphatics$_A$	10	15	52	4	<1			mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	4	3	3	2	<1			mg/kg	1	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1	2	<1	<1			mg/kg	1	A-T-055s
Aro >C12-C16$_A$	4	<1	7	2	<1			mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	14	8	43	15	1			mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	43	43	14	46	4			mg/kg	1	A-T-055s
Total Aromatics$_A$	64	54	68	65	6			mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	74	69	121	69	6			mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s

REPORT NOTES

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.
Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: RSK Environment Ltd Hemel, 18 Frogmore Road, Hemel Hempstead, Hertfordshire, UK, HP3 9RT

Project: Barnes Hospital

Clients Project No: 1920884

Project No: 19/11968

Date Received: 17/12/2019 (am)

Cool Box Temperatures (°C): 5.9 & 6.0

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT
SUPPLEMENT TO TEST REPORT 19/11968/1

Amendments: Request for Additional Analysis

Envirolab Job Number: 19/11968
Issue Number: 2 **Date:** 16 January, 2020

Client:
RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Heshawa Abayatilaka/Nigel Austin/Ziaul Hoque
Project Name: Barnes Hospital
Project Ref: 1920884
Order No: N/A
Date Samples Received: 17/12/19
Date Instructions Received: 17/12/19
Date Analysis Completed: 10/01/20

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
% Stones >10mm$_A$	10.3	21.3	7.6	22.4	1.3			% w/w	0.1	A-T-044
pH$_D^{M\#}$	8.00	8.49	6.73	8.27	8.03			pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.04	<0.01	0.28	0.02	<0.01			g/l	0.01	A-T-026s
Sulphate (acid soluble)$_D^{M\#}$	430	390	1700	610	<200			mg/kg	200	A-T-028s
Total Organic Carbon$_D^{M\#}$	4.27	-	10.2	-	0.62			% w/w	0.03	A-T-032s
Arsenic$_D^{M\#}$	15	18	52	9	8			mg/kg	1	A-T-024s
Cadmium$_D^{M\#}$	0.5	0.6	1.5	<0.5	<0.5			mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	88	24	119	26	8			mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	17	18	26	16	15			mg/kg	1	A-T-024s
Lead$_D^{M\#}$	295	78	268	323	32			mg/kg	1	A-T-024s
Mercury$_D$	1.61	0.31	0.84	0.53	<0.17			mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	18	14	79	11	9			mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	<1	<1	2	<1	<1			mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	78	75	120	50	25			mg/kg	5	A-T-024s
Leachate Prep BS EN 12457-2 (10:1)$_A$	*	-	*	*	-					A-T-001
Arsenic (leachable)$_A^{\#}$	7	-	5	14	-			µg/l	1	A-T-025w
Cadmium (leachable)$_A^{\#}$	<1	-	<1	<1	-			µg/l	1	A-T-025w
Copper (leachable)$_A^{\#}$	9	-	2	22	-			µg/l	1	A-T-025w
Chromium (leachable)$_A^{\#}$	<1	-	<1	7	-			µg/l	1	A-T-025w
Lead (leachable)$_A^{\#}$	35	-	1	92	-			µg/l	1	A-T-025w
Mercury (leachable)$_A^{\#}$	<0.1	-	<0.1	<0.1	-			µg/l	0.1	A-T-025w
Nickel (leachable)$_A^{\#}$	<1	-	2	2	-			µg/l	1	A-T-025w
Selenium (leachable)$_A^{\#}$	1	-	1	<1	-			µg/l	1	A-T-025w
Zinc (leachable)$_A^{\#}$	6	-	15	30	-			µg/l	1	A-T-025w

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_D^{\#}$	NAD	NAD	NAD	NAD	-					A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	N/A	N/A	N/A	-					A-T-045

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

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Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.02	0.04	<0.01	0.02	<0.01			mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	0.07	0.04	<0.01	0.04	<0.01			mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	0.59	0.22	<0.02	0.09	0.02			mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	1.44	0.86	<0.04	0.55	0.10			mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	1.07	0.76	<0.04	0.62	0.11			mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	1.02	0.73	<0.05	0.57	0.11			mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.58	0.56	<0.05	0.40	0.09			mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.46	0.30	<0.07	0.22	<0.07			mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	1.21	0.79	<0.06	0.60	0.12			mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.17	0.11	<0.04	0.09	<0.04			mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	2.73	1.71	<0.08	1.09	0.20			mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	0.06	0.04	<0.01	0.02	<0.01			mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.78	0.67	<0.03	0.48	0.10			mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	0.03	<0.03	<0.03	<0.03			mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	1.08	0.72	0.08	0.41	0.10			mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	2.24	1.48	<0.07	0.95	0.18			mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	13.5	9.06	0.08	6.15	1.13			mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
Speciated PCB-WHO12										
PCB BZ 81$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
PCB BZ 105$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
PCB BZ 114$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
PCB BZ 118$_A^{M\#}$	-	-	-	<0.007	-			mg/kg	0.007	A-T-004s
PCB BZ 123$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
PCB BZ 126$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
PCB BZ 156$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
PCB BZ 157$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
PCB BZ 167$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
PCB BZ 169$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
PCB BZ 189$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
PCB BZ 77$_A$	-	-	-	<0.005	-			mg/kg	0.005	A-T-004s
Total Speciated PCB-WHO12$_A$	-	-	-	<0.007	-			mg/kg	0.005	A-T-004s

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

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Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
VOC										
Dichlorodifluoromethane$_A$	-	<1	-	-	-			µg/kg	1	A-T-006s
Chloromethane$_A$	-	<10	-	-	-			µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene)$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Bromomethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Chloroethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Trichlorofluoromethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1-Dichloroethene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Carbon Disulphide$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Dichloromethane$_A$	-	<5	-	-	-			µg/kg	5	A-T-006s
trans 1,2-Dichloroethene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1-Dichloroethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
cis 1,2-Dichloroethene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
2,2-Dichloropropane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Bromochloromethane$_A^\#$	-	<5	-	-	-			µg/kg	5	A-T-006s
Chloroform$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1,1-Trichloroethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1-Dichloropropene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Carbon Tetrachloride$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2-Dichloroethane$_A^\#$	-	<2	-	-	-			µg/kg	2	A-T-006s
Benzene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Trichloroethene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2-Dichloropropane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Dibromomethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Bromodichloromethane$_A^\#$	-	<10	-	-	-			µg/kg	10	A-T-006s
cis 1,3-Dichloropropene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Toluene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
trans 1,3-Dichloropropene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1,2-Trichloroethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,3-Dichloropropane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Tetrachloroethene$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s
Dibromochloromethane$_A^\#$	-	<3	-	-	-			µg/kg	3	A-T-006s
1,2-Dibromoethane$_A^\#$	-	<1	-	-	-			µg/kg	1	A-T-006s

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
Chlorobenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane$_{A}$	-	<1	-	-	-			µg/kg	1	A-T-006s
Ethylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
m & p Xylene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
o-Xylene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
Styrene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
Bromoform$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
Isopropylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane$_{A}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2,3-Trichloropropane$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
Bromobenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
n-Propylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
2-Chlorotoluene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
4-Chlorotoluene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
tert-Butylbenzene$_{A}^{\#}$	-	<2	-	-	-			µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
sec-Butylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
4-Isopropyltoluene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,3-Dichlorobenzene$_{A}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,4-Dichlorobenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
n-Butylbenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2-Dichlorobenzene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP)$_{A}$	-	<2	-	-	-			µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene$_{A}$	-	<3	-	-	-			µg/kg	3	A-T-006s
Hexachlorobutadiene$_{A}^{\#}$	-	<1	-	-	-			µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene$_{A}$	-	<3	-	-	-			µg/kg	3	A-T-006s

Envirolab Job Number: 19/11968

Client Project Name: Barnes Hospital

Client Project Ref: 1920884

Lab Sample ID	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6			Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	N					
Client Sample ID	WS202	WS209	WS210	WS211	WS211					
Depth to Top	0.80	0.15	1.00	0.40	0.80					
Depth To Bottom										
Date Sampled	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4AB	4AB	4AE	4AB	4A					
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	1	<1	2	<1	<1			mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	1	<1	2	<1	<1			mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	1	2	10	<1	<1			mg/kg	1	A-T-055s
Ali >C21-C35$_A$	6	13	38	4	<1			mg/kg	1	A-T-055s
Total Aliphatics$_A$	10	15	52	4	<1			mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	4	3	3	2	<1			mg/kg	1	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1	2	<1	<1			mg/kg	1	A-T-055s
Aro >C12-C16$_A$	4	<1	7	2	<1			mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	14	8	43	15	1			mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	43	43	14	46	4			mg/kg	1	A-T-055s
Total Aromatics$_A$	64	54	68	65	6			mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	74	69	121	69	6			mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.05	<0.01	<0.01			mg/kg	0.01	A-T-022s

REPORT NOTES

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.
Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: RSK Environment Ltd Hemel, 18 Frogmore Road, Hemel Hempstead, Hertfordshire, UK, HP3 9RT

Project: Barnes Hospital

Clients Project No: 1920884

Project No: 19/11968

Date Received: 17/12/2019 (am)

Cool Box Temperatures (°C): 5.9 & 6.0

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 20/00001
Issue Number: 1 **Date:** 08 January, 2020

Client:
RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Ziaul Hoque
Project Name: Not specified
Project Ref: 1920986
Order No: N/A
Date Samples Received: 24/12/19
Date Instructions Received: 02/01/20
Date Analysis Completed: 07/01/20

Prepared by:

Sophie France
Admin Assistant

Approved by:

Danielle Brierley
Client Manager

Envirolab Job Number: 20/00001

Client Project Name: Not specified

Client Project Ref: 1920986

Lab Sample ID	20/00001/1							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS1									
Depth to Top	0.30									
Depth To Bottom										
Date Sampled	03-Dec-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_D^{\#}$	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A									A-T-045

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For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

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Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: RSK Environment Ltd Hemel, 18 Frogmore Road, Hemel Hempstead, Hertfordshire, UK, HP3 9RT

Project:

Clients Project No: 1920986

Project No: 20/00001

Date Received: 02/01/2020 (am)

Cool Box Temperatures (°C): 6.4

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

APPENDIX I
LABORATORY CERTIFICATES FOR GEOTECHNICAL ANALYSIS

STRUCTURAL SOILS LTD

TEST REPORT

Report No. 584180-01 (00) 1774

Date 21-January-2020 Contract Barnes Hospital (Plot A)

Client RSK
Address 18 Frogmore Rd
Apsley
Hemel Hempstead
Hertfordshire
HP3 9RT
For the Attention of Ziaul Hoque

Samples submitted by client	03-January-2020	Client Reference	1920844
Testing Started	03-January-2020	Client Order No.	n/a
Testing Completed	21-January-2020	Instruction Type	Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests

1.01	Moisture Content (oven drying method) BS1377:Part 2:1990:clause 3.2 (superseded)*
1.03	Liquid Limit (one point method) & Plastic Limit BS1377:Part 2:1990,clause 4.4/5.3 (superseded)*
1.10	Particle Size Distribution wet sieve method BS1377:Part 2:1990,clause 9.2 (superseded)*
1.13a	Particle Size Distribution sedimentation pipette method BS1377:Part 2: 1990,clause 9.4 (superseded)*
5.04	Undrained shear strength triaxial compression without pore pressure measurement (definitive method) 100mm diameter specimens BS1377:Part 7:1990,clause 8.4 (superseded)*

Undertaken by subcontractor

2.06	Sulphate content (acid extract) in accordance with BRE Special Digest 1:2005
2.04	Sulphate content (water extract) in accordance with BRE Special Digest 1:2005
2.07	pH value in accordance with BRE Special Digest 1:2005
2.05	Total sulphur in accordance with BRE Special Digest 1:2005

* This clause of BS1377 is no longer the most up to date method due to the publication of ISO17892

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of .
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

Structural Soils Ltd 18 Frogmore Rd Hemel Hempstead HP3 9RT Tel.01442 416661 e-mail dimitris.xirouchakis@soils.co.uk

TESTING VERIFICATION CERTIFICATE

1774

The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **21/01/2020 14:44:57**.

Testing reported after this date is not covered by this Verification Certificate.

Approved Signatory
Sharon Cairns (Laboratory Manager)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
Bedminster
Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
WF10 1NJ

Hemel Laboratory
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Tonbridge Laboratory
Anerley Court, Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU

STRUCTURAL SOILS LTD	Contract: **Barnes Hospital**	Job No: **584180**

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
BH01		B	9.50	32	71	33	38	100	Brown CLAY
BH01	13	U	10.50	29	73	30	43	100	Brown CLAY
BH01		B	11.00	32	71	32	39	98	Brown CLAY with occasional roots
BH01		B	12.50	28	71	33	38	100	Brown CLAY
BH01	17	U	13.50	26	71	31	40	100	Brown CLAY
BH01		B	15.50	28	71	27	44	99	Brown CLAY with occasional roots
BH01	21	U	16.50	23	69	30	39	100	Brown CLAY
BH01	25	U	19.50	25	72	29	43	100	Brown CLAY with occasional gravel

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
BH01		B	21.00	28	73	29	44	100	Brown CLAY with occasional gravel
BH01	33	U	25.50	26	70	34	36	100	Brown clayey SILT
BH02		B	8.00	30	71	33	38	91	Brown slightly sandy slightly gravelly silty CLAY
BH02	10	U	9.00	28	72	32	40	100	Brown slightly sandy silty CLAY
BH02	13	U	12.00	28	71	30	41	100	Brown CLAY with occasional shell fragments
BH02		B	12.45	32	68	32	36	85	Brown silty CLAY
BH02		B	14.00	34	71	32	39	100	Brown slightly gravelly slightly sandy silty CLAY
BH02	17	U	15.00	26	69	33	36	100	Brown silty CLAY

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
BH02	20	U	18.00	26	72	33	39	100	Brown CLAY with rare gravel
BH02		B	18.95	30	72	33	39	100	Brown CLAY with occasional gravel
BH03		B	7.00	36	72	32	40	98	Brown slightly gravelly silty CLAY
BH03	11	U	7.50	28	80	32	48	100	Grey mottled brown CLAY
BH03		B	10.00	37	68	31	37	100	Grey mottled brown slightly sandy silty CLAY
BH03	15	U	10.50	29	68	33	35	100	Brown clayey SILT
BH03		D							Brown slightly gravelly CLAY with one piece of cobble. SAMPLE DESCRIPTION ONLY
BH04		D	1.00	9.5	43	38	5	31	Brown gravelly clayey SAND

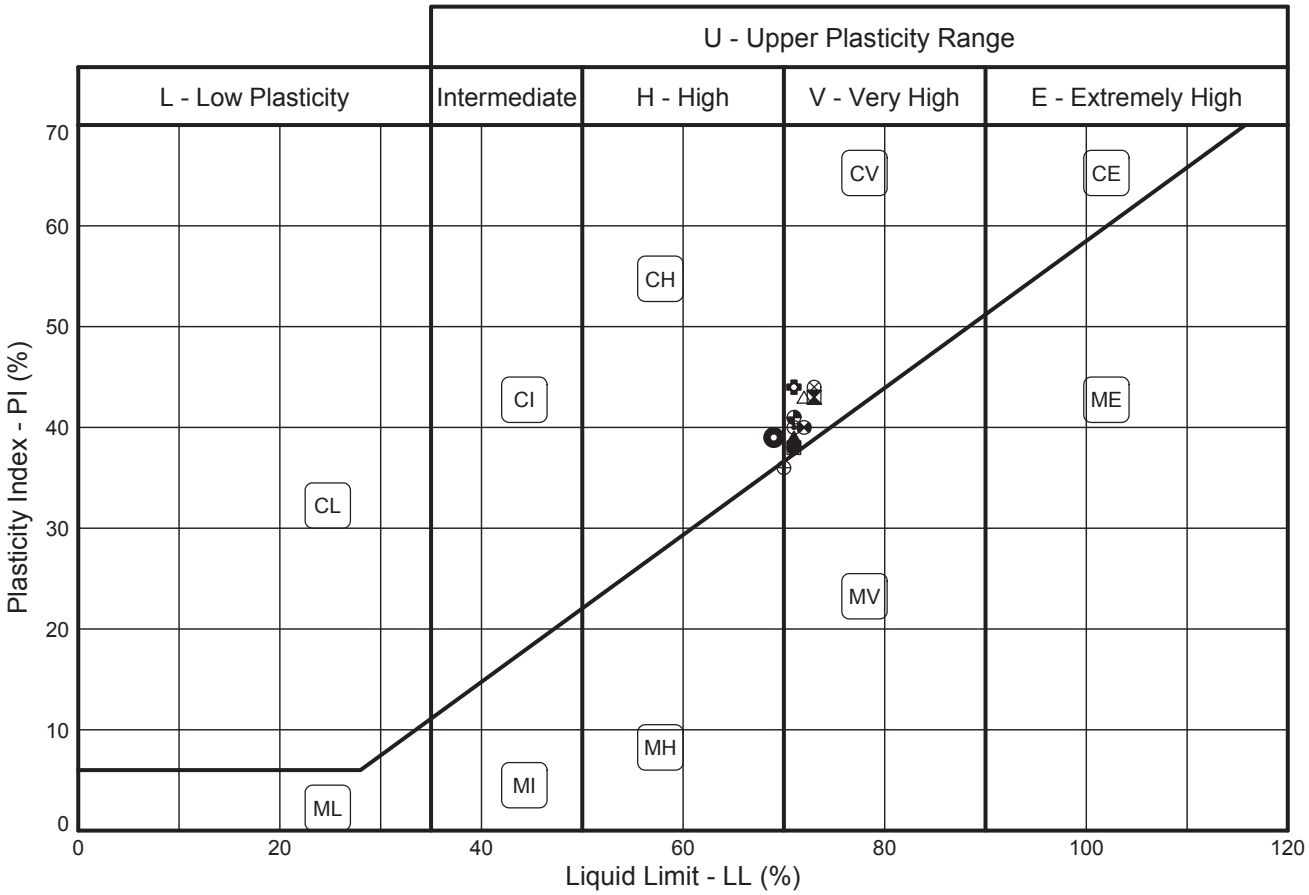
SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
BH04		D	8.00	33	78	38	40	99	Brown clayey SILT with occasional gravel
WS201	1	B	2.00	14	43	21	22	90	Brown mottled orangish brown and dark grey slightly sandy slightly gravelly silty CLAY

PLASTICITY CHART - PI Vs LL

In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990



Sample Identification				BS Test Method #	Preparation Method +	MC	LL	PL	PI	<425um	Lab location
	Exploratory Position ID	Sample	Depth (m)			%	%	%	%	%	
●	BH01	B	9.50	3.2/4.4/5.3/5.4	4.2.3	32	71	33	38	100	H
⊠	BH01	13U	10.50	3.2/4.4/5.3/5.4	4.2.3	29	73	30	43	100	H
▲	BH01	B	11.00	3.2/4.4/5.3/5.4	4.2.4	32	71	32	39	98	H
★	BH01	B	12.50	3.2/4.4/5.3/5.4	4.2.3	28	71	33	38	100	H
⊙	BH01	17U	13.50	3.2/4.4/5.3/5.4	4.2.3	26	71	31	40	100	H
✿	BH01	17U	13.50	3.2/4.4/5.3/5.4	4.2.4	28	71	27	44	99	H
◉	BH01	21U	16.50	3.2/4.4/5.3/5.4	4.2.3	23	69	30	39	100	H
△	BH01	25U	19.50	3.2/4.4/5.3/5.4	4.2.3	25	72	29	43	100	H
⊗	BH01	B	21.00	3.2/4.4/5.3/5.4	4.2.3	28	73	29	44	100	H
⊕	BH01	33U	25.50	3.2/4.4/5.3/5.4	4.2.4	26	70	34	36	100	H
□	BH02	B	8.00	3.2/4.4/5.3/5.4	4.2.4	30	71	33	38	91	H
⊛	BH02	10U	9.00	3.2/4.4/5.3/5.4	4.2.3	28	72	32	40	100	H
✚	BH02	13U	12.00	3.2/4.4/5.3/5.4	4.2.4	28	71	30	41	100	H

Tested in accordance with the following clauses of BS1377-2:1990.

3.2 - Moisture Content
4.3 - Cone Penetrometer Method
4.4 - One Point Cone Penetrometer Method
4.6 - One Point Casagrande Method
5.3 - Plastic Limit Method
5.4 - Plasticity Index

+ Tested in accordance with the following clauses of BS1377-2:1990.

4.2.3 - Natural State
4.2.4 - Wet Sieved

Key: * = Non-standard test, NP = Non plastic.

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

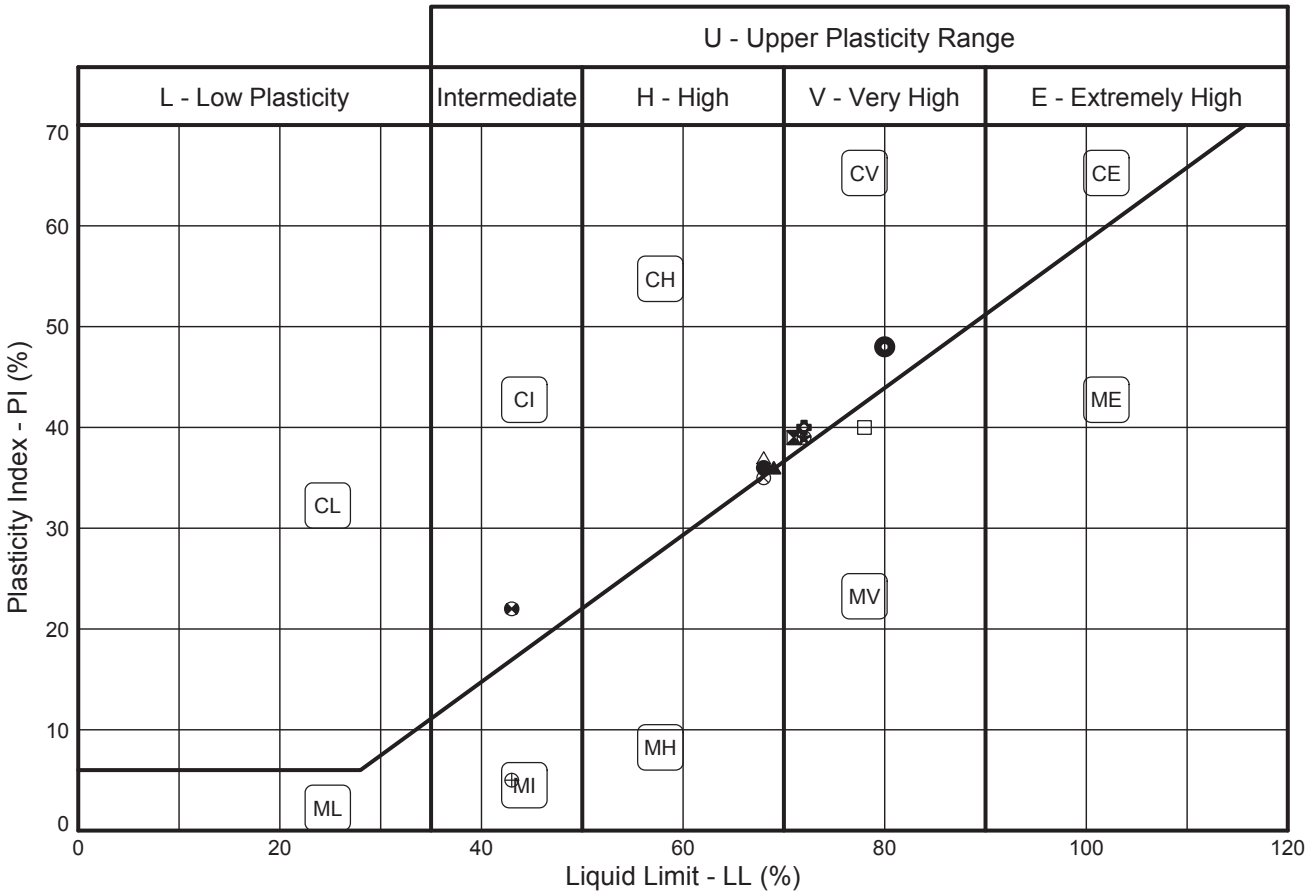
Compiled By		Date
SC	SHARON CAIRNS	21/01/20

Contract	Contract Ref:
Barnes Hospital	584180

AGS

PLASTICITY CHART - PI Vs LL

In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990



Sample Identification				BS Test Method #	Preparation Method +	MC	LL	PL	PI	<425um	Lab location	
	Exploratory Position ID	Sample	Depth (m)			%	%	%	%	%		
●	BH02	B	12.45	3.2/4.4/5.3/5.4	4.2.4	32	68	32	36	85	H	
⊠	BH02	B	14.00	3.2/4.4/5.3/5.4	4.2.4	34	71	32	39	100	H	
▲	BH02	17U	15.00	3.2/4.4/5.3/5.4	4.2.3	26	69	33	36	100	H	
★	BH02	20U	18.00	3.2/4.4/5.3/5.4	4.2.4	26	72	33	39	100	H	
⊙	BH02	B	18.95	3.2/4.4/5.3/5.4	4.2.4	30	72	33	39	100	H	
✿	BH03	B	7.00	3.2/4.4/5.3/5.4	4.2.4	36	72	32	40	98	H	
●	BH03	11U	7.50	3.2/4.4/5.3/5.4	4.2.3	28	80	32	48	100	H	
△	BH03	B	10.00	3.2/4.4/5.3/5.4	4.2.4	37	68	31	37	100	H	
⊗	BH03	15U	10.50	3.2/4.4/5.3/5.4	4.2.3	29	68	33	35	100	H	
⊕	BH04	D	1.00	3.2/4.4/5.3/5.4	4.2.4	9.5	43	38	5	31	H	
□	BH04	D	8.00	3.2/4.4/5.3/5.4	4.2.4	33	78	38	40	99	H	
⊛	WS201	1B	2.00	3.2/4.4/5.3/5.4	4.2.4	14	43	21	22	90	H	

Tested in accordance with the following clauses of BS1377-2:1990.

3.2 - Moisture Content
4.3 - Cone Penetrometer Method
4.4 - One Point Cone Penetrometer Method
4.6 - One Point Casagrande Method
5.3 - Plastic Limit Method
5.4 - Plasticity Index

+ Tested in accordance with the following clauses of BS1377-2:1990.

4.2.3 - Natural State
4.2.4 - Wet Sieved

Key: * = Non-standard test, NP = Non plastic.

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date
SC	SHARON CAIRNS	21/01/20

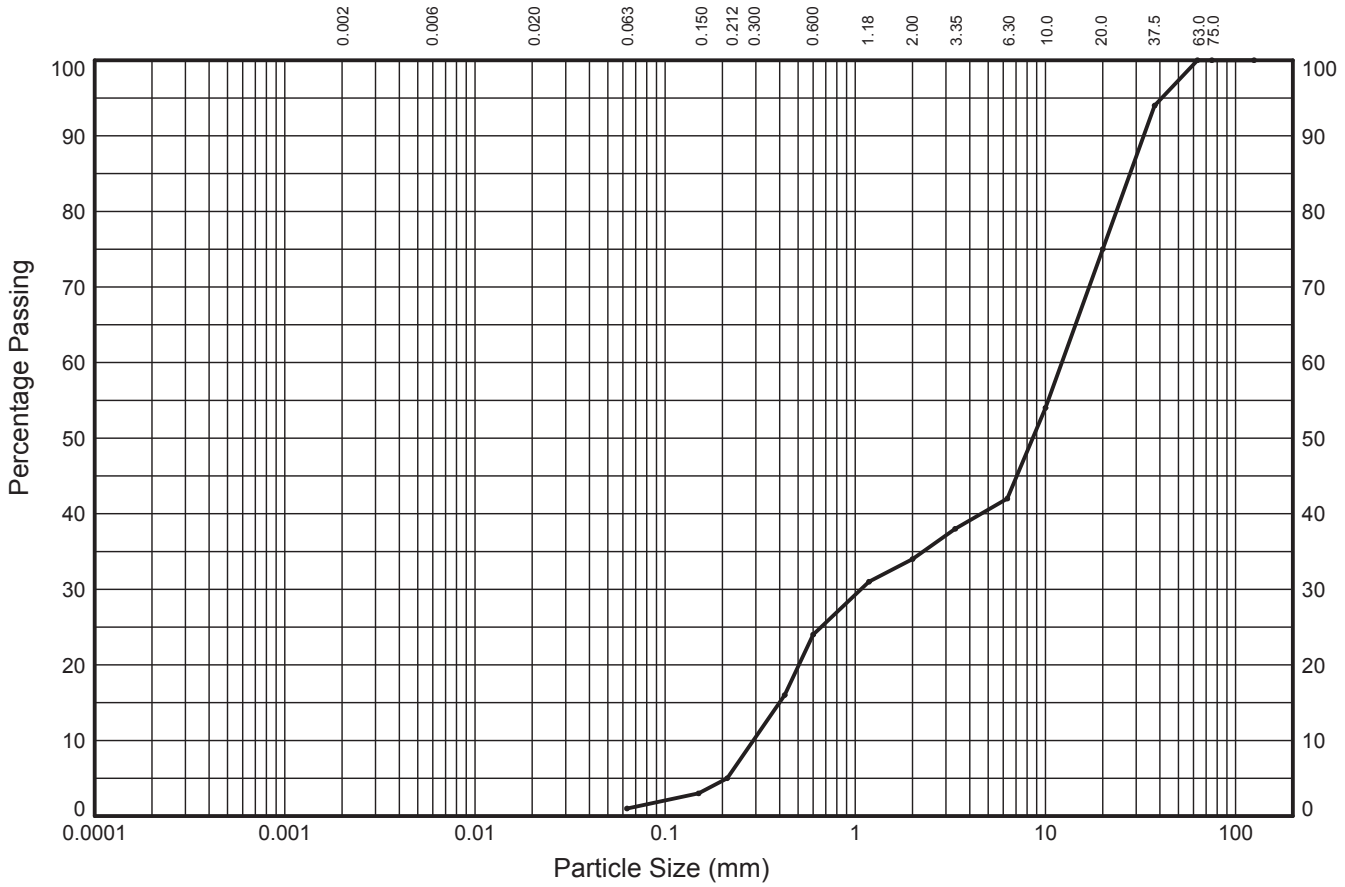
Contract	Contract Ref:
Barnes Hospital	584180

AGS

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH01** Sample Ref: **11** Sample Type: **B** Depth (m): **2.00**



CLAY										
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	4%	20%	10%	8%	33%	25%	
	SILT			SAND			GRAVEL			
1%				33%			66%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**94**
20.0	**75**
10.0	**54**
6.30	**42**
3.35	**38**
2.00	**34**
1.18	**31**
0.600	**24**
0.425	**16**
0.212	**5**
0.150	**3**
0.063	**1**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.291**
D_{15} (mm)	**0.399**
D_{30} (mm)	**1.071**
D_{50} (mm)	**8.573**
D_{60} (mm)	**12.190**
D_{85} (mm)	**27.843**
D_{90} (mm)	**32.852**
C_U	**42**
C_C	**0.32**

Soil Description:

Brown mottled grey, white and pale yellow very sandy slightly clayey GRAVEL

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

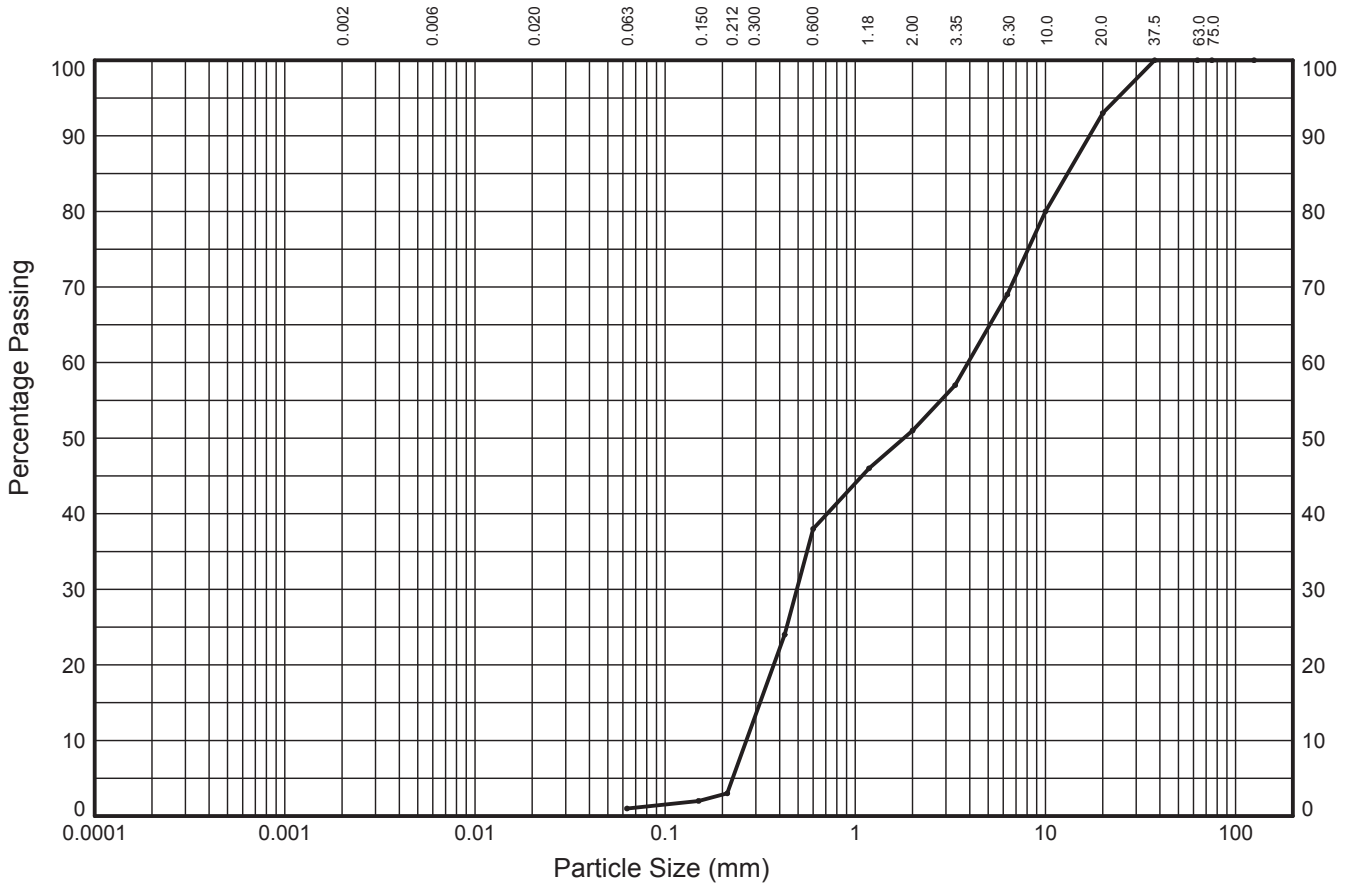
Compiled By	Date
SHARON CAIRNS	21/01/20

Contract	Contract Ref:
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH01** Sample Ref: **15** Sample Type: **B** Depth (m): **4.00**



CLAY										
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	2%	36%	13%	18%	24%	7%	
	SILT			SAND			GRAVEL			
1%				50%			49%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**93**
10.0	**80**
6.30	**69**
3.35	**57**
2.00	**51**
1.18	**46**
0.600	**38**
0.425	**24**
0.212	**3**
0.150	**2**
0.063	**1**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.267**
D_{15} (mm)	**0.315**
D_{30} (mm)	**0.493**
D_{50} (mm)	**1.800**
D_{60} (mm)	**3.923**
D_{85} (mm)	**13.055**
D_{90} (mm)	**17.044**
C_U	**15**
C_C	**0.23**

Soil Description:

Brown very sandy slightly clayey GRAVEL

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

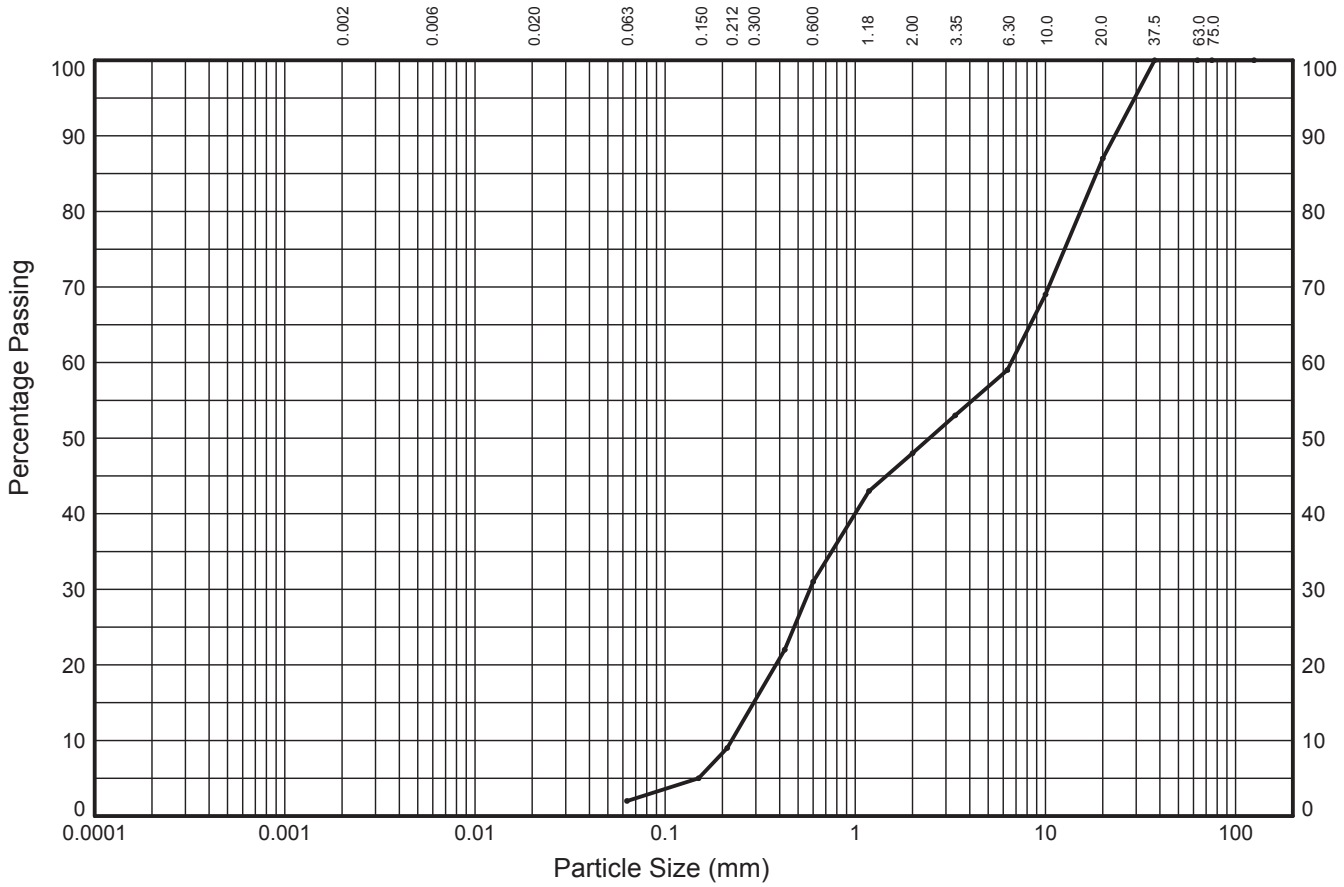
Compiled By	Date
SHARON CAIRNS	21/01/20

Contract	Contract Ref:
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH01** Sample Ref: **-** Sample Type: **B** Depth (m): **7.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	6%	23%	16%	11%	28%	13%	
	SILT			SAND			GRAVEL			
2%				46%			52%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**87**
10.0	**69**
6.30	**59**
3.35	**53**
2.00	**48**
1.18	**43**
0.600	**31**
0.425	**22**
0.212	**9**
0.150	**5**
0.063	**2**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.224**
D_{15} (mm)	**0.292**
D_{30} (mm)	**0.577**
D_{50} (mm)	**2.458**
D_{60} (mm)	**6.598**
D_{85} (mm)	**18.517**
D_{90} (mm)	**23.122**
C_U	**30**
C_C	**0.23**

Soil Description:

Brown very sandy slightly clayey GRAVEL

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

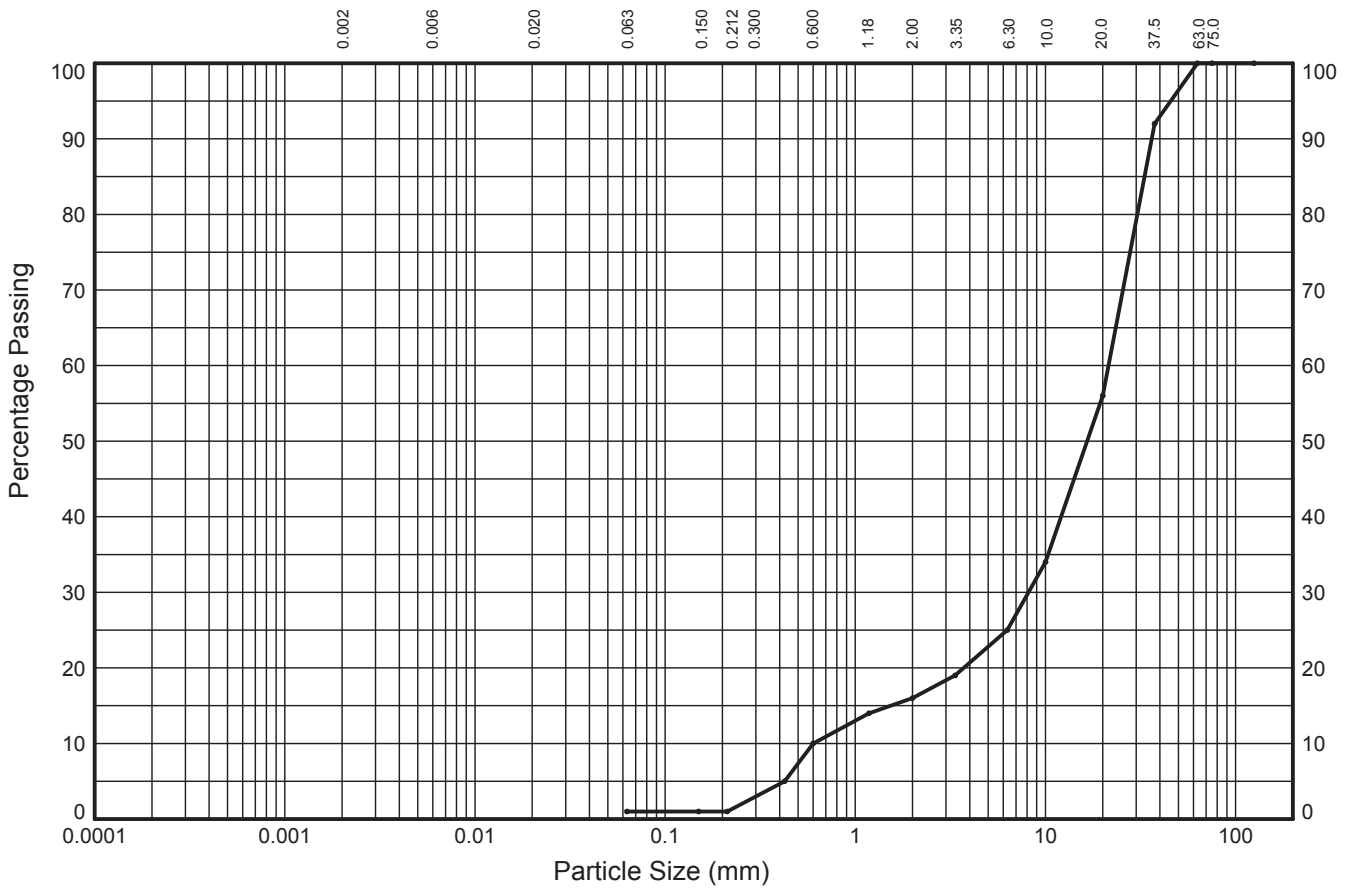
Compiled By		Date
SC	**SHARON CAIRNS**	**21/01/20**

Contract	Contract Ref:
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH02** Sample Ref: **-** Sample Type: **B** Depth (m): **2.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	0%	9%	6%	9%	31%	44%	
	SILT			SAND			GRAVEL			
1%				15%			84%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**92**
20.0	**56**
10.0	**34**
6.30	**25**
3.35	**19**
2.00	**16**
1.18	**14**
0.600	**10**
0.425	**5**
0.212	**1**
0.150	**1**
0.063	**1**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.600**
D_{15} (mm)	**1.536**
D_{30} (mm)	**8.144**
D_{50} (mm)	**16.555**
D_{60} (mm)	**21.447**
D_{85} (mm)	**33.185**
D_{90} (mm)	**36.213**
C_U	**36**
C_C	**5**

Soil Description:

Brown sandy slightly clayey GRAVEL

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

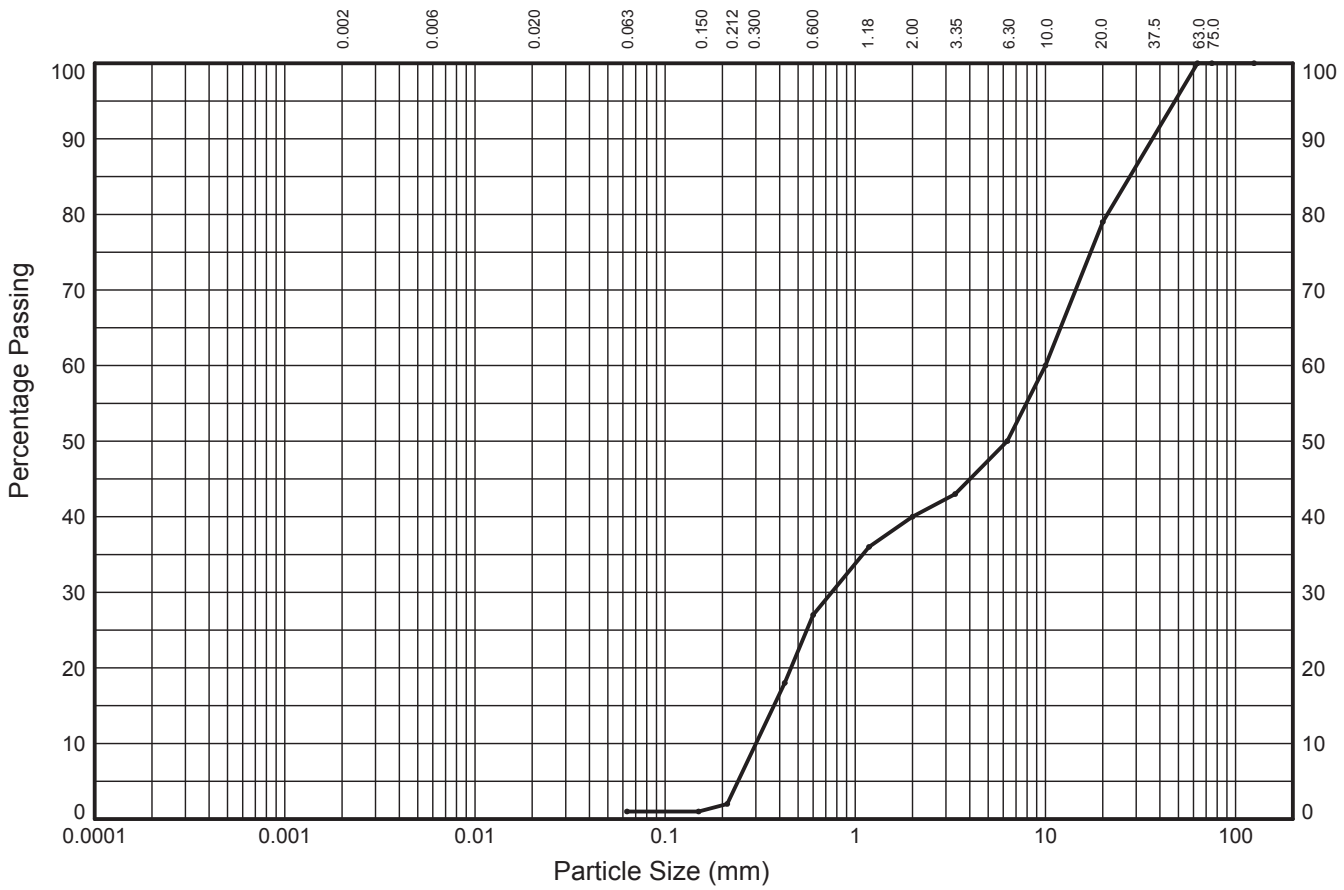
Compiled By		Date
SC	**SHARON CAIRNS**	**21/01/20**

Contract	Contract Ref:
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH02** Sample Ref: **-** Sample Type: **B** Depth (m): **4.00**



CLAY										
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	1%	26%	13%	10%	29%	21%	
	SILT			SAND			GRAVEL			
1%				39%			60%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	
20.0	**79**
10.0	**60**
6.30	**50**
3.35	**43**
2.00	**40**
1.18	**36**
0.600	**27**
0.425	**18**
0.212	**2**
0.150	**1**
0.063	**1**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.300**
D_{15} (mm)	**0.373**
D_{30} (mm)	**0.752**
D_{50} (mm)	**6.300**
D_{60} (mm)	**10.000**
D_{85} (mm)	**27.759**
D_{90} (mm)	**36.480**
C_U	**33**
C_C	**0.19**

Soil Description:

Brown very sandy slightly clayey GRAVEL

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

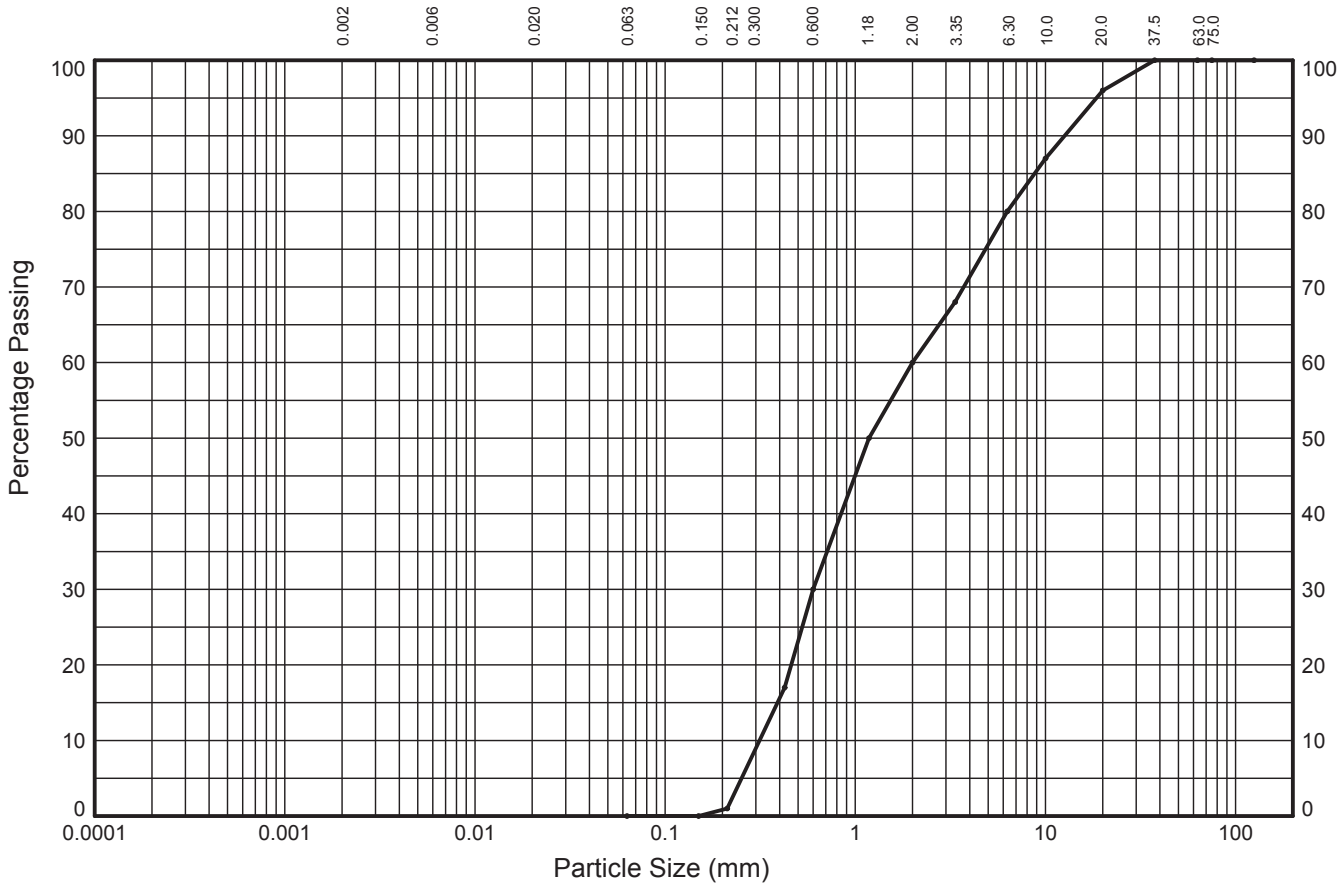
Compiled By		Date
SC	**SHARON CAIRNS**	**21/01/20**

Contract	Contract Ref:
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH02** Sample Ref: **-** Sample Type: **B** Depth (m): **6.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	1%	30%	29%	20%	16%	4%	
	SILT			SAND			GRAVEL			
0%				60%			40%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**96**
10.0	**87**
6.30	**80**
3.35	**68**
2.00	**60**
1.18	**50**
0.600	**30**
0.425	**17**
0.212	**1**
0.150	**0**
0.063	**0**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.314**
D_{15} (mm)	**0.390**
D_{30} (mm)	**0.600**
D_{50} (mm)	**1.180**
D_{60} (mm)	**2.000**
D_{85} (mm)	**8.763**
D_{90} (mm)	**12.599**
C_U	**6.4**
C_C	**0.57**

Soil Description:

Brown very gravelly SAND

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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18 Frogmore Road
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Hertfordshire
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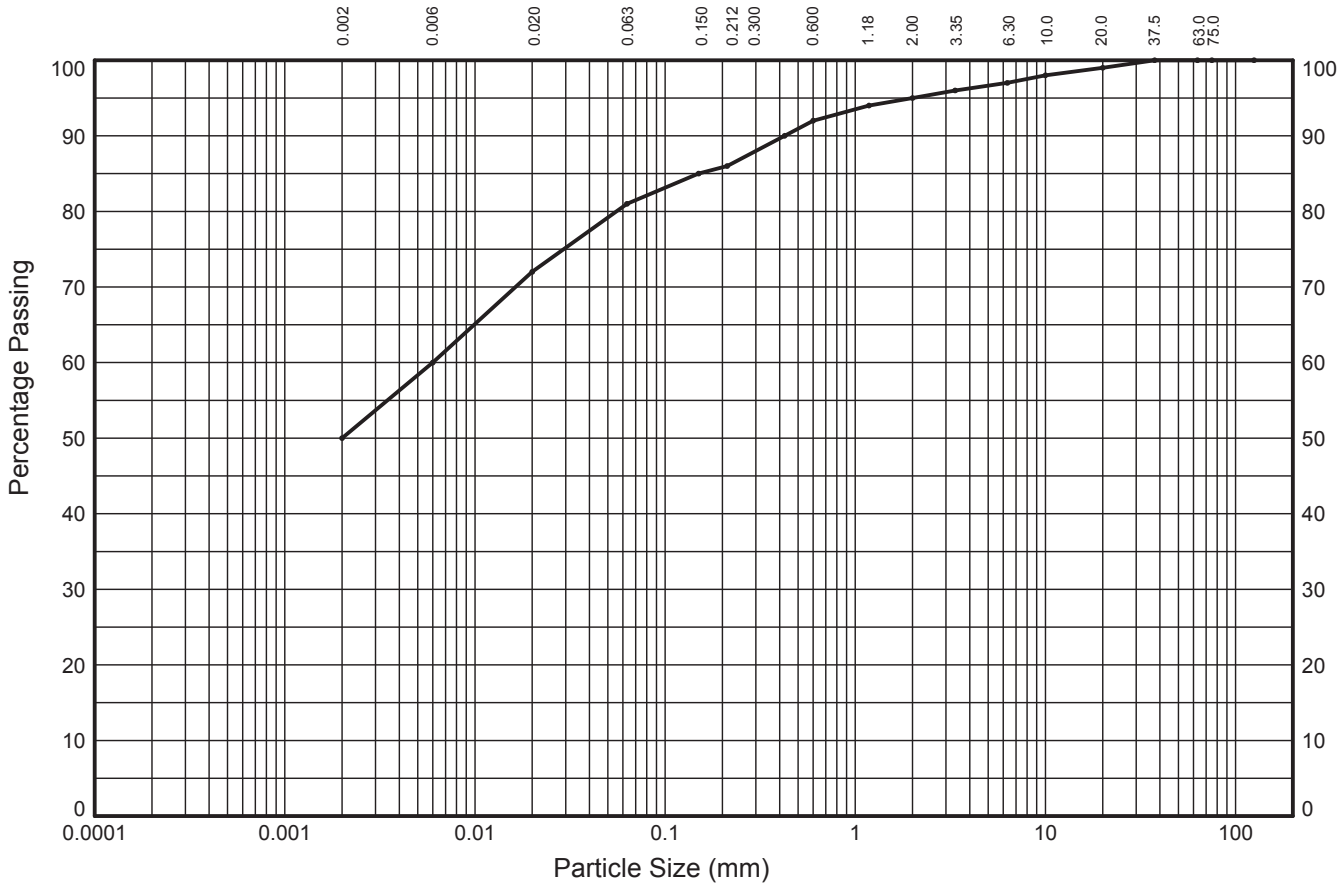
Compiled By		Date
SC	**SHARON CAIRNS**	**21/01/20**

Contract	Contract Ref:
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.4 of BS1377:Part 2:1990

Borehole: **BH02** Sample Ref: **-** Sample Type: **B** Depth (m): **8.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	10%	12%	9%	5%	6%	3%	2%	2%	1%	
	SILT			SAND			GRAVEL			
50%	31%			14%			5%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**99**
10.0	**98**
6.30	**97**
3.35	**96**
2.00	**95**
1.18	**94**
0.600	**92**
0.425	**90**
0.212	**86**
0.150	**85**
0.063	**81**

Particle Diameter (mm)	Percent Passing (%)
0.02	**72**
0.006	**60**
0.002	**50**

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**NA**
D_{15} (mm)	**NA**
D_{30} (mm)	**NA**
D_{50} (mm)	**0.002**
D_{60} (mm)	**0.006**
D_{85} (mm)	**0.150**
D_{90} (mm)	**0.425**
C_U	**NA**
C_C	**NA**

Soil Description:

Brown slightly sandy slightly gravelly silty CLAY

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

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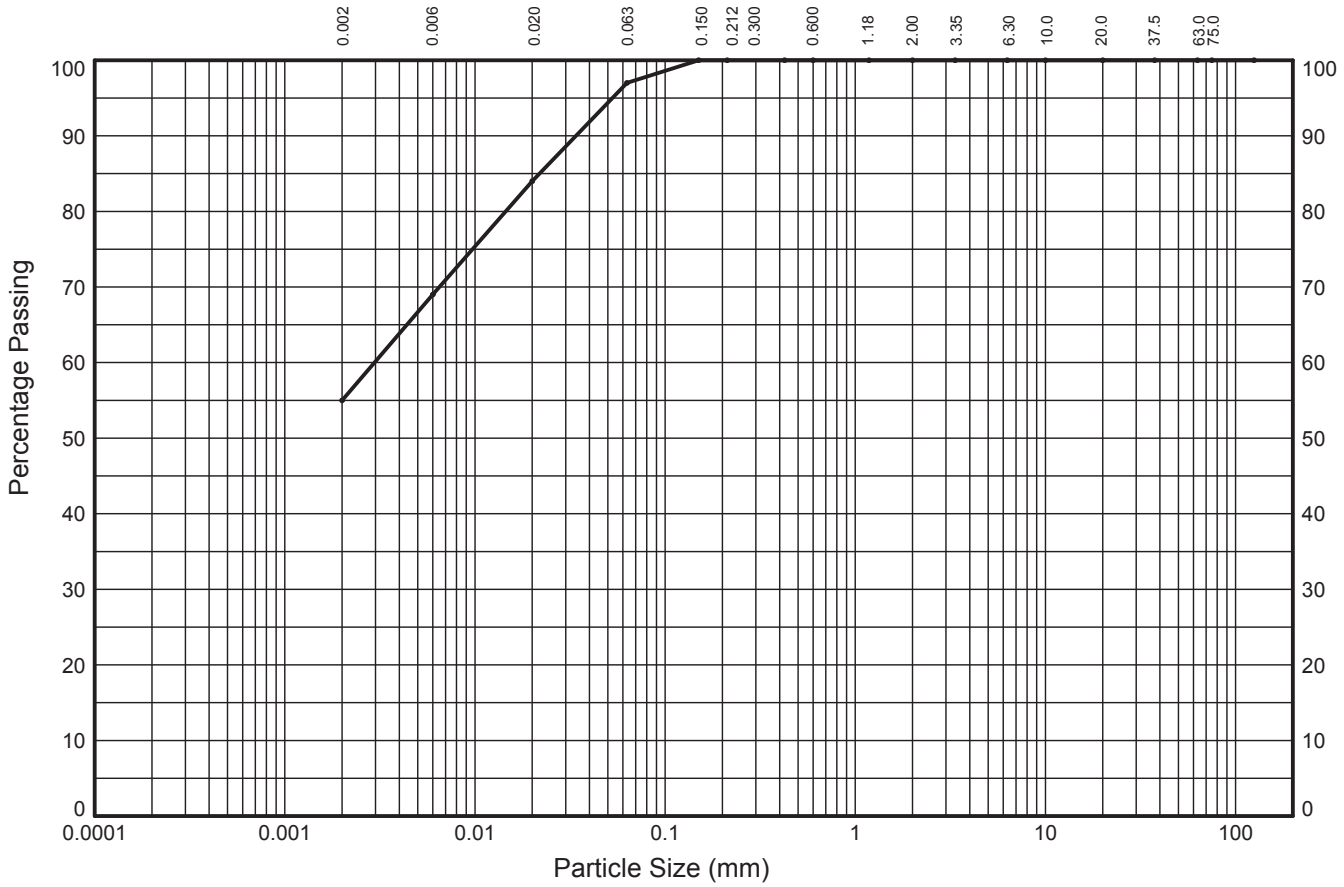
SC	**SHARON CAIRNS**	**21/01/20**

Contract	Contract Ref:
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.4 of BS1377:Part 2:1990

Borehole: **BH02** Sample Ref: **10** Sample Type: **U** Depth (m): **9.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	14%	15%	13%	3%	0%	0%	0%	0%	0%	
	SILT			SAND			GRAVEL			
55%	42%			3%			0%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**100**
10.0	**100**
6.30	**100**
3.35	**100**
2.00	**100**
1.18	**100**
0.600	**100**
0.425	**100**
0.212	**100**
0.150	**100**
0.063	**97**

Particle Diameter (mm)	Percent Passing (%)
0.02	**84**
0.006	**69**
0.002	**55**

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**NA**
D_{15} (mm)	**NA**
D_{30} (mm)	**NA**
D_{50} (mm)	**NA**
D_{60} (mm)	**0.003**
D_{85} (mm)	**0.022**
D_{90} (mm)	**0.034**
C_U	**NA**
C_C	**NA**

Soil Description:

Brown slightly sandy silty CLAY

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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Hemel Hempstead
Hertfordshire
HP3 9RT

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SC	**SHARON CAIRNS**	**21/01/20**

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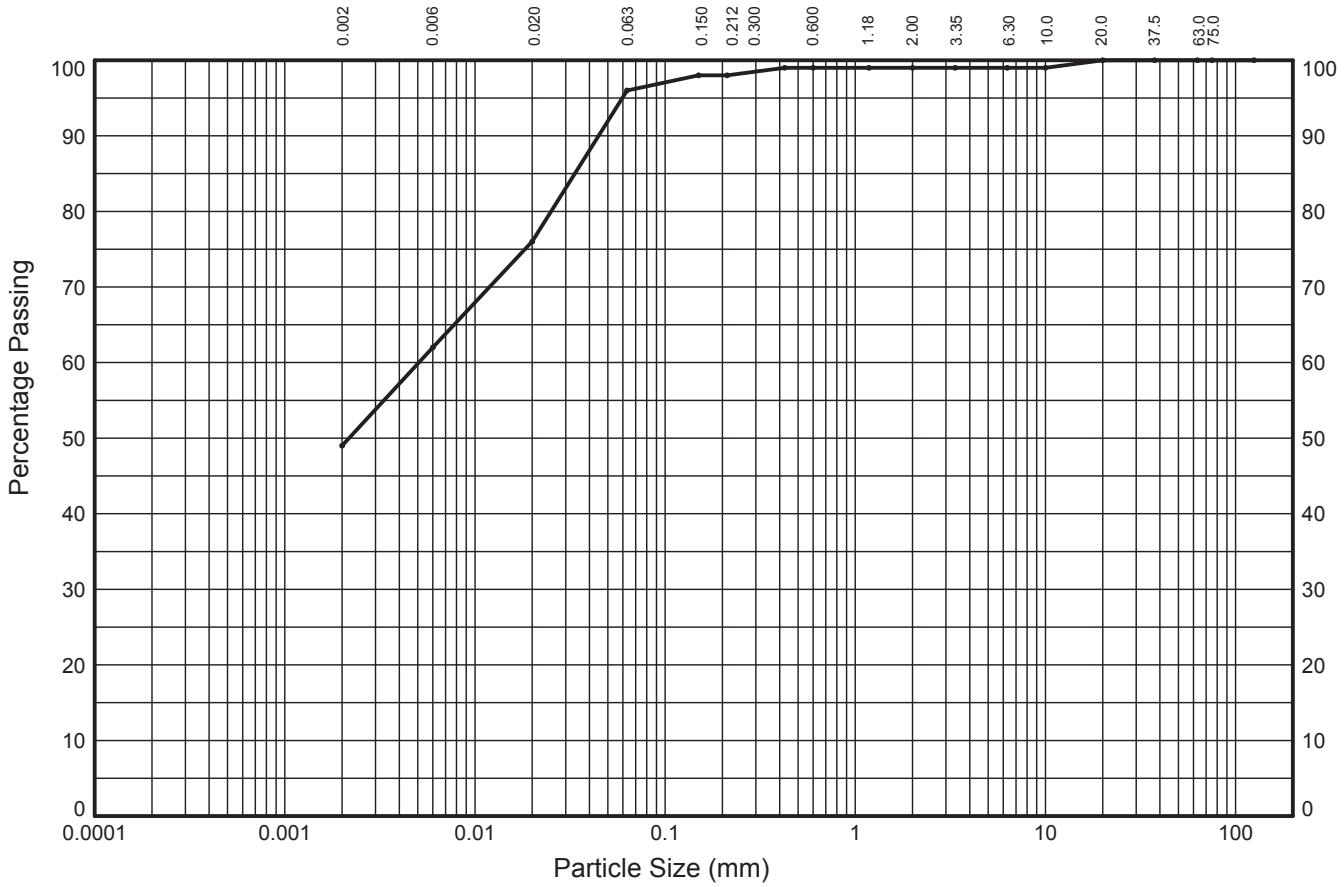
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.4 of BS1377:Part 2:1990

Borehole: **BH02** Sample Ref: **-** Sample Type: **B** Depth (m): **14.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	13%	14%	20%	2%	1%	0%	0%	1%	0%	
	SILT			SAND			GRAVEL			
49%	47%			3%			1%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**100**
10.0	**99**
6.30	**99**
3.35	**99**
2.00	**99**
1.18	**99**
0.600	**99**
0.425	**99**
0.212	**98**
0.150	**98**
0.063	**96**

Particle Diameter (mm)	Percent Passing (%)
0.02	**76**
0.006	**62**
0.002	**49**

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**NA**
D_{15} (mm)	**NA**
D_{30} (mm)	**NA**
D_{50} (mm)	**0.002**
D_{60} (mm)	**0.005**
D_{85} (mm)	**0.034**
D_{90} (mm)	**0.045**
C_U	**NA**
C_C	**NA**

Soil Description:

Brown slightly gravelly slightly sandy silty CLAY

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

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SC	**SHARON CAIRNS**	**21/01/20**

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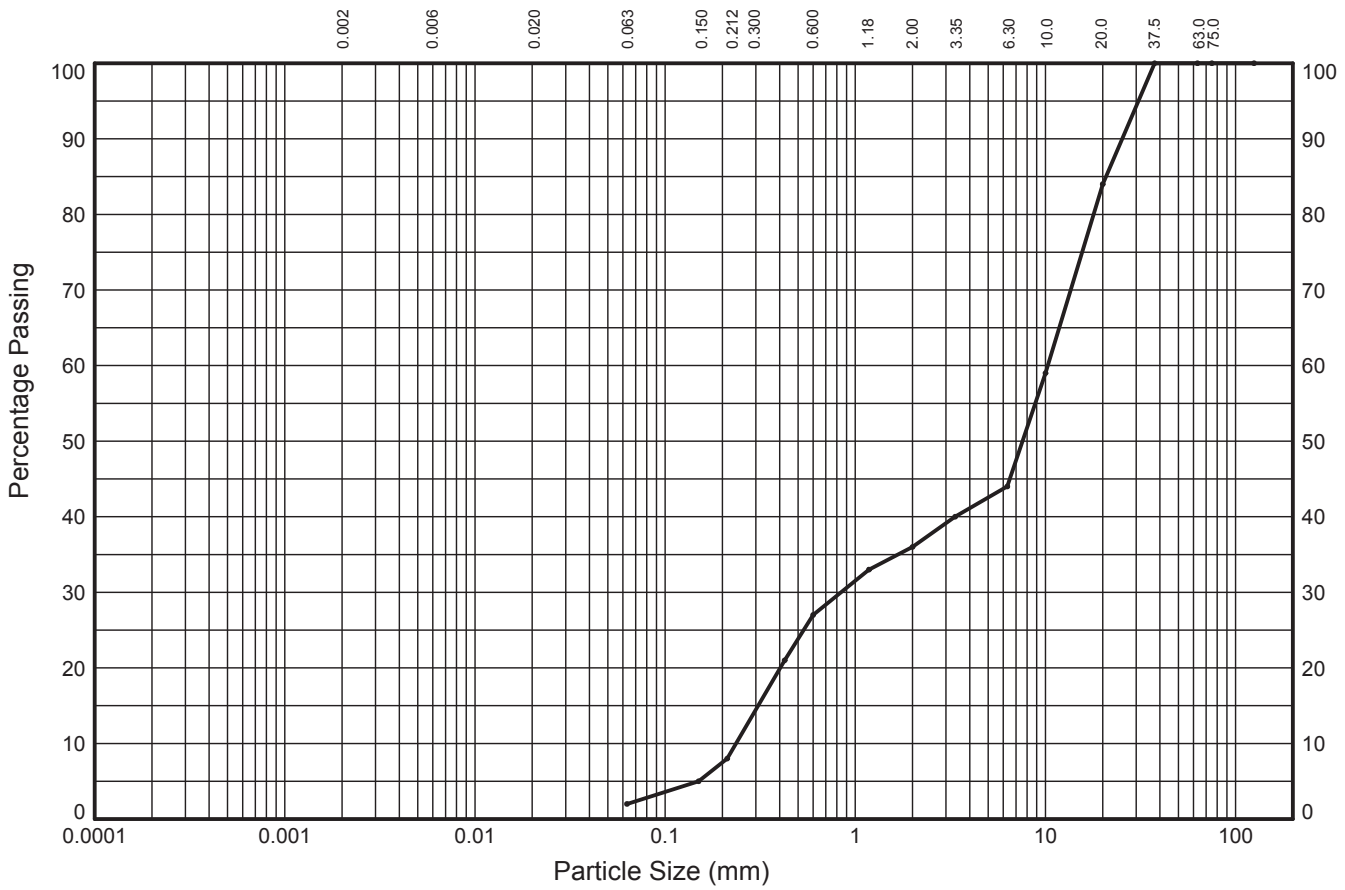
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH03** Sample Ref: **-** Sample Type: **B** Depth (m): **3.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	5%	20%	9%	8%	40%	16%	
	SILT			SAND			GRAVEL			
2%				34%			64%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**84**
10.0	**59**
6.30	**44**
3.35	**40**
2.00	**36**
1.18	**33**
0.600	**27**
0.425	**21**
0.212	**8**
0.150	**5**
0.063	**2**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.236**
D_{15} (mm)	**0.308**
D_{30} (mm)	**0.841**
D_{50} (mm)	**7.579**
D_{60} (mm)	**10.281**
D_{85} (mm)	**20.801**
D_{90} (mm)	**25.317**
C_U	**44**
C_C	**0.29**

Soil Description:

Brown very sandy slightly clayey GRAVEL

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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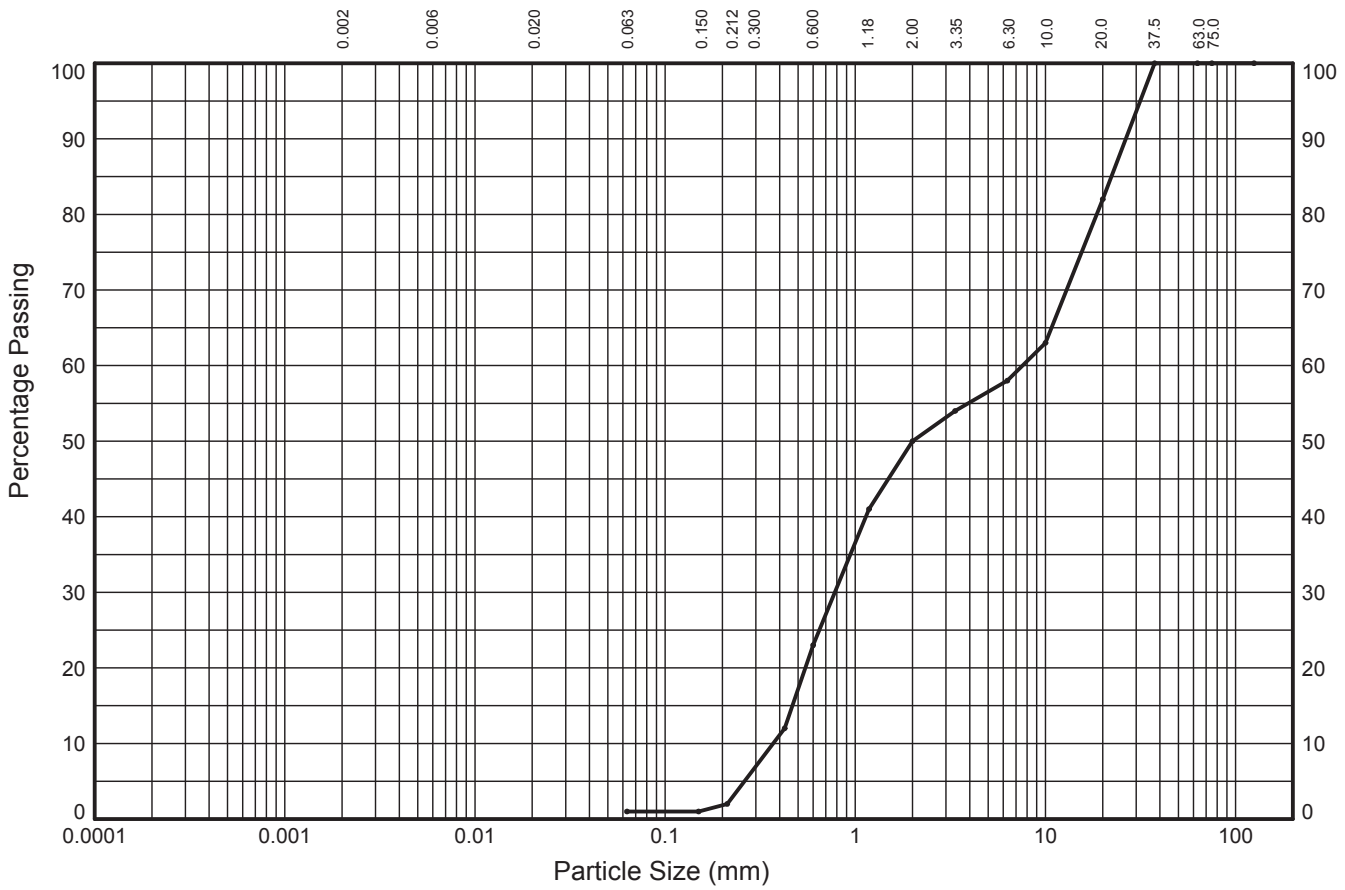
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH03** Sample Ref: **-** Sample Type: **B** Depth (m): **5.00**



CLAY										
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	1%	22%	26%	8%	24%	18%	
	SILT			SAND			GRAVEL			
1%				49%			50%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**82**
10.0	**63**
6.30	**58**
3.35	**54**
2.00	**50**
1.18	**41**
0.600	**23**
0.425	**12**
0.212	**2**
0.150	**1**
0.063	**1**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.370**
D_{15} (mm)	**0.467**
D_{30} (mm)	**0.781**
D_{50} (mm)	**2.000**
D_{60} (mm)	**7.579**
D_{85} (mm)	**22.209**
D_{90} (mm)	**26.446**
C_U	**20**
C_C	**0.22**

Soil Description:

Brown very sandy slightly clayey GRAVEL

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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Hertfordshire
HP3 9RT

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SC	**SHARON CAIRNS**	**21/01/20**

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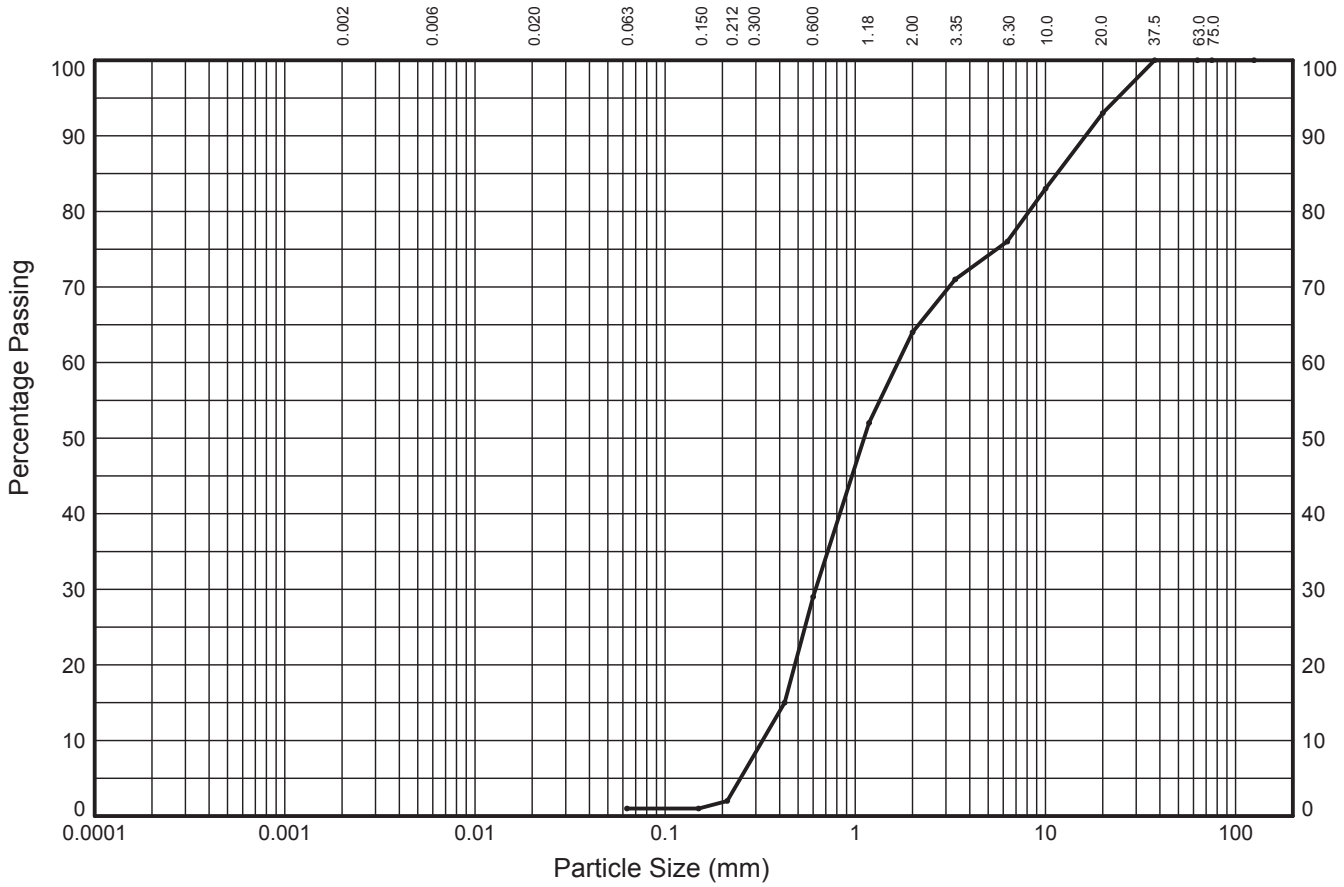
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH03** Sample Ref: **-** Sample Type: **B** Depth (m): **6.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	1%	28%	34%	12%	17%	7%	
	SILT			SAND			GRAVEL			
1%				63%			36%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**93**
10.0	**83**
6.30	**76**
3.35	**71**
2.00	**64**
1.18	**52**
0.600	**29**
0.425	**15**
0.212	**2**
0.150	**1**
0.063	**1**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.325**
D_{15} (mm)	**0.425**
D_{30} (mm)	**0.618**
D_{50} (mm)	**1.113**
D_{60} (mm)	**1.677**
D_{85} (mm)	**11.487**
D_{90} (mm)	**16.245**
C_U	**5.2**
C_C	**0.70**

Soil Description:

Brown very gravelly slightly clayey SAND

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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HP3 9RT

Compiled By		Date
SC	**SHARON CAIRNS**	**21/01/20**

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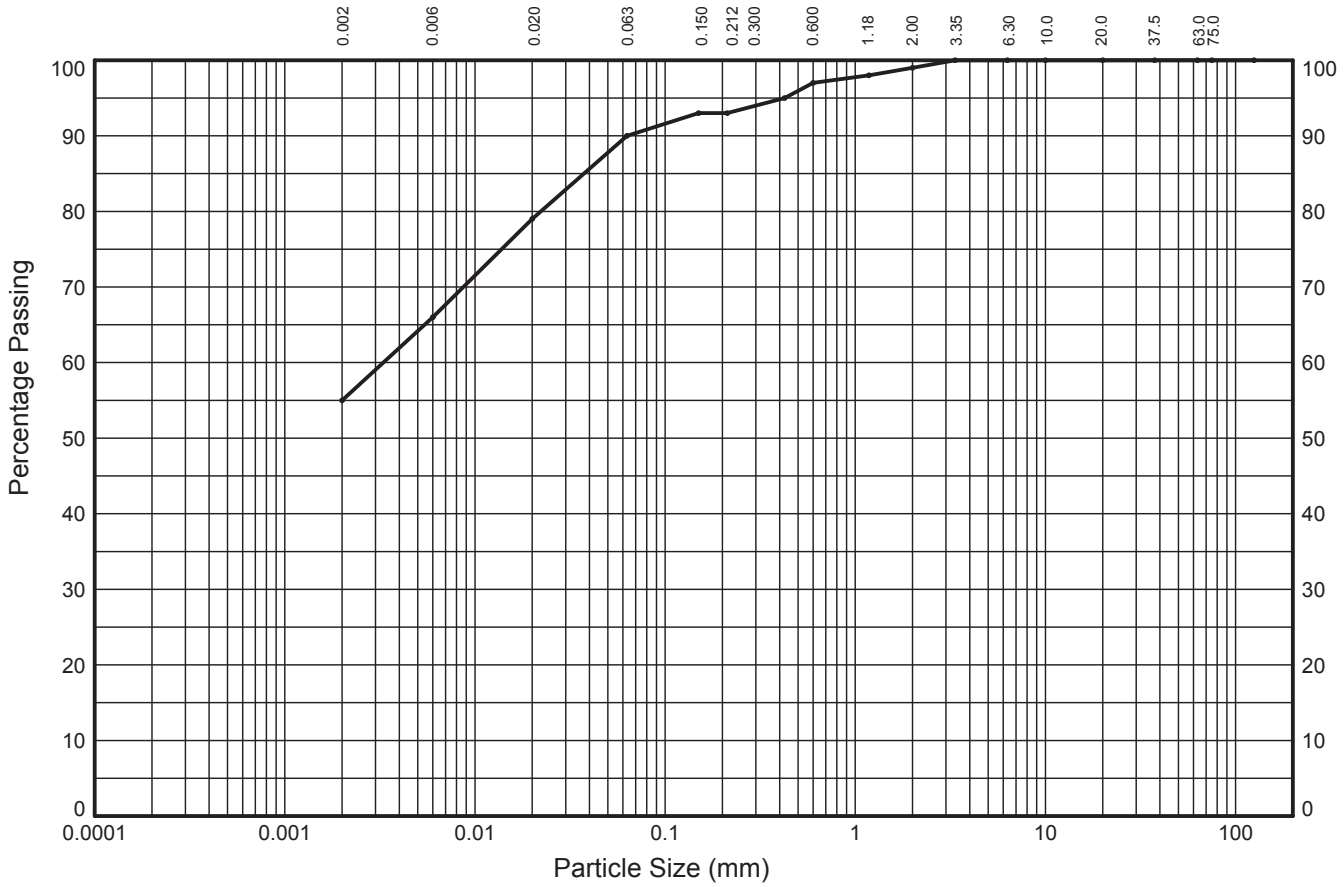
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.4 of BS1377:Part 2:1990

Borehole: **BH03** Sample Ref: **-** Sample Type: **B** Depth (m): **7.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	11%	13%	11%	3%	4%	2%	1%	0%	0%	
	SILT			SAND			GRAVEL			
55%	35%			9%			1%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**100**
10.0	**100**
6.30	**100**
3.35	**100**
2.00	**99**
1.18	**98**
0.600	**97**
0.425	**95**
0.212	**93**
0.150	**93**
0.063	**90**

Particle Diameter (mm)	Percent Passing (%)
0.02	**79**
0.006	**66**
0.002	**55**

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**NA**
D_{15} (mm)	**NA**
D_{30} (mm)	**NA**
D_{50} (mm)	**NA**
D_{60} (mm)	**0.003**
D_{85} (mm)	**0.037**
D_{90} (mm)	**0.063**
C_U	**NA**
C_C	**NA**

Soil Description:

Brown slightly gravelly silty CLAY

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

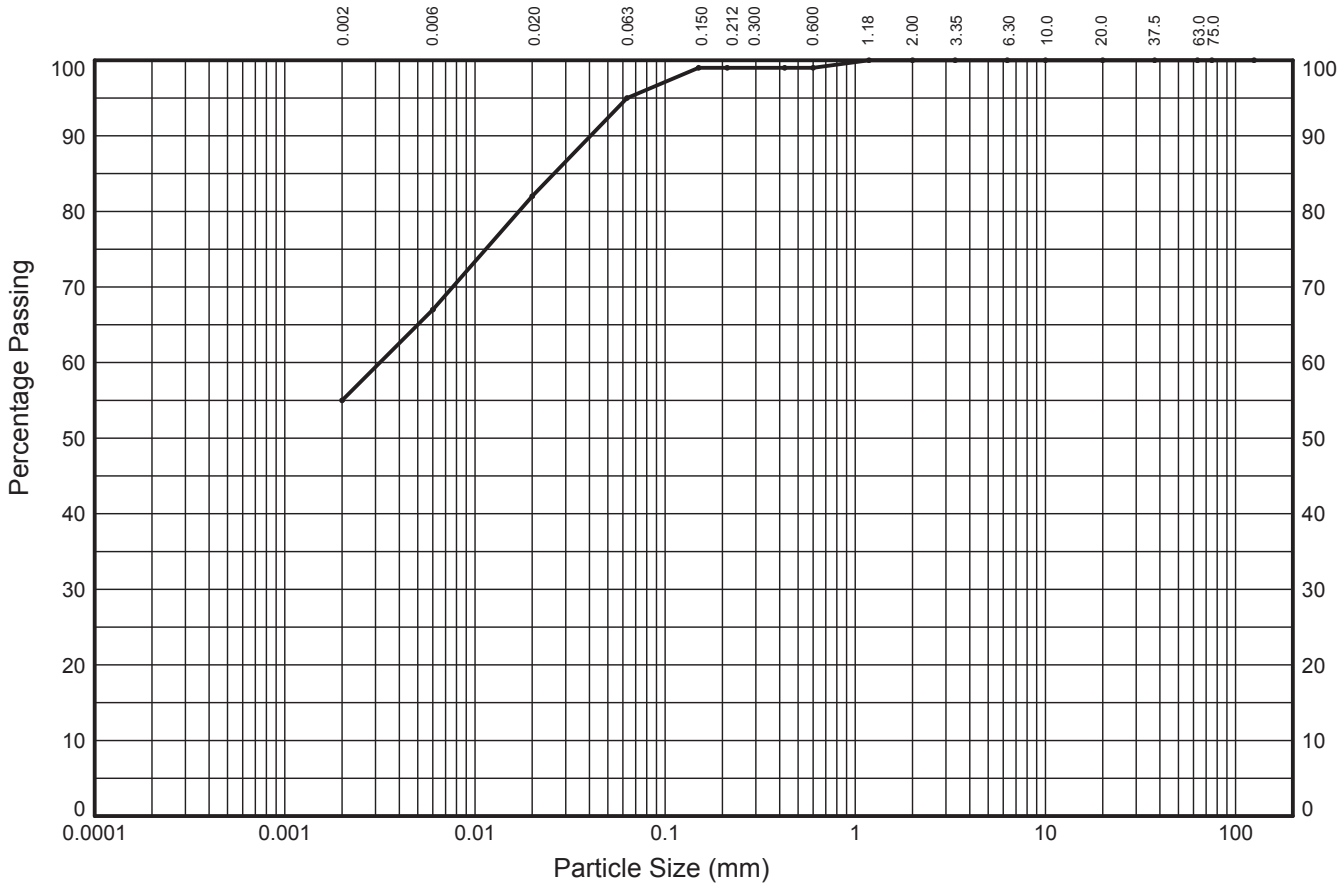
Compiled By		Date
SC	**SHARON CAIRNS**	**21/01/20**

Contract	Contract Ref:
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.4 of BS1377:Part 2:1990

Borehole: **BH03** Sample Ref: **-** Sample Type: **B** Depth (m): **10.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	12%	15%	13%	4%	0%	1%	0%	0%	0%	
	SILT			SAND			GRAVEL			
55%	40%			5%			0%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**100**
10.0	**100**
6.30	**100**
3.35	**100**
2.00	**100**
1.18	**100**
0.600	**99**
0.425	**99**
0.212	**99**
0.150	**99**
0.063	**95**

Particle Diameter (mm)	Percent Passing (%)
0.02	**82**
0.006	**67**
0.002	**55**

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**NA**
D_{15} (mm)	**NA**
D_{30} (mm)	**NA**
D_{50} (mm)	**NA**
D_{60} (mm)	**0.003**
D_{85} (mm)	**0.026**
D_{90} (mm)	**0.041**
C_U	**NA**
C_C	**NA**

Soil Description:

Grey mottled brown slightly sandy silty CLAY

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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Hertfordshire
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SC	**SHARON CAIRNS**	**21/01/20**

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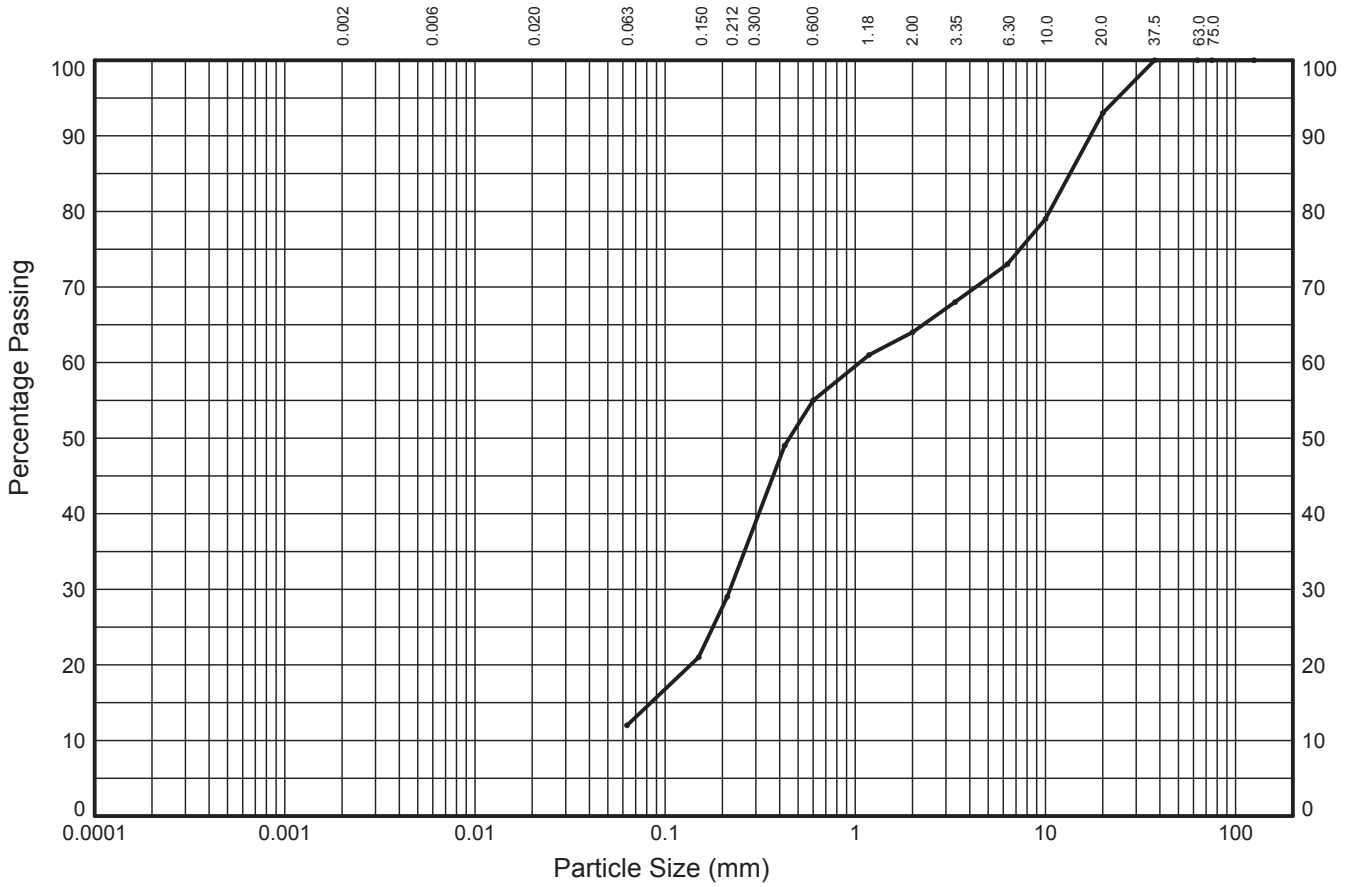
PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH04** Sample Ref: **-** Sample Type: **B** Depth (m): **1.50**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	%	%	%	15%	28%	9%	9%	20%	7%	
	SILT			SAND			GRAVEL			
%	%			52%			36%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**93**
10.0	**79**
6.30	**73**
3.35	**68**
2.00	**64**
1.18	**61**
0.600	**55**
0.425	**49**
0.212	**29**
0.150	**21**
0.063	**12**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**NA**
D_{15} (mm)	**0.084**
D_{30} (mm)	**0.220**
D_{50} (mm)	**0.450**
D_{60} (mm)	**1.054**
D_{85} (mm)	**13.459**
D_{90} (mm)	**17.239**
C_U	**NA**
C_C	**NA**

Soil Description:

Brown very gravelly clayey SAND

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

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Hertfordshire
HP3 9RT

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SC	**SHARON CAIRNS**	**21/01/20**

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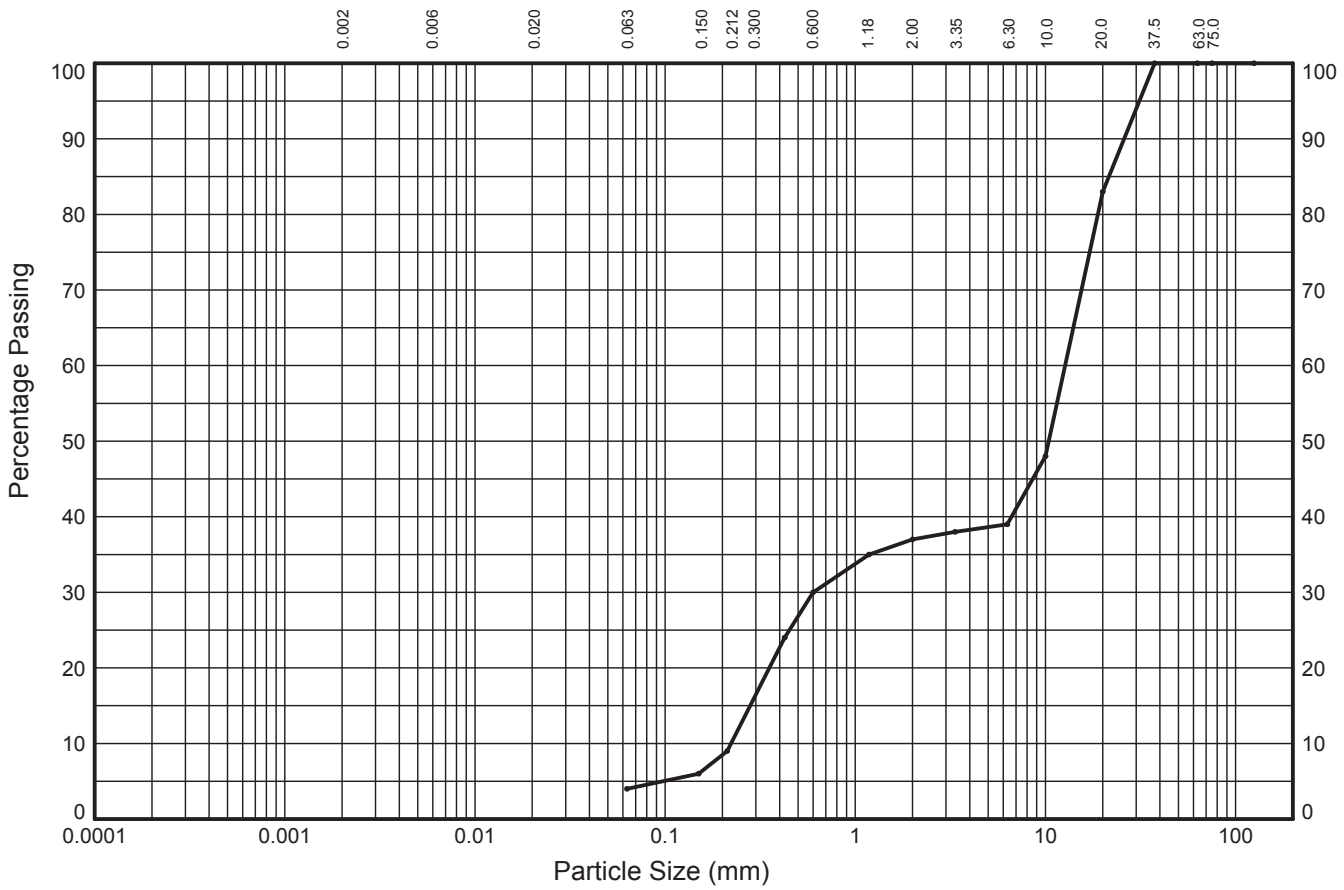
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH04** Sample Ref: **-** Sample Type: **B** Depth (m): **3.50**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	4%	22%	7%	2%	44%	17%	
	SILT			SAND			GRAVEL			
4%				33%			63%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**83**
10.0	**48**
6.30	**39**
3.35	**38**
2.00	**37**
1.18	**35**
0.600	**30**
0.425	**24**
0.212	**9**
0.150	**6**
0.063	**4**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.222**
D_{15} (mm)	**0.280**
D_{30} (mm)	**0.600**
D_{50} (mm)	**10.404**
D_{60} (mm)	**12.683**
D_{85} (mm)	**21.535**
D_{90} (mm)	**25.909**
C_U	**57**
C_C	**0.13**

Soil Description:

Brown very sandy slightly clayey GRAVEL

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

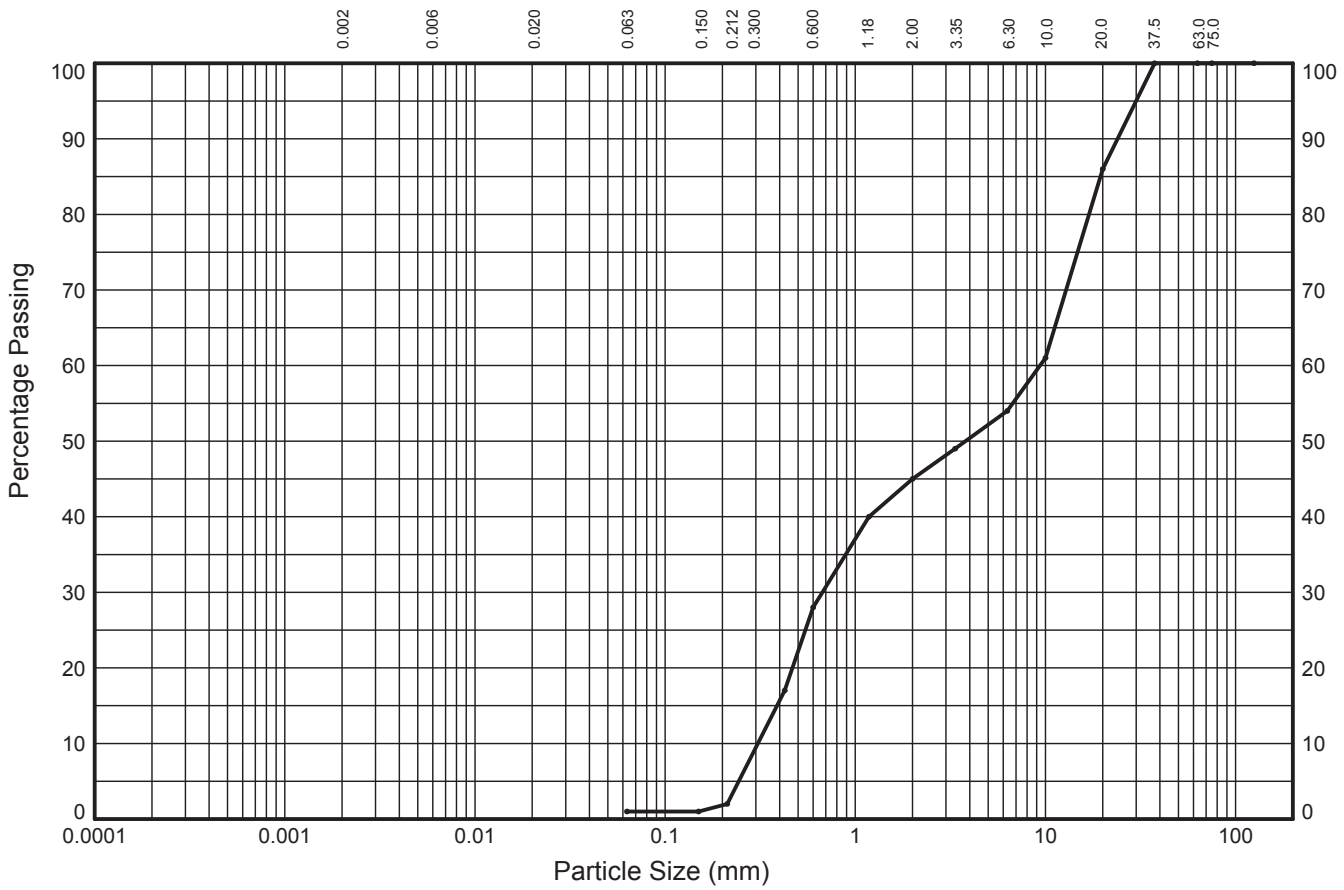
Compiled By		Date
SC	**SHARON CAIRNS**	**21/01/20**

Contract	Contract Ref:
Barnes Hospital	**584180**

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH04** Sample Ref: **-** Sample Type: **B** Depth (m): **5.50**



CLAY										
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	1%	27%	16%	9%	32%	14%	
	SILT			SAND			GRAVEL			
1%				44%			55%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**86**
10.0	**61**
6.30	**54**
3.35	**49**
2.00	**45**
1.18	**40**
0.600	**28**
0.425	**17**
0.212	**2**
0.150	**1**
0.063	**1**

Particle Diameter (mm)	Percent Passing (%)

Sedimentation sample was not pre-treated

Coefficients	
D_{10} (mm)	**0.307**
D_{15} (mm)	**0.387**
D_{30} (mm)	**0.672**
D_{50} (mm)	**3.801**
D_{60} (mm)	**9.361**
D_{85} (mm)	**19.453**
D_{90} (mm)	**23.935**
C_U	**30**
C_C	**0.16**

Soil Description:

Brown very sandy slightly clayey GRAVEL

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2

STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date
SC	**SHARON CAIRNS**	**21/01/20**

Contract	Contract Ref:
Barnes Hospital	**584180**

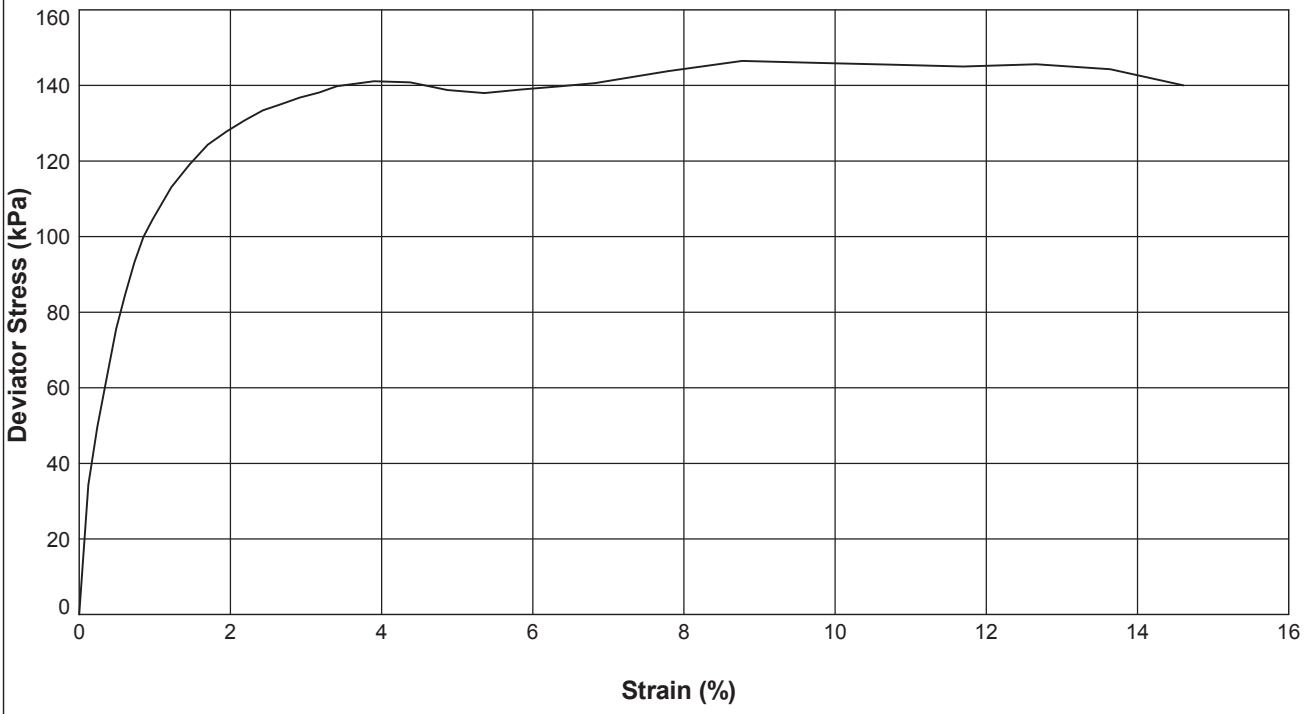
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 8

Borehole: **BH01** Sample Ref: **13** Sample Type: **U** Depth (m): **10.50**

Description : **Brown CLAY**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	Sample Condition		Undisturbed		
	Orientation of sample		Vertical		
	Diameter	(mm)	101.93		
	Height	(mm)	205.35		
	Moisture Content	(%)	31		
	Bulk Density	(Mg/m^3)	2.02		
	Dry Density	(Mg/m^3)	1.55		
TEST DETAILS	Membrane Thickness	(mm)	0.38		
	Rate of Axial Displacement	(%/min)	1.22		
	Cell Pressure	(kPa)	210		
	Membrane Correction	(kPa)	0.77		
	Corrected Deviator Stress	(kPa)	146		
	Undrained Shear Strength	(kPa)	73		
	Strain at Failure	(%)	8.8		
	Mode of Failure		Brittle		



STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date
SC	SHARON CAIRNS	21/01/20

Contract	Contract Ref:
Barnes Hospital	584180

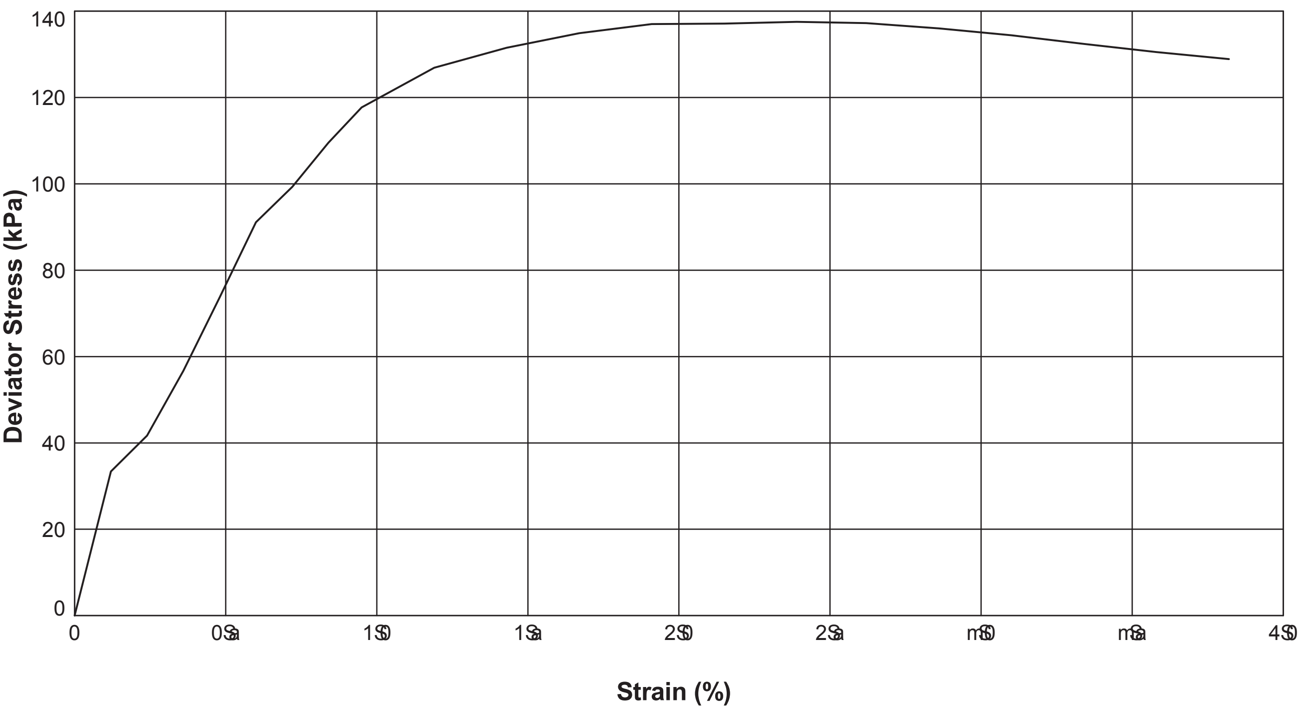
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

_t l xxi DD t xn wrfB bp 1m : jFl D : j1990, d ol ygn 8

bi DnBi onj **BH01** pl e Con PnHl **16** pl e Con AcConj **U** h nCfB /e 3j **13.50**

h ngxDCfri t j **Brown CLAY**

STAGE NUMBER		1	2	3
SAMPLE DETAILS	pl e Con di t Cfri t	Undisturbed		
	s Dnt fl fri t i Hgl e Con	Vertical		
	h rl e nfnD /e e 3	103.20		
	MnruBf /e e 3	209.53		
	k i rgfyDn di t fnt f /G 3	28		
	by dT h nt grfc /k ule m3	1.99		
	h Dc h nt grfc /k ule m3	1.57		
TEST DETAILS	k ne RDD t n ABrxTt ngg /e e 3	0.37		
	Pl fn i Hv Ul oh rgCol xne nt f /G le rt 3	1.34		
	d nooFDnggyDn /TFl 3	260		
	k ne RDD t n di Dnxfri t /TFl 3	0.25		
	di DnxfnOh n(rl fi DpfDngg /TFl 3	137		
	) t CDDrt nOpBnl DpfDnt ufB /TFl 3	89		
	pfDrt l f %l rgyDn /G 3	2.4		
	k i Cn i H%l rgyDn	Brittle		



pAP) d A) Pv V ps _Vp 18 %Due i Dn Pi l O Mne noMne CgfnI O MnDHI DOgBrDn MFm9PA	di e CmnObc	h l fn
		SHARON CAIRNS — 21/01/20
	di t fDxf: **Barnes Hospital**	di t fDxf PnHl: **574170**

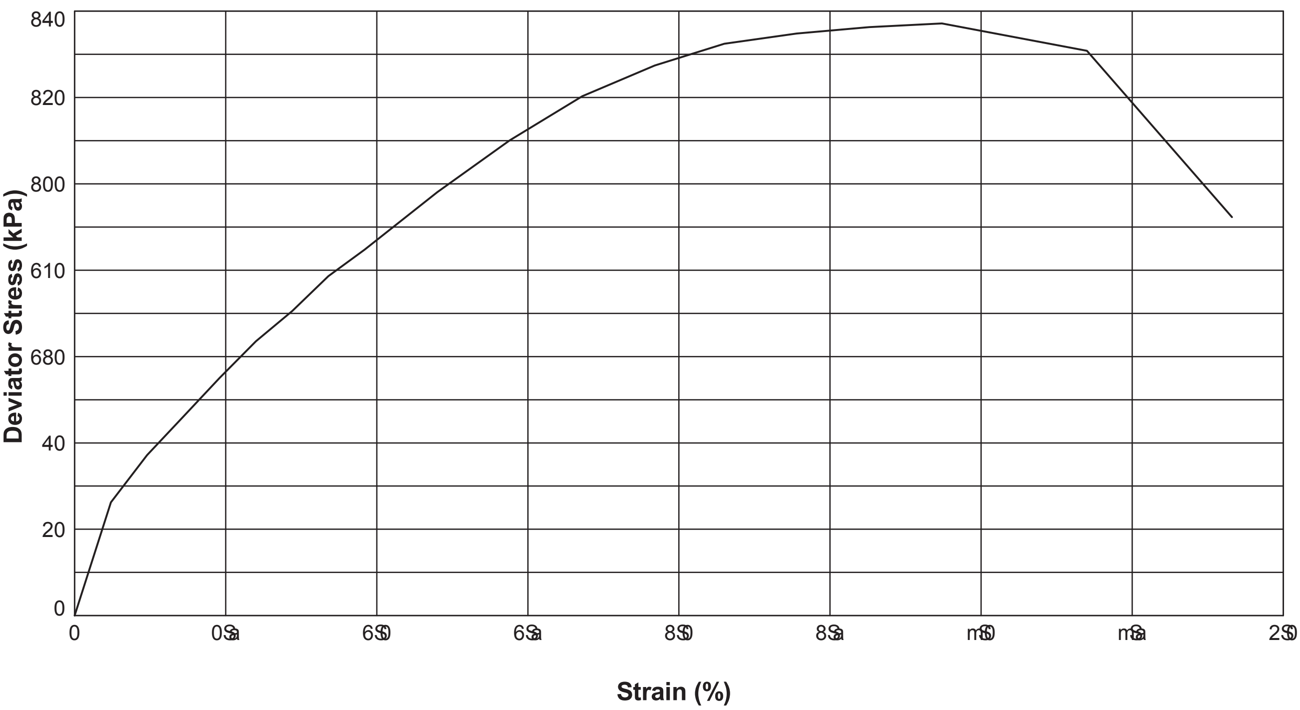
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

_t l xxi DD t xn wrfB bp6m : jFl D : j6990, d d ygn 4

bi DnBi onj **BH01** pl e Con PnHl **21** pl e Con AcCnj **U** h nCfB /e 3j **15.70**

h ngxDCfri t j **Brown CLAY**

STAGE NUMBER		1	2	3
SAMPLE DETAILS	pl e Con di t Cfri t	Undisturbed		
	s Dnt fl fri t i Hgl e Con	Vertical		
	h rl e nfnD /e e 3	102.95		
	MnruBf /e e 3	208.87		
	k i rgfyDn d i t fnt f /G 3	27		
	byoT h nt grfc /k ule m3	2.03		
	h Dc h nt grfc /k ule m3	1.51		
TEST DETAILS	k ne RD t n ABrxTt ngg /e e 3	0.34		
	Pl fn i Hv Ul oh rgCol xne nt f /G le rt 3	1.17		
	d nooFDnggyDn /TFl 3	330		
	k ne RD t n di Ddnxfri t /TFl 3	0.25		
	di Ddnxfn Oh n(rl fi DpfDngg /TFl 3	264		
	) t ODrt nOpBnl DpfDnt ufB /TFl 3	136		
	pfDrt l f %l rnyDn /G 3	2.9		
	k i Cn i H%l rnyDn	Brittle		



pAP) dA) PvVps_Vp 64 %Due i Dn Pi l O Mne noMne CgfnI O MnDHl DOgBrDn MFm9PA	di e OmObc		h l fn
		SHARON CAIRNS	21/01/20
	di t fDxf Barnes Hospital	di t fDxf PnHl 784180	

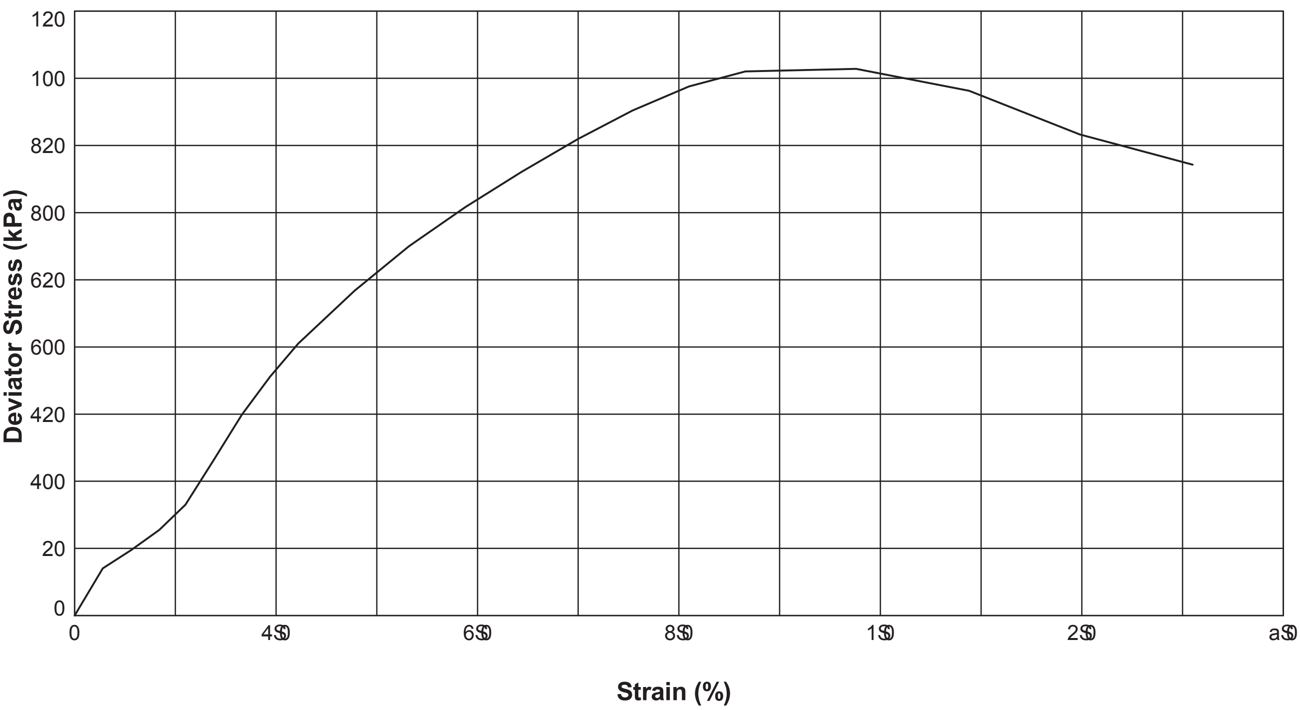
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

ÑI pAAdst pi Ao wÕu y m48: : jUpsr : j4990, n ÕkHb .

y dsoudÕj **BH01** mpl eÕ x oĐ **25** mpl eÕ RTeoj **U** g oeru %o /j **19.50**

g oHAsÕrÕi j **Brown CLAY with occasional gravel**

STAGE NUMBER		1	2	3
SAMPLE DETAILS	mpl eÕ n di t ÕÕi	Undisturbed		
	f sÕi rprÕi dDHpl eÕ	Vertical		
	g Õl oros %o l /	100.53		
	h oÕur %o l /	180.21		
	B dÕHkso n di roi r %3 /	24		
	y kÕ g oi HÕT %B MG [8]/	2.05		
	g sT g oi HÕT %B MG [8]/	1.66		
TEST DETAILS	B ol cspi o RuÕbi oHH %o l /	0.20		
	x pro dDPvÕÕg ÕeÕAol oi r %3 G Õ/	1.11		
	n oÕUsoHkso %oUp/	390		
	B ol cspi o ndssoArÕi %oUp/	0.21		
	ndssoArot g oFÕrds mrsoHH %oUp/	407		
	(i t spÕot muops mrsoi Mu %oUp/	204		
	mrspÕ pr) pÕkso %3 /	3.9		
	B dt o dD) pÕkso	Brittle		



mRx (n R(x PY mf ÑYm 4.) sdM dso x dpt h ol oÕh ol eHopt hosrDdst HuÕo h U8 9x R	n dl eÕt yT		g pro
		SHARON CAIRNS	21/01/20
	n di rspAr: **Barnes Hospital**	n di rspAr x oĐ: **584180**	

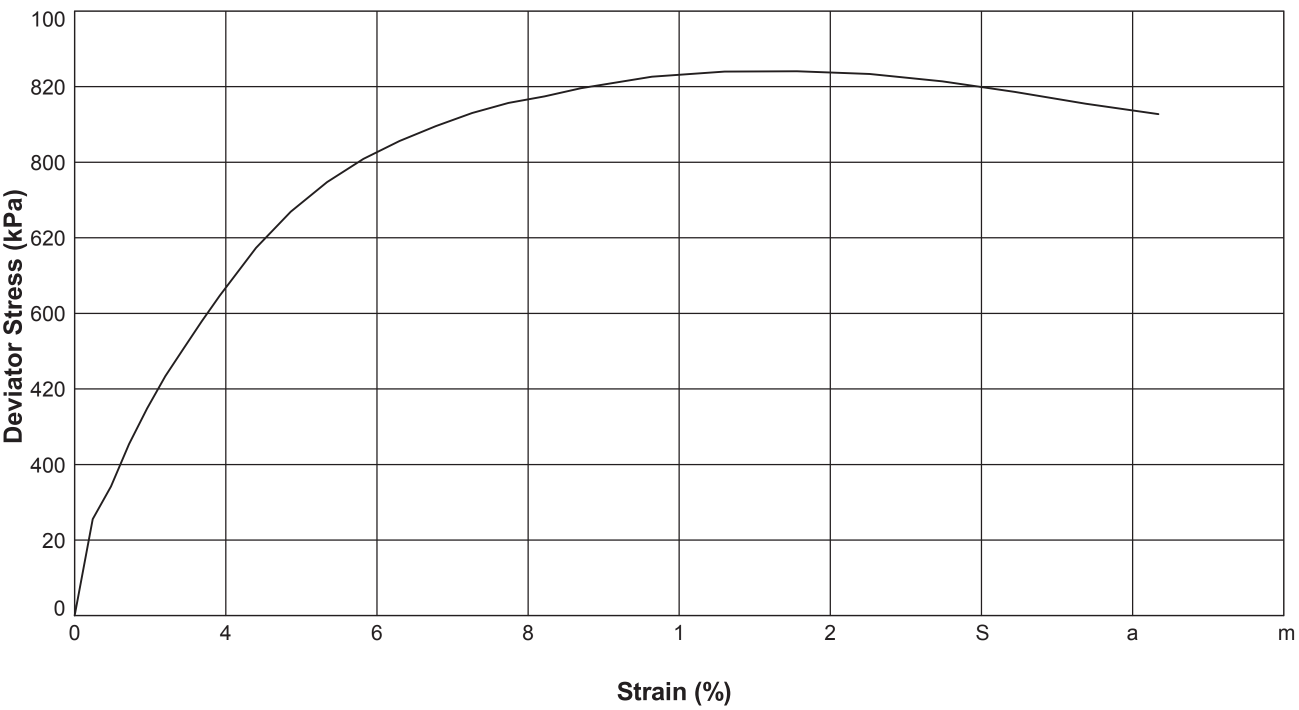
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

_t l xxi DDt xn wrfB bp48aajFl Daj4990, ddygn m

bi DnBi onj **BH01** pl e Con PnHl **33** pl e Con AcCnj **U** hnCfB /e 3j **25.50**

hngxDCfri t j **Brown clayey SILT**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	pl e Con di t Ofri t		Undisturbed		
	s Dnt fl fri t i Hgl e Con		Vertical		
	hrl e nfnD	/e e 3	102.57		
	MnruBf	/e e 3	209.17		
	k irgfyDn di t fnt f	/G3	24		
	byoT h nt grfc	/k ule ^{8}3	2.01		
	hDc h nt grfc	/k ule ^{8}3	1.62		
TEST DETAILS	k ne RDt n ABrxTt ngg	/e e 3	0.38		
	Pl fn i HvUl ohrgCd xne nt f	/Gle rt 3	0.91		
	dnooFDnggyDn	/TFl 3	510		
	k ne RDt n di Dnxfri t	/TFl 3	0.48		
	di DnxfnOh n(rl fi DpfDngg	/TFl 3	360		
	) t ODrt nOpBnl DpfDnt ufB	/TFl 3	180		
	pfDrt l f%l ryDn	/G3	4.8		
	ki Oni H%l ryDn		Brittle		



pAP) dA) PvVps_Vp 4m%Dueim Pil O Mne noMne CgfnI O MnDHHDOgBrDn MF8 9PA	di e OmObc		hl fn
		SHARON CAIRNS	21/01/20
	di t fDxf **Barnes Hospital**	di t fDxf PnHl **584180**	

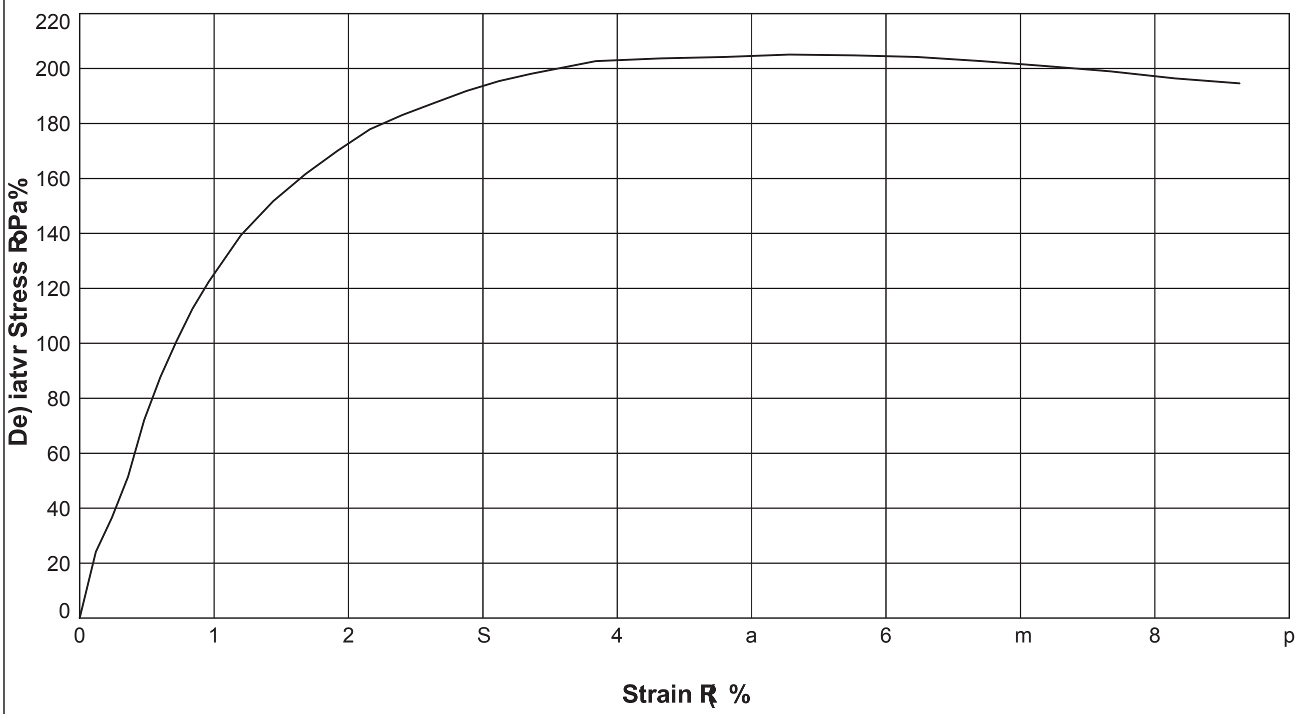
UGk CGSCLIDATED OUIk Q UGDNAIGED RSIGBLE STABE% TNIAKIAL k CMPNESSICG TEST

LOePPt HI eOPd wfsk TI 1Smm|(eHsm|1pp0, i mbhd 8

Tt Hdkt nd| **6 X02** I eC ond v dg| **10** I eC ond x Rod| **U** Mdosk 3C G **7.00**

MdhPHfosft O| **6 rvHn k LAw**

STABE GUM6 EN			1	2	3
SAMPLE DETAILS	I eC ond i t Or fsft O		Undisturbed		
	DHdOsesft Ot gheC ond		Vertical		
	MfeC dsdH	3C C G	103.90		
	u dfBks	3C C G	205.91		
	y t fhsbHd i t OsdOs	3I G	28		
	T bnc MdChfsR	3y BNC^S G	2.01		
	MHR MdChfsR	3y BNC^S G	1.97		
TEST DETAILS	y dC AHeOd x kfPcOdhh	3C C G	0.24		
	v esd t gUFfenMfhomePdC dOs	3I NCfOG	1.27		
	i dm(Hdhhbd	3c(eG	150		
	y dC AHeOd i t HHdPsft O	3c(eG	0.39		
	i t HHdPsdr Md) fest HI sHdhh	3c(eG	209		
	%Or HefOdr I kdeHI sHdOBsk	3c(eG	103		
	I sHefOes/ efmbHd	3I G	9.3		
	y t r d t g/ efmbHd		6 rittle		



I xv %i x%v U7 I DL7I 18 / HBCt Hd v t er u dC dnu dC ohsder u dHsg Hr hkfHd u(S pv x	i t Cofndr TR		Mesd
		SXANCG k AINGS	21/01/20
	i t OsHePs **6 arnes Xvspital**	i t OsHePs v dg **95Y150**	

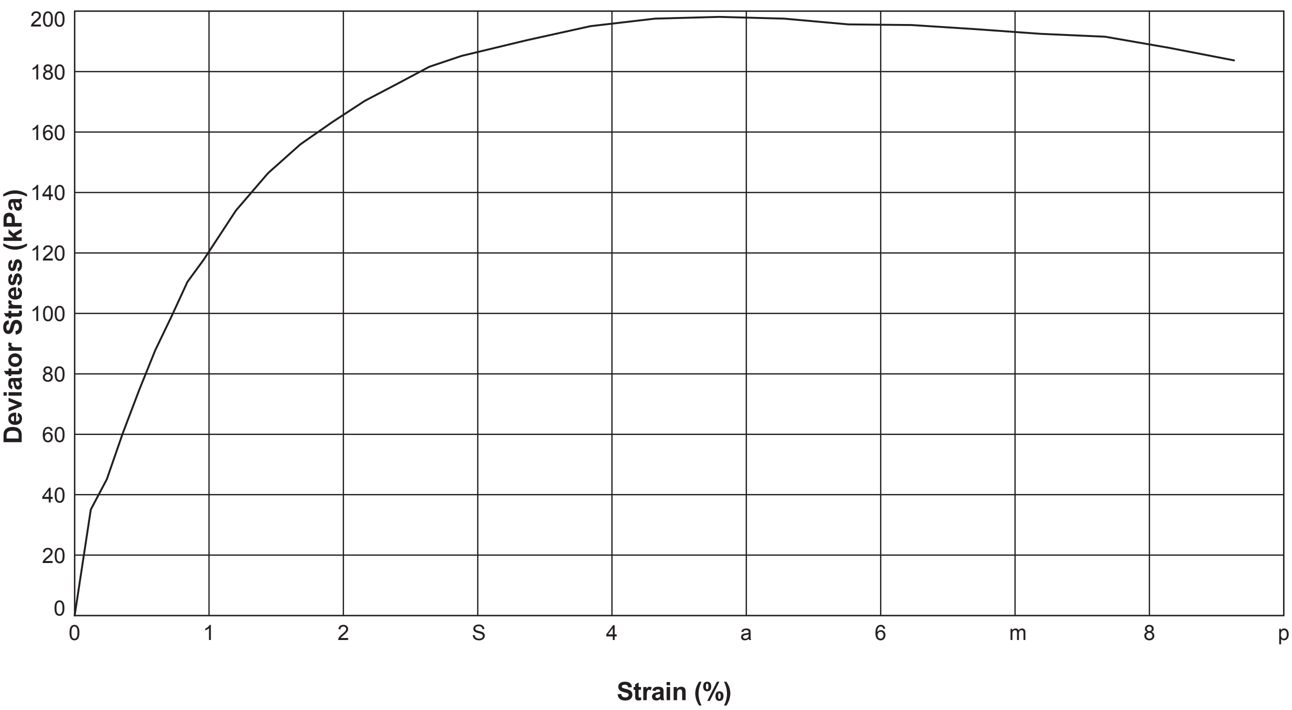
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

LOePPt HeOPd wfsk TI 1Smm|(eHstm|1pp0, i mebhd 8

Tt Hdkt md| **BH02** I eC omd v dg| **13** I eC omd x Rod| **U** Mdosk 3C C G **12.00**

MdhPHfosft O| **Brown CLAY with occasional shell fragments**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	I eC omd i t Or fsft O		Undisturbed		
	DHdOsesft Ot gheC omd		Vertical		
	MfeC dsdH	3C C G	103.19		
	u dfBks	3C C G	208.51		
	y t fhsbHd i t OsdOs	3I G	28		
	Tbmc MdOhfsR	3y BNC^S G	2.02		
	MHR MdOhfsR	3y BNC^S G	1.58		
TEST DETAILS	y dC AHeOd x kfPcOdhh	3C C G	0.39		
	v esd t gUFfenMfhomePdC dOs	3I NCfOG	1.10		
	i dm(Hdhhbd	3c(eG	240		
	y dC AHeOd i t HHdPsft O	3c(eG	0.49		
	i t HHdPsdr Md) fest HI sHdhh	3c(eG	198		
	%Or HefOdr I kdeHI sHdOBsk	3c(eG	99		
	I sHefOes/ efmbHd	3I G	4.8		
	y t r d t g/ efmbHd		Brittle		



I xv %i x %v U7 I DL7I 18 / HBCt Hd v t er u dC dnu dC ohsder u dHsgt HI hkfHd u(S pv x	i t Cofmdr TR		Mesd
		SHARON CAIRNS	21/01/20
	i t OsHePs: Barnes Hospital	i t OsHePs v dg: 584180	

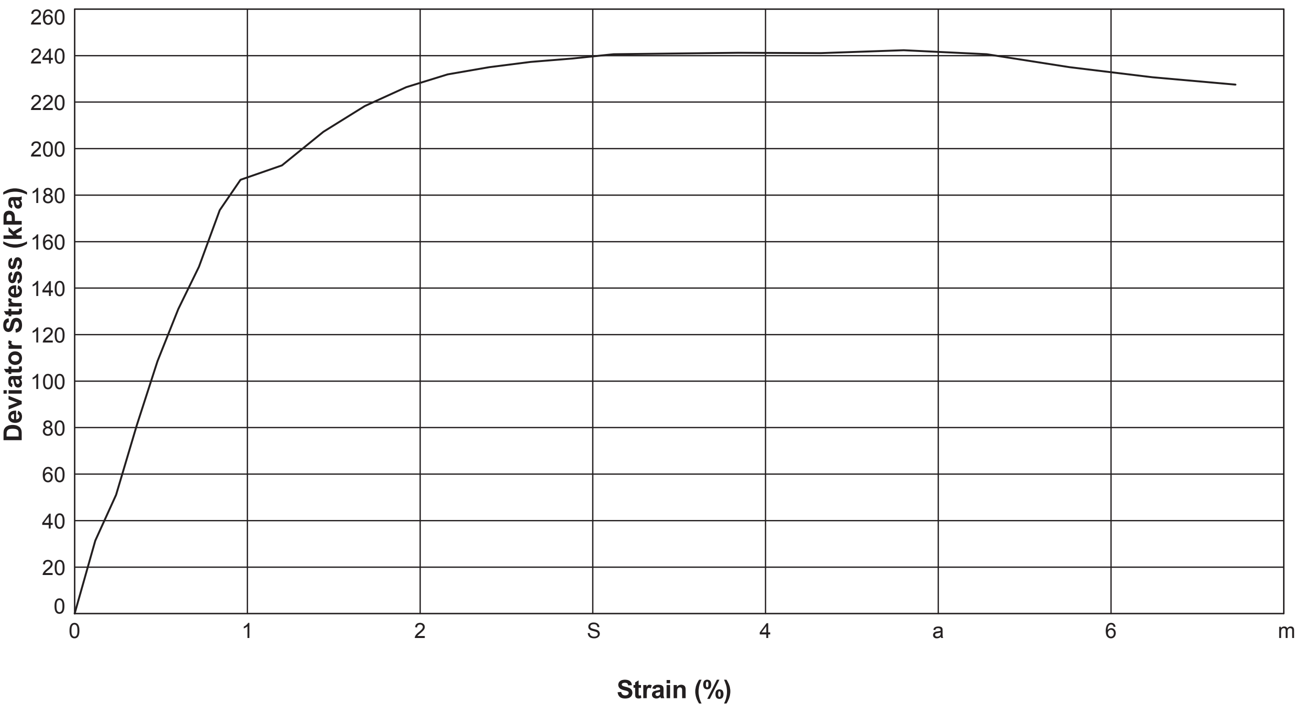
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

_t l xxi DDl t xn wrfB bp 1SmmjFl Dmj1990, d dl ygn 8

bi DnBi onj **BH02** pl e Con PnHjl **17** pl e Con AcCnj **U** h nCfB /e 3j **15.00**

h ngxDCfri t j **Brown silty CLAY**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	pl e Con di t Cfri t		**Undisturbed**		
	s Dnt fl fri t i Hgl e Con		**Vertical**		
	h rl e nfnD	/e e 3	**103.06**		
	MnruBf	/e e 3	**208.38**		
	k i rgfyDn di t fnt f	/G 3	**27**		
	byuT h nt grfc	/k ule S3	**2.04**		
	h Dc h nt grfc	/k ule S3	**1.61**		
TEST DETAILS	k ne RDl t n ABrxTt ngg	/e e 3	**0.28**		
	Pl fn i Hv Ufl oh rgCol xne nt f	/G le rt 3	**0.96**		
	d nooFDnggyDn	/TFl 3	**300**		
	k ne RDl t n di Dnxfri t	/TFl 3	**0.36**		
	di DnxfnOh n(rl fi DpfDngg	/TFl 3	**242**		
	) t ODrt nOpBnl DpfDnt ufB	/TFl 3	**121**		
	pfDrt l f %l rgDn	/G 3	**4.8**		
	k i Cn i H%l rgDn		**Brittle**		



pAP) d A) PvVps _Vp
18 %Dl ue i Dn Pi l O
Mne noMne CgfnI O
MnDHl DgBrDn
MFS 9PA

di e OonObc		h l fn
	SHARON CAIRNS	**21/01/20**
di t fDxf **Barnes Hospital**	di t fDxf PnHjl **584180**	

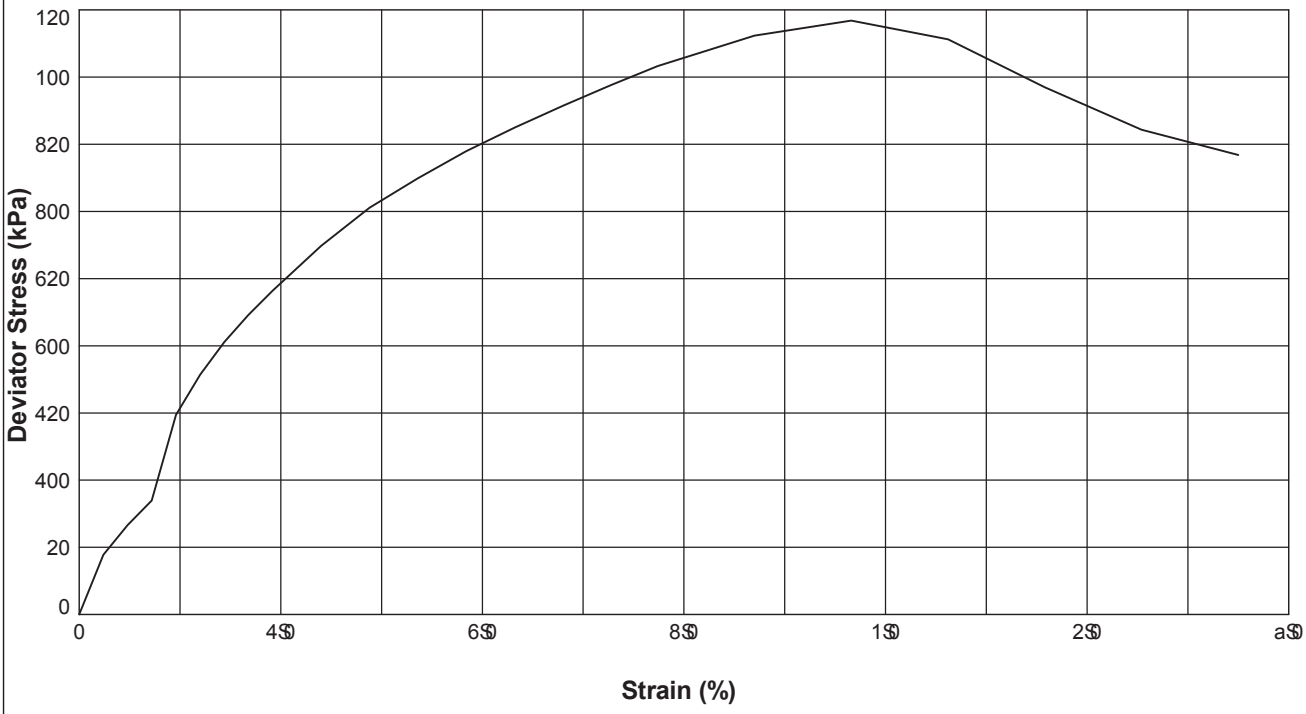
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

Nl pAAdst pi Ao w@u y m48: : jUpsr : j4990, n@pkHb .

y dsoud@oj **BH02** mpl e@ x o[) **20** mpl e@ RTeoj **U** g oeru % /j **18.00**

g oHAs@erGi j **Brown CLAY with rare gravel**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	mpl e@ n di t @Gi		Undisturbed		
	f s@i rpr@i dD-pl e@		Vertical		
	g@l oros	% l /	103.08		
	h od@ur	% l /	208.70		
	B d@Hkso n di roi r	%3 /	26		
	y k@ g oi H@T	%B MG 8/	2.04		
	g sT g oi H@T	%B MG 8/	1.62		
TEST DETAILS	B ol cspi o Ru@bi oHH	% l /	0.44		
	x pro dDPv@CgHe@Aol oi r	%3 G O/	1.05		
	n o@CUsoHHkso	%Up/	360		
	B ol cspi o n dsso Ar@i	%Up/	0.45		
	n dsso Arot g oF@rds mrsoHH	%Up/	442		
	(i t sp@ot muops mrsoi Mu	%Up/	221		
	mrsp@ pr) p@kso	%3 /	3.8		
	B dt o dD) p@kso		Brittle		



mRx (n R(x PY mf NYm 4.) sdM dso x dpt h ol oCh ol eHopt h osrDdst HuGso h U8 9x R	n dl e@t yT	g pro
	SC	SHARON CAIRNS 21/01/20
	n di rspAr: Barnes Hospital	n di rspAr x o[): 584180

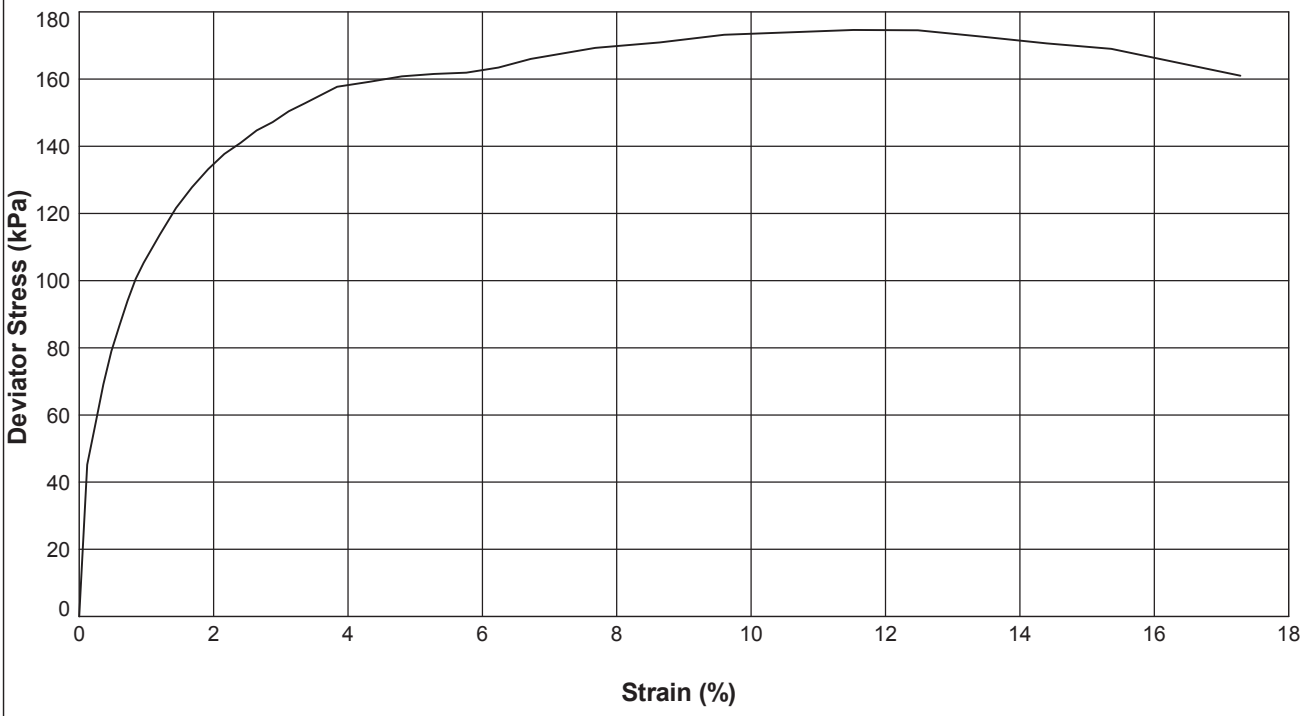
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 8

Borehole: **BH03** Sample Ref: **11** Sample Type: **U** Depth (m): **7.50**

Description : **Grey mottled brown CLAY**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	Sample Condition		Undisturbed		
	Orientation of sample		Vertical		
	Diameter	(mm)	103.60		
	Height	(mm)	208.32		
	Moisture Content	(%)	26		
	Bulk Density	(Mg/m^3)	1.98		
	Dry Density	(Mg/m^3)	1.57		
TEST DETAILS	Membrane Thickness	(mm)	0.16		
	Rate of Axial Displacement	(%/min)	1.20		
	Cell Pressure	(kPa)	150		
	Membrane Correction	(kPa)	0.39		
	Corrected Deviator Stress	(kPa)	175		
	Undrained Shear Strength	(kPa)	87		
	Strain at Failure	(%)	11.5		
	Mode of Failure		Brittle		



STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date
SC	SHARON CAIRNS	21/01/20

Contract	Contract Ref:
Barnes Hospital	584180

AGS

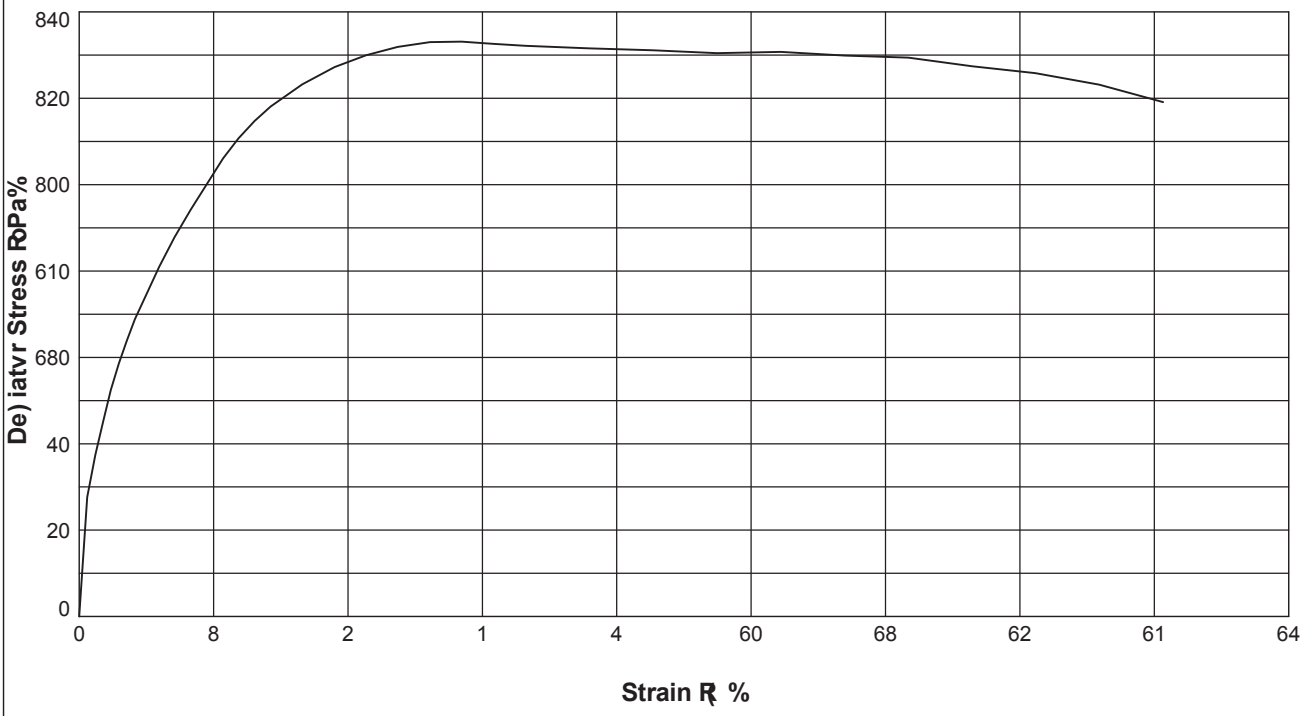
UGk CGSCLIDATED OUIk Q UGDNAIGED RSIGBLE STABE% TNIAKIAL k CMPNESSICG TEST

In accordance with BS6377:Part 7:6990, Clause 4

Borehole: **8X03** Sample Ref: **16** Sample Type: **U** Depth (m): **10.60**

Description : **8rvHn clawewSILT**

STABE GUM8EN			1	2	3
SAMPLE DETAILS	Sample Condition		**Undisturbed**		
	Orientation of sample		**Vertical**		
	Diameter	(mm)	**103.05**		
	Height	(mm)	**210.79**		
	Moisture Content	(%)	**27**		
	Bulk Density	(Mg/m^3)	**1.54**		
	Dry Density	(Mg/m^3)	**1.69**		
TEST DETAILS	Membrane Thickness	(mm)	**0.34**		
	Rate of Axial Displacement	(%/min)	**1.23**		
	Cell Pressure	(kPa)	**210**		
	Membrane Correction	(kPa)	**0.66**		
	Corrected Deviator Stress	(kPa)	**299**		
	Undrained Shear Strength	(kPa)	**133**		
	Strain at Failure	(%)	**6.7**		
	Mode of Failure		**8rittle**		



	Compiled By	Date
STRUCTURAL SOILS 64 Frogmore Road Hemel Hempstead Hertfordshire HP3 9RT	SXANCG k AINGS	21/01/20
	Contract: **8arnes Xvspital**	Contract Ref: **64y140**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 20/00136
Issue Number: 1 **Date:** 14 January, 2020

Client: Structural Soils Limited (Hemel Hempstead Lab)
18 Frogmore Road
Hemel Hempstead
UK
HP3 9RT

Project Manager: Hemel Lab/Sharon Cairns
Project Name: Barnes Hospital (Plot A)
Project Ref: 1920884
Order No: N/A
Date Samples Received: 09/01/20
Date Instructions Received: 09/01/20
Date Analysis Completed: 14/01/20

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 20/00136

Client Project Name: Barnes Hospital (Plot A)

Client Project Ref: 1920884

Lab Sample ID	20/00136/1	20/00136/2	20/00136/3	20/00136/4	20/00136/5	20/00136/6	20/00136/7	Units	Limit of Detection	Method ref
Client Sample No	10	13	17	20						
Client Sample ID	BH02	BH02	BH02	BH02	BH02	BH02	BH04			
Depth to Top	9.00	12.00	15.00	18.00	6.00	1.20	1.50			
Depth To Bottom	9.45	12.45	15.45	18.45						
Date Sampled										
Sample Type	Soil - U	Soil - U	Soil - U	Soil - U	Soil - B	Soil - B	Soil - B			
Sample Matrix Code	5	5	5	5	4A	5A	4A			
% Stones >10mm$_A$	<0.1	<0.1	<0.1	<0.1	11.0	<0.1	11.3	% w/w	0.1	A-T-044
pH BRE$_D^{M\#}$	8.61	8.34	8.73	8.94	8.45	8.08	8.15	pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1)$_D^{M\#}$	120	111	56	66	<10	<10	15	mg/l	10	A-T-026s
Sulphate BRE (acid sol)$_D^{M\#}$	0.10	0.20	0.07	0.06	-	-	-	% w/w	0.02	A-T-028s
Sulphur BRE (total)$_D$	0.44	7.38	0.34	0.30	-	-	-	% w/w	0.01	A-T-024s

Envirolab Job Number: 20/00136

Client Project Name: Barnes Hospital (Plot A)

Client Project Ref: 1920884

Lab Sample ID	20/00136/8	20/00136/9	20/00136/10	20/00136/11	20/00136/12	20/00136/13	20/00136/14	Units	Limit of Detection	Method ref
Client Sample No					13	17	21			
Client Sample ID	BH04	BH04	BH04	BH04	BH01	BH01	BH01			
Depth to Top	3.50	5.50	8.00	0.50	10.50	13.50	16.50			
Depth To Bottom					10.95	13.95	16.95			
Date Sampled										
Sample Type	Soil - B	Soil - B	Soil - D	Soil - B	Soil - U	Soil - U	Soil - U			
Sample Matrix Code	4A	4A	5	6AE	5	5	5			
% Stones >10mm$_A$	30.0	39.8	<0.1	<0.1	<0.1	<0.1	<0.1	% w/w	0.1	A-T-044
pH BRE$_D^{M\#}$	8.50	8.29	8.76	7.92	8.86	8.71	8.41	pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1)$_D^{M\#}$	<10	<10	66	<10	39	92	308	mg/l	10	A-T-026s
Sulphate BRE (acid sol)$_D^{M\#}$	-	-	0.05	-	0.08	0.10	0.16	% w/w	0.02	A-T-028s
Sulphur BRE (total)$_D$	-	-	0.17	-	0.38	0.48	0.41	% w/w	0.01	A-T-024s

Envirolab Job Number: 20/00136

Client Project Name: Barnes Hospital (Plot A)

Client Project Ref: 1920884

Lab Sample ID	20/00136/15	20/00136/16	20/00136/17	20/00136/18	20/00136/19	20/00136/20	20/00136/21	Units	Limit of Detection	Method ref
Client Sample No	25	33	11	15						
Client Sample ID	BH01	BH01	BH03	BH03	BH01	BH01	BH03			
Depth to Top	19.50	25.50	7.50	10.50	2.00	7.00	5.00			
Depth To Bottom	19.95	25.95	7.95	10.95						
Date Sampled										
Sample Type	Soil - U	Soil - U	Soil - U	Soil - U	Soil - B	Soil - B	Soil - B			
Sample Matrix Code	5	5	5	5	4A	4A	4A			
% Stones >10mm$_A$	<0.1	<0.1	<0.1	<0.1	46.5	23.6	31.2	% w/w	0.1	A-T-044
pH BRE$_D^{M\#}$	8.43	8.49	8.28	8.74	8.42	8.11	8.17	pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1)$_D^{M\#}$	174	184	150	68	<10	<10	<10	mg/l	10	A-T-026s
Sulphate BRE (acid sol)$_D^{M\#}$	0.12	0.20	0.14	0.07	-	-	-	% w/w	0.02	A-T-028s
Sulphur BRE (total)$_D$	0.36	5.32	0.45	0.42	-	-	-	% w/w	0.01	A-T-024s

Envirolab Job Number: 20/00136

Client Project Name: Barnes Hospital (Plot A)

Client Project Ref: 1920884

Lab Sample ID	20/00136/22							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH03									
Depth to Top	1.20									
Depth To Bottom										
Date Sampled										
Sample Type	Soil - B									
Sample Matrix Code	5AE									
% Stones >10mm$_A$	12.2							% w/w	0.1	A-T-044
pH BRE$_D$$^{M\#}$	8.09							pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1)$_D$$^{M\#}$	11							mg/l	10	A-T-026s

REPORT NOTES

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.
Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

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Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Structural Soils Limited (Hemel Hempstead Lab), 18 Frogmore Road, Hemel Hempstead, UK, HP3 9RT

Project: Barnes Hospital (Plot A)

Clients Project No: 1920884

Project No: 20/00136

Date Received: 09/01/2020 (am)

Cool Box Temperatures (°C): 10.9

Lab Sample ID	20/00136/1	20/00136/2	20/00136/3	20/00136/4	20/00136/5	20/00136/6	20/00136/7	20/00136/8	20/00136/9	20/00136/10	20/00136/11
Client Sample No	10	13	17	20							
Client Sample ID/Depth	BH02 9.00-9.45m	BH02 12.00-12.45m	BH02 15.00-15.45m	BH02 18.00-18.45m	BH02 6.00m	BH02 1.20m	BH04 1.50m	BH04 3.50m	BH04 5.50m	BH04 8.00m	BH04 0.50m
Date Sampled											
Deviation Code											
E (no date)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Lab Sample ID	20/00136/12	20/00136/13	20/00136/14	20/00136/15	20/00136/16	20/00136/17	20/00136/18	20/00136/19	20/00136/20	20/00136/21	20/00136/22
Client Sample No	13	17	21	25	33	11	15				
Client Sample ID/Depth	BH01 10.50-10.95m	BH01 13.50-13.95m	BH01 16.50-16.95m	BH01 19.50-19.95m	BH01 25.50-25.95m	BH03 7.50-7.95m	BH03 10.50-10.95m	BH01 2.00m	BH01 7.00m	BH03 5.00m	BH03 1.20m
Date Sampled											
Deviation Code											
E (no date)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Key
E (no date) *No sampling date provided (all results affected if not provided)*

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

APPENDIX J
GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH

Generic assessment criteria for human health: residential scenario without home-grown produce

Background

RSK's generic assessment criteria (GAC) were initially prepared following the publication by the Environment Agency (EA) of soil guideline value (SGV) and toxicological (TOX) reports, and associated publications in 2009[1]. RSK GAC were updated following the publication of GAC by LQM/CIEH in 2009[2]. RSK GAC are periodically revised when updated information on toxicological, land use or receptor parameters is published.

Updates to the RSK GAC

In 2014, the publication of Category 4 Screening Levels (C4SL)[3,4], as part of the Defra-funded research project SP1010, included modifications to certain exposure assumptions documented within EA Science Report SC050221/SR3 (herein after referred to as SR3)[5] used in the generation of SGVs.

C4SL were published for six substances (cadmium, arsenic, benzene, benzo(a)pyrene, chromium VI and lead) for a sandy loam soil type with 6% soil organic matter, based on a low level of toxicological concern (LLTC; see Section 2.3 of research project report SP1010[3]). Where a C4SL has been published, the RSK GAC duplicates the C4SL published values using all input parameters within the SP1010 final project report[3] and associated appendices[6], and adopts them as GAC for these six substances.

For all other substances the C4SL exposure modifications relevant for residential without home-grown produce end use have been applied to the current RSK GAC. These include alterations to daily inhalation rates for residential and commercial scenarios, reducing soil adherence factors in children (age classes 1 to 12 only) and reducing exposure frequency for dermal contact outdoors.

The RSK GAC have also been revised with updated toxicology published by LQM/CIEH in 2015[7] or by the USEPA[14], where a C4SL has not been published.

RSK GAC derivation for metals and organic compounds

Model selection

Soil assessment criteria (SAC) were calculated using the Contaminated Land Exposure Assessment (CLEA) tool v1.071, supporting EA guidance[5,8,9] and revised exposure scenarios published for the C4SL[3]. The SAC are also termed GAC.

Conceptual model

In accordance with SR3[5], the residential without home-grown produce scenario considers risks to a female child between the ages of 0 and 6 years old as the highest risk scenario. In accordance with Box 3.1 of SR3[5], the pathways considered for production of the SAC in the residential without home-grown produce scenario are

- direct soil and dust ingestion in areas of soft landscaping
- dermal contact with soil and indoor dust

- inhalation of indoor and outdoor dust and vapours.

Figure 1 is a conceptual model illustrating these linkages.

In line with guidance in the EA SGV report for cadmium[1], the RSK GAC for cadmium has been derived based on estimates representative of lifetime exposure. Although young children are generally more likely to have higher exposures to soil contaminants, the renal toxicity of cadmium, and the derivation of the TDI_{oral} and TDI_{inh}, are based on considerations of the kidney burden accumulated over 50 years or so. It is therefore reasonable to consider exposure not just in childhood but averaged over a longer period.

With respect to volatilisation, the CLEA model assumes a simple linear partitioning of a chemical in the soil between the sorbed, dissolved and vapour phase[9]. The upper boundaries of this partitioning are represented by the maximum aqueous solubility and pure saturated vapour concentration of the chemical. The CLEA model estimates saturated soil concentrations where these limits are reached[9]. The CLEA software uses a traffic light system to identify when individual and/or combined assessment criteria exceed the lower of either the aqueous- or vapour-based soil saturation limits. Model output cells are flagged red where the saturated soil concentration has been exceeded and the contribution of the indoor and outdoor vapour pathway to total exposure is greater than 10%. In this case, further consideration of the following is required[9]:

- Free phase contamination may be present.
- Exposure from the vapour pathways will be over-predicted by the model, as in reality the vapour phase concentration will not increase at concentrations above saturation limits
- Where the vapour pathway contribution is greater than 90%, it is unlikely the relevant health criteria value (HCV) will be exceeded at soil concentrations at least a factor of ten higher than the relevant HCV.

Where the vapour pathway is the predominant pathway (contributes greater than 90% of exposure) or the only exposure route considered and the cell is highlighted red (SAC exceeds saturation limit), the risk based on the assumed conceptual model is likely to be negligible as the vapour risk is assumed to be tolerable at maximum possible soil concentrations. In such circumstances, the vapour pathway exposure should be considered based on the presence of free phase or non-aqueous phase liquid sources and the measured concentrations of volatile organic compounds (VOC) in the vapour phase. Screening could be considered based on setting the SAC as the modelled soil saturation limits. However, as stated within the CLEA handbook[9], this is likely to not be practical in many cases because of the very low saturation limits and, in any case, is highly conservative.

It should also be noted that for mixtures of compounds, free phase may be present where soil (or groundwater) concentrations are well below saturation limits for individual compounds.

Where the vapour pathway is only one of the exposure pathways considered, an additional approach can then be utilised as detailed within Section 4.12 of the CLEA model handbook[9], which explains how to calculate an effective assessment criterion manually.

SR3[5] states that, as a general rule of thumb, it is recognised that estimating vapour phase concentrations from dissolved and sorbed phase contamination by petroleum hydrocarbons are at least a factor of ten higher than those likely to be measured on-site. RSK has therefore applied an empirical subsurface to indoor air correction factor of 10 into the CLEA model chemical database for all petroleum hydrocarbon fractions (including BTEX, trimethylbenzenes and the

polycyclic aromatic hydrocarbons (PAH) naphthalene, acenaphthene and acenaphthylene) to reduce this conservatism.

Input selection

The most up-to-date published chemical and toxicological data was obtained from EA Report SC050021/SR7[10], the EA TOX[1] reports, the C4SL SP1010 project report and associated appendices[3,6], the 2015 LQM/CIEH report[7] or the USEPA IRIS database[14]. Where a C4SL has been published, the RSK GAC have duplicated the C4SL published values using all input parameters within the SP1010 final project report[3] and associated appendices[6], and has adopted them as GAC for these six substances. Toxicological and specific chemical parameters for 1,2,4-trimethylbenzene, barium and methyl tertiary-butyl ether (MTBE) were obtained from the CL:AIRE Soil Generic Assessment Criteria report[11].

For TPH, aromatic hydrocarbons C_5–C_8 were not modelled, as this range comprises benzene (>EC5-EC7) and toluene (>EC7-EC8), which are modelled separately.

Physical parameters

For the residential without home-grown produce scenario, the CLEA default building is a small, two-storey terrace house with a concrete ground-bearing slab. SR3[5] notes this residential building type to be the most conservative in terms of potential for vapour intrusion. The building parameters used in the production of the RSK GACs are the default CLEA v1.06 inputs presented in Table 3.3 of SR3[3], with a dust loading factor detailed in Section 9.3 of SR3[5]. The parameters for a sandy loam soil type were used in line with Table 4.4 of SR3[5]. This includes a value of 6% for the percentage of soil organic matter (SOM) within the soil. In RSK's experience, this is rather high for many sites. To avoid undertaking site-specific risk assessments for this SOM, RSK has produced an additional set of GAC for SOM of 1% and 2.5% for all substances using the CLEA tool.

Summary of modifications to the default CLEA SR3[5] input parameters for residential without home-grown produce

In summary, the RSK GAC were produced using the default input parameters for soil properties, the air dispersion model, building properties and the vapour model detailed in SR3[5]. Modifications to the default SR3[5] exposure scenarios based on the C4SL exposure scenarios[3] are presented in Table 2 below.

The final selected GAC are presented by pathway in Table 3 and the combined GAC in Table 4.

Figure 1: Conceptual model for CLEA residential scenario without home-grown produce

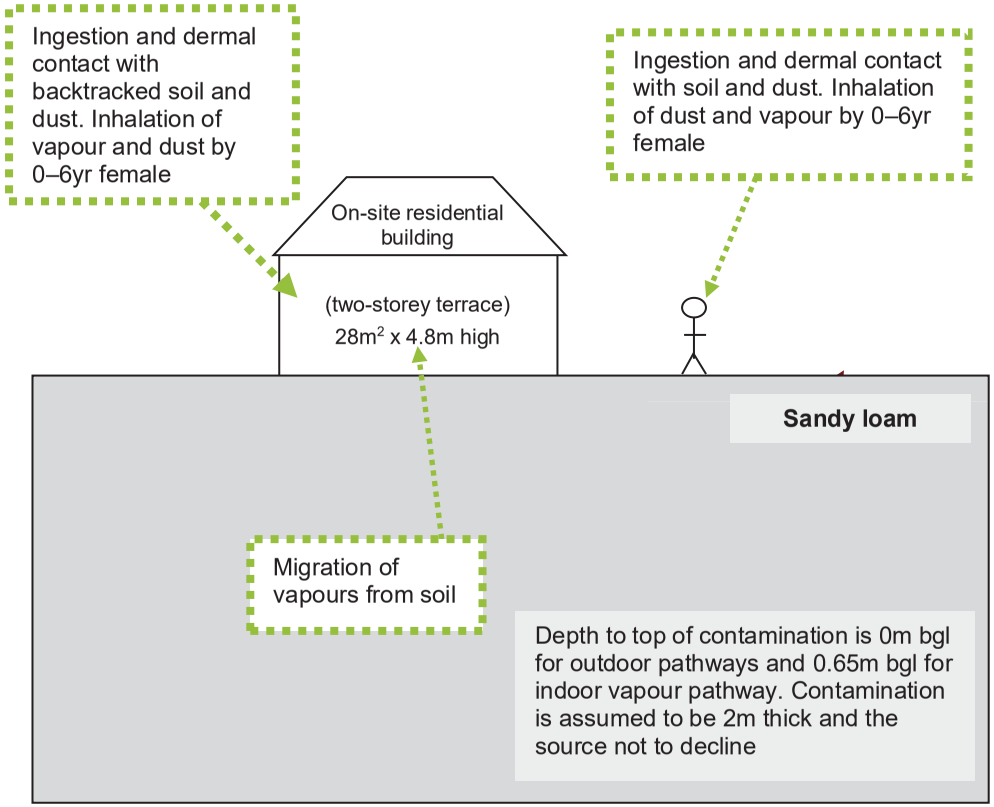


Table 1: Exposure assessment parameters for residential scenario without home-grown produce – inputs for CLEA model

Parameter	Value	Justification
Land use	Residential without home-grown produce	Chosen land use
Receptor	Female child	Key generic assumption given in Box 3.1, SR3[5]
Building	Small terraced house	Key generic assumption given in Box 3.1, SR3[5]. Small, two-storey terraced house chosen, as it is the most conservative residential building type in terms of protection from vapor intrusion (Section 3.4.6, SR3)[5]
Soil type	Sandy loam	Most common UK soil type (Section 4.3.1, from Table 3.1, SR3)[5]
Start age class (AC)	1	Range of age classes corresponding to key generic assumption that the critical receptor is a young female child aged 0–6. From Box 3.1, SR3[5]
End AC	6	
SOM (%)	6	Representative of sandy loamy soil according to EA guidance note dated January 2009 entitled 'Changes We Have Made to the CLEA Framework Documents'[13]
	1	To provide SAC for sites where SOM <6% as often observed by RSK
	2.5	
pH	7	Model default

Table 2: Residential without home-grown produce – modified receptor data

Parameter	Unit	Age class					
		1	2	3	4	5	6
Soil to skin adherence factor – (outdoor)	mg soil/cm^2 skin	0.1	0.1	0.1	0.1	0.1	0.1
Justification		Table 3.5, SP1010[3]					
Inhalation rate	m^3 day^{-1}	5.4	8.0	8.9	10.1	10.1	10.1
Justification		Mean value USEPA, 2011[12]; Table 3.2, SP1010[3]					
Notes: For **cadmium**, the exposure assessment for a residential land use is based on estimates representative of lifetime exposure AC1-18. This is because the TDI_{oral} and TDI_{inh} are based on considerations of the kidney burden accumulated over 50 years. It is therefore reasonable to consider exposure not just in childhood but averaged over a longer period. See the Environment Agency Science Report SC05002/ TOX 3[1], Science Report SC050021/Cadmium SGV[1] and the project report SP1010[3] for more information.							

References

1. Environment Agency (2009), 'Science Reports SC050021 - SGV and TOX reports for: benzene, toluene, ethylbenzene, xylene, mercury, selenium, nickel, arsenic, cadmium, phenol, dioxins, furans and dioxin-like PCBs'; 'Supplementary information for the derivation of SGV for: benzene, toluene, ethylbenzene, xylene, mercury, selenium, nickel, arsenic, cadmium, phenol, dioxins, furans and dioxin-like PCBs', and 'Contaminants in soil: updated collation of toxicological data and intake values for humans: benzene, toluene, ethylbenzene, xylene, mercury, selenium, nickel, arsenic, cadmium, phenol, dioxins, furans and dioxin-like PCBs'. Available at: https://www.gov.uk/government/publications/contaminants-in-soil-updated-collation-of-toxicological-data-and-intake-values-for-humans and https://www.gov.uk/government/publications/land-contamination-soil-guideline-values-sgvs (accessed 4 February 2015)

2. Nathanial, C. P., McCaffrey, C., Ashmore, M., Cheng, Y., Gillet, A. G., Ogden, R. C. and Scott, D. (2009), *LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment*, second edition (Nottingham: Land Quality Press).

3. Contaminated Land: Applications in Real Environment (CL:AIRE) (2014). 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination', Revision 2, DEFRA research project SP1010.

4. Department for Environment, Food and Rural Affairs (Defra) (2014), 'SP1010: Development of Category 4 Screening Levels for assessment of land affected by contamination – Policy Companion Document', Revision 2.

5. Environment Agency (2009), *Science Report – SC050021/SR3. Updated technical background to the CLEA model* (Bristol: Environment Agency).

6. Contaminated Land: Applications in Real Environment (CL:AIRE) (2014). 'Appendices C to H). DEFRA research project SP1010'.

7. Nathanial, C. P., McCaffrey, C., Gillet, A. G., Ogden, R. C. and Nathanial, J. F. (2015), *The LQM/CIEH S4ULs for Human Health Risk Assessment* (Nottingham: Land Quality Press).

8. Environment Agency (2009), *Human health toxicological assessment of contaminants in soil. Science Report – Final SC050021/SR2* (Bristol: Environment Agency).

9. Environment Agency (2009), *Science Report – SC050021/SR4 CLEA Software (version 1.05) Handbook* (Bristol: Environment Agency).

10. Environment Agency (2008), *Science Report SC050021/SR7. Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values* (Bristol: Environment Agency).

11. CL:AIRE (2010), *Soil Generic Assessment Criteria for Human Health Risk Assessment* (London: CL:AIRE).

12. USEPA (2011), *Exposure factors handbook*, EPA/600/R-090/052F (Washington, DC: Office of Research and Development).

13. Environment Agency (2009), 'Changes made to the CLEA framework documents after the three-month evaluation period in 2008', released January 2009.

14. USEPA (2010). Hydrogen cyanide and cyanide salts. Integrated Risk Information Systems (IRIS) Chemical Assessment Summary. September 2010. https://www.epa.gov/iris (accessed 9 December 2015)

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - RESIDENTIAL WITHOUT HOME-GROWN PRODUCE

Table 3

Human Health Generic Assessment Criteria by Pathway for Residential Scenario Without Home-Grown Produce

Compound	Notes	SAC Appropriate to Pathway SOM 1% (mg/kg)			Soil Saturation Limit (mg/kg)	SAC Appropriate to Pathway SOM 2.5% (mg/kg)			Soil Saturation Limit (mg/kg)	SAC Appropriate to Pathway SOM 6% (mg/kg)			Soil Saturation Limit (mg/kg)
		Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
Metals													
Arsenic	(a,b)	3.99E+01	5.26E+02	NR	NR	3.99E+01	5.26E+02	NR	NR	3.99E+01	5.26E+02	NR	NR
Barium	(b)	1.35E+03	NR	NR	NR	1.35E+03	NR	NR	NR	1.35E+03	NR	NR	NR
Beryllium		1.56E+02	1.72E+00	NR	NR	1.56E+02	1.72E+00	NR	NR	1.56E+02	1.72E+00	NR	NR
Boron		1.08E+04	5.20E+06	NR	NR	1.08E+04	5.20E+06	NR	NR	1.08E+04	5.20E+06	NR	NR
Cadmium	(a)	1.95E+02	4.88E+02	1.49E+02	NR	1.95E+02	4.88E+02	1.49E+02	NR	1.95E+02	4.88E+02	1.49E+02	NR
Chromium (III) - trivalent	(c)	1.98E+04	9.07E+02	NR	NR	1.98E+04	9.07E+02	NR	NR	1.98E+04	9.07E+02	NR	NR
Chromium (VI) - hexavalent	(a,d)	5.91E+01	2.06E+01	NR	NR	5.91E+01	2.06E+01	NR	NR	5.91E+01	2.06E+01	NR	NR
Copper		1.08E+04	1.41E+04	7.13E+03	NR	1.08E+04	1.41E+04	7.13E+03	NR	1.08E+04	1.41E+04	7.13E+03	NR
Lead	(a)	3.14E+02	NR	NR	NR	3.14E+02	NR	NR	NR	3.14E+02	NR	NR	NR
Elemental Mercury (Hg^0)	(d)	NR	2.41E-01	NR	4.31E+00	NR	5.74E-01	NR	1.07E+01	NR	1.25E+00	NR	2.58E+01
Inorganic Mercury (Hg^{2+})		5.71E+01	3.63E+03	5.62E+01	NR	5.71E+01	3.63E+03	5.62E+01	NR	5.71E+01	3.63E+03	5.62E+01	NR
Methyl Mercury (Hg^{4+})		1.80E+01	1.87E+01	9.16E+00	7.33E+01	1.80E+01	3.62E+01	1.20E+01	1.42E+02	1.80E+01	7.68E+01	1.46E+01	3.04E+02
Nickel	(d)	1.88E+02	1.81E+02	NR	NR	1.88E+02	1.81E+02	NR	NR	1.88E+02	1.81E+02	NR	NR
Selenium	(b)	4.31E+02	NR	NR	NR	4.31E+02	NR	NR	NR	4.31E+02	NR	NR	NR
Vanadium		1.17E+03	1.46E+03	NR	NR	1.17E+03	1.46E+03	NR	NR	1.17E+03	1.46E+03	NR	NR
Zinc	(b)	4.05E+04	3.63E+07	NR	NR	4.05E+04	3.63E+07	NR	NR	4.05E+04	3.63E+07	NR	NR
Cyanide (free)		4.03E+01	1.37E+04	4.02E+01	NR	4.03E+01	1.37E+04	4.02E+01	NR	4.03E+01	1.37E+04	4.02E+01	NR
Volatile Organic Compounds													
Benzene	(a)	7.36E+01	9.01E-01	8.90E-01	1.22E+03	7.36E+01	1.68E+00	1.64E+00	2.26E+03	7.36E+01	3.48E+00	3.33E+00	4.71E+03
Toluene		2.87E+04	9.08E+02	8.80E+02	8.69E+02	2.87E+04	2.00E+03	1.87E+03	1.92E+03	2.87E+04	4.55E+03	3.93E+03	4.36E+03
Ethylbenzene		1.29E+04	8.34E+01	8.29E+01	5.18E+02	1.29E+04	1.96E+02	1.93E+02	1.22E+03	1.29E+04	4.58E+02	4.42E+02	2.84E+03
Xylene - m		2.32E+04	8.25E+01	8.22E+01	6.25E+02	2.32E+04	1.95E+02	1.93E+02	1.47E+03	2.32E+04	4.56E+02	4.47E+02	3.46E+03
Xylene - o		2.32E+04	8.87E+01	8.83E+01	4.78E+02	2.32E+04	2.08E+02	2.06E+02	1.12E+03	2.32E+04	4.86E+02	4.76E+02	2.62E+03
Xylene - p		2.32E+04	7.93E+01	7.90E+01	5.76E+02	2.32E+04	1.86E+02	1.85E+02	1.35E+03	2.32E+04	4.36E+02	4.28E+02	3.17E+03
Total xylene		2.32E+04	7.93E+01	7.90E+01	6.25E+02	2.32E+04	1.86E+02	1.85E+02	1.47E+03	2.32E+04	4.36E+02	4.28E+02	3.46E+03
Methyl tertiary-Butyl ether (MTBE)		3.87E+04	1.04E+02	1.04E+02	2.04E+04	3.87E+04	1.69E+02	1.69E+02	3.31E+04	3.87E+04	3.21E+02	3.19E+02	6.27E+04
Trichloroethene		6.45E+01	1.72E-02	1.72E-02	1.54E+03	6.45E+01	3.59E-02	3.59E-02	3.22E+03	6.45E+01	7.98E-02	7.97E-02	7.14E+03
Tetrachloroethene		7.13E+02	1.79E-01	1.79E-01	4.24E+02	7.13E+02	4.02E-01	4.02E-01	9.51E+02	7.13E+02	9.21E-01	9.20E-01	2.18E+03
1,1,1-Trichloroethane		7.74E+04	9.01E+00	9.01E+00	1.43E+03	7.74E+04	1.84E+01	1.84E+01	2.92E+03	7.74E+04	4.04E+01	4.04E+01	6.39E+03
1,1,1,2 Tetrachloroethane		7.34E+02	1.54E+00	1.53E+00	2.60E+03	7.34E+02	3.56E+00	3.55E+00	6.02E+03	7.34E+02	8.29E+00	8.20E+00	1.40E+04
1,1,2,2-Tetrachloroethane		7.34E+02	3.92E+00	3.90E+00	2.67E+03	7.34E+02	8.04E+00	7.95E+00	5.46E+03	7.34E+02	1.76E+01	1.72E+01	1.20E+04
Carbon Tetrachloride		5.15E+02	2.58E-02	2.58E-02	1.52E+03	5.15E+02	5.65E-02	5.64E-02	3.32E+03	5.15E+02	1.28E-01	1.28E-01	7.54E+03
1,2-Dichloroethane		1.55E+01	9.20E-03	9.20E-03	3.41E+03	1.55E+01	1.33E-02	1.33E-02	4.91E+03	1.55E+01	2.28E-02	2.27E-02	8.43E+03
Vinyl Chloride		1.81E+00	7.73E-04	7.73E-04	1.36E+03	1.81E+00	1.00E-03	9.99E-04	1.76E+03	1.81E+00	1.53E-03	1.53E-03	2.69E+03
1,2,4-Trimethylbenzene		NR	5.58E+00	NR	4.74E+02	NR	1.29E+01	NR	1.16E+03	NR	2.69E+01	NR	2.76E+03
1,3,5-Trimethylbenzene	(e)	NR	NR	NR	2.30E+02	NR	NR	NR	5.52E+02	NR	NR	NR	1.30E+03
Semi-Volatile Organic Compounds													
Acenaphthene		7.64E+03	4.86E+04	6.60E+03	5.70E+01	7.64E+03	1.18E+05	7.17E+03	1.41E+02	7.64E+03	2.68E+05	7.43E+03	3.36E+02
Acenaphthylene		7.65E+03	4.59E+04	6.55E+03	8.61E+01	7.65E+03	1.11E+05	7.15E+03	2.12E+02	7.65E+03	2.53E+05	7.42E+03	5.06E+02
Anthracene		3.82E+04	1.53E+05	3.06E+04	1.17E+00	3.82E+04	3.77E+05	3.47E+04	2.91E+00	3.82E+04	8.76E+05	3.66E+04	6.96E+00
Benzo(a)anthracene		1.98E+01	2.47E+01	1.10E+01	1.71E+00	1.98E+01	4.37E+01	1.36E+01	4.28E+00	1.98E+01	6.26E+01	1.50E+01	1.03E+01
Benzo(a)pyrene	(a)	5.34E+00	3.51E+01	NR	9.11E-01	5.34E+00	3.77E+01	NR	2.28E+00	5.34E+00	3.89E+01	NR	5.46E+00
Benzo(b)fluoranthene		4.97E+00	1.93E+01	3.95E+00	1.22E+00	4.97E+00	2.13E+01	4.03E+00	3.04E+00	4.97E+00	2.22E+01	4.06E+00	7.29E+00
Benzo(g,h,i)perylene		4.38E+02	1.87E+03	3.55E+02	1.54E-02	4.38E+02	1.94E+03	3.58E+02	3.85E-02	4.38E+02	1.97E+03	3.59E+02	9.23E-02
Benzo(k)fluoranthene		1.31E+02	5.41E+02	1.06E+02	6.87E-01	1.31E+02	5.76E+02	1.07E+02	1.72E+00	1.31E+02	5.91E+02	1.07E+02	4.12E+00
Chrysene		3.95E+01	1.19E+02	2.97E+01	4.40E-01	3.95E+01	1.49E+02	3.12E+01	1.10E+00	3.95E+01	1.66E+02	3.19E+01	2.64E+00
Dibenzo(a,h)anthracene		3.95E-01	1.45E+00	3.10E-01	3.93E-03	3.95E-01	1.64E+00	3.18E-01	9.82E-03	3.95E-01	1.74E+00	3.22E-01	2.36E-02
Fluoranthene		1.59E+03	3.83E+04	1.53E+03	1.89E+01	1.59E+03	8.87E+04	1.56E+03	4.73E+01	1.59E+03	1.83E+05	1.58E+03	1.13E+02

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - RESIDENTIAL WITHOUT HOME-GROWN PRODUCE

Table 3

Human Health Generic Assessment Criteria by Pathway for Residential Scenario Without Home-Grown Produce

Compound	Notes	SAC Appropriate to Pathway SOM 1% (mg/kg)			Soil Saturation Limit (mg/kg)	SAC Appropriate to Pathway SOM 2.5% (mg/kg)			Soil Saturation Limit (mg/kg)	SAC Appropriate to Pathway SOM 6% (mg/kg)			Soil Saturation Limit (mg/kg)
		Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
Fluorene		5.09E+03	6.20E+03	2.80E+03	3.09E+01	5.09E+03	1.53E+04	3.82E+03	7.65E+01	5.09E+03	3.62E+04	4.47E+03	1.83E+02
Indeno(1,2,3-cd)pyrene		5.65E+01	2.12E+02	4.46E+01	6.13E-02	5.65E+01	2.38E+02	4.56E+01	1.53E-01	5.65E+01	2.50E+02	4.60E+01	3.68E-01
Naphthalene		2.50E+03	2.33E+01	2.31E+01	7.64E+01	2.50E+03	5.58E+01	5.46E+01	1.83E+02	2.50E+03	1.31E+02	1.25E+02	4.32E+02
Phenanthrene		1.58E+03	7.17E+03	1.30E+03	3.60E+01	1.58E+03	1.76E+04	1.45E+03	8.96E+01	1.58E+03	4.07E+04	1.52E+03	2.14E+02
Pyrene		3.82E+03	8.79E+04	3.66E+03	2.20E+00	3.82E+03	2.04E+05	3.75E+03	5.49E+00	3.82E+03	4.23E+05	3.79E+03	1.32E+01
Phenol		6.48E+04	4.58E+02	4.55E+02	2.42E+04	6.48E+04	6.95E+02	6.88E+02	3.81E+04	6.48E+04	1.19E+03	1.17E+03	7.03E+04
Total Petroleum Hydrocarbons													
Aliphatic hydrocarbons EC_5-EC_6		3.23E+05	4.24E+01	4.24E+01	3.04E+02	3.23E+05	7.79E+01	7.79E+01	5.58E+02	3.23E+05	1.61E+02	1.61E+02	1.15E+03
Aliphatic hydrocarbons >EC_6-EC_8		3.23E+05	1.04E+02	1.04E+02	1.44E+02	3.23E+05	2.31E+02	2.31E+02	3.22E+02	3.23E+05	5.29E+02	5.29E+02	7.36E+02
Aliphatic hydrocarbons >EC_8-EC_{10}		6.45E+03	2.68E+01	2.68E+01	7.77E+01	6.45E+03	6.55E+01	6.53E+01	1.90E+02	6.45E+03	1.56E+02	1.55E+02	4.51E+02
Aliphatic hydrocarbons >EC_{10}-EC_{12}		6.45E+03	1.33E+02	1.32E+02	4.75E+01	6.45E+03	3.31E+02	3.27E+02	1.18E+02	6.45E+03	7.93E+02	7.67E+02	2.83E+02
Aliphatic hydrocarbons >EC_{12}-EC_{16}		6.45E+03	1.11E+03	1.06E+03	2.37E+01	6.45E+03	2.78E+03	2.42E+03	5.91E+01	6.45E+03	6.67E+03	4.37E+03	1.42E+02
Aliphatic hydrocarbons >EC_{16}-EC_{35}	(b)	6.50E+04	NR	NR	8.48E+00	9.25E+04	NR	NR	2.12E+01	1.11E+05	NR	NR	5.09E+01
Aliphatic hydrocarbons >EC_{35}-EC_{44}	(b)	6.50E+04	NR	NR	8.48E+00	9.25E+04	NR	NR	2.12E+01	1.11E+05	NR	NR	5.09E+01
Aromatic hydrocarbons >EC_8-EC_{10}		2.58E+03	4.74E+01	4.72E+01	6.13E+02	2.58E+03	1.16E+02	1.15E+02	1.50E+03	2.58E+03	2.77E+02	2.69E+02	3.58E+03
Aromatic hydrocarbons >EC_{10}-EC_{12}		2.58E+03	2.58E+02	2.52E+02	3.64E+02	2.58E+03	6.39E+02	5.94E+02	8.99E+02	2.58E+03	1.52E+03	1.24E+03	2.15E+03
Aromatic hydrocarbons >EC_{12}-EC_{16}		2.58E+03	2.85E+03	1.80E+03	1.69E+02	2.58E+03	7.07E+03	2.30E+03	4.19E+02	2.58E+03	1.68E+04	2.48E+03	1.00E+03
Aromatic hydrocarbons >EC_{16}-EC_{21}	(b)	1.86E+03	NR	NR	5.37E+01	1.90E+03	NR	NR	1.34E+02	1.92E+03	NR	NR	3.21E+02
Aromatic hydrocarbons >EC_{21}-EC_{35}	(b)	1.93E+03	NR	NR	4.83E+00	1.93E+03	NR	NR	1.21E+01	1.93E+03	NR	NR	2.90E+01
Aromatic hydrocarbons >EC_{35}-EC_{44}	(b)	1.93E+03	NR	NR	4.83E+00	1.93E+03	NR	NR	1.21E+01	1.93E+03	NR	NR	2.90E+01

Notes:

EC - equivalent carbon. GrAC - groundwater assessment criteria. SAC - soil assessment criteria.

The CLEA model output is colour coded depending upon whether the soil saturation limit has been exceeded.

Calculated SAC exceeds soil saturation limit and may significantly affect the interpretation of any exceedances as the contribution of the indoor and outdoor vapour pathway to total exposure is >10%.

Calculated SAC exceeds soil saturation limit but the exceedance will not affect the SAC significantly as the contribution of the indoor and outdoor vapour pathway to total exposure is <10%.

Calculated SAC does not exceed the soil saturation limit.

The SAC for organic compounds are dependant upon soil organic matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58. 1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.

SAC for TPH fractions, PAHs napthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway (Section 10.1.1, SR3)

(a) SAC for arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead are derived using the C4SL toxicology data.

(b) SAC for boron and selenium should not include the inhalation pathway as no expert group HCV has been derived; aliphatic and aromatic hydrocarbons >EC16 should not include inhalation pathway due to their non-volatile nature and inhalation exposure being minimal (oral, dermal and inhalation exposure is compared to the oral HCV); arsenic should only be based on oral contribution (rather than combined) owing to the relative small contribution from inhalation in accordance with the SGV report. The Oral SAC should be adopted for zinc and benzo(a)pyrene.

(c) SAC for CrIII should be based on the lower of the oral and inhalation SAC (see LQM/CIEH 2015 Section 6.8)

(d) SAC for elemental mercury, chromium VI and nickel should be based on the inhalation pathway only.

(e) SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used.

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - RESIDENTIAL WITHOUT HOME-GROWN PRODUCE

Table 4
Human health generic assessment criteria for residential without home-grown produce

Compound	SAC for Soil SOM 1% (mg/kg)	SAC for Soil SOM 2.5% (mg/kg)	SAC for Soil SOM 6% (mg/kg)
Metals			
Arsenic	40	40	40
Barium	1,300	1,300	1,300
Beryllium	1.7	1.7	1.7
Boron	11,000	11,000	11,000
Cadmium	149	149	149
Chromium (III) - trivalent	910	910	910
Chromium (VI) - hexavalent	21	21	21
Copper	7,100	7,100	7,100
Lead	310	310	310
Elemental Mercury (Hg^0)	0.2	0.6	1.2
Inorganic Mercury (Hg^{2+})	56	56	56
Methyl Mercury (Hg^{4+})	9	12	15
Nickel	180	180	180
Selenium	430	430	430
Vanadium	1,200	1,200	1,200
Zinc	40,000	40,000	40,000
Cyanide (free)	40	40	40
Volatile Organic Compounds			
Benzene	0.9	1.6	3.3
Toluene	900 (869)	1,900	3,900
Ethylbenzene	80	190	440
Xylene - m	80	190	450
Xylene - o	90	210	480
Xylene - p	80	180	430
Total xylene	80	180	430
Methyl tertiary-Butyl ether (MTBE)	100	170	320
Trichloroethene	0.02	0.04	0.08
Tetrachloroethene	0.2	0.4	0.9
1,1,1-Trichloroethane	9.0	18.4	40.4
1,1,1,2 Tetrachloroethane	1.5	3.5	8.2
1,1,2,2-Tetrachloroethane	3.9	8.0	17.2
Carbon Tetrachloride	0.026	0.056	0.128
1,2-Dichloroethane	0.009	0.013	0.023
Vinyl Chloride	0.0008	0.0010	0.0015
1,2,4-Trimethylbenzene	5.6	12.9	26.9
1,3,5-Trimethylbenzene	NR	NR	NR
Semi-Volatile Organic Compounds			
Acenaphthene	6,600 (57)	7,200	7,400
Acenaphthylene	6,600 (86)	7,200	7,400
Anthracene	31,000 (1.17)	35,000	37,000
Benzo(a)anthracene	11.0	13.6	15.0
Benzo(a)pyrene	5.3	5.3	5.3
Benzo(b)fluoranthene	4.0	4.0	4.1
Benzo(g,h,i)perylene	355	358	359
Benzo(k)fluoranthene	106	107	107
Chrysene	30	31	32
Dibenzo(a,h)anthracene	0.31	0.32	0.32
Fluoranthene	1,500	1,600	1,600
Fluorene	2,800 (31)	3,800 (77)	4,500 (183)
Indeno(1,2,3-cd)pyrene	45	46	46
Naphthalene	23	55	125
Phenanthrene	1,300 (36)	1,450	1,520
Pyrene	3,700	3,800	3,800
Phenol	440*	688	1,170
Total Petroleum Hydrocarbons			
Aliphatic hydrocarbons EC_5-EC_6	42	78	161
Aliphatic hydrocarbons >EC_6-EC_8	100	230	530
Aliphatic hydrocarbons >EC_8-EC_{10}	27	65	155
Aliphatic hydrocarbons >EC_{10}-EC_{12}	130 (48)	330 (118)	770 (283)
Aliphatic hydrocarbons >EC_{12}-EC_{16}	1,100 (24)	2,400 (59)	4,400 (142)
Aliphatic hydrocarbons >EC_{16}-EC_{35}	65,000 (8)	92,000 (21)	111,000
Aliphatic hydrocarbons >EC_{35}-EC_{44}	65,000 (8)	92,000 (21)	111,000
Aromatic hydrocarbons >EC_8-EC_{10}	47	115	269
Aromatic hydrocarbons >EC_{10}-EC_{12}	300	600	1,200
Aromatic hydrocarbons >EC_{12}-EC_{16}	1,800 (169)	2,300 (419)	2,500
Aromatic hydrocarbons >EC_{16}-EC_{21}	1,900	1,900	1,900
Aromatic hydrocarbons >EC_{21}-EC_{35}	1,900	1,900	1,900
Aromatic hydrocarbons >EC_{35}-EC_{44}	1,900	1,900	1,900
Minerals			
Asbestos	Stage 1 test – No asbestos detected with ID; Stage 2 test - <0.001% dry weight (exceedance of either equates to an exceedance of the GAC)[1]		

Notes:
'-' Generic assessment criteria not calculated owing to low volatility of substance and therefore no pathway, or an absence of toxicological data.
NR - SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used
EC - equivalent carbon. SAC - soil assessment criteria.
[1] LOD for weight of asbestos per unit weight of soil calculated on a dry weight basis using PLM, handpicking and gravimetry.

The SAC for organic compounds are dependent on Soil Organic Matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58.
1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.

SAC for TPH fractions, PAHs napthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway, section 10.1.1, SR3.

(VALUE IN BRACKETS)
RSK has adopted an approach for petroleum hydrocarbons in accordance with LQM/CIEH whereby the concentration modelled for each petroleum hydrocarbon fraction has been tabulated as the SAC with the corresponding solubility or vapour saturation limits given in brackets.

APPENDIX K
GENERIC ASSESSMENT CRITERIA FOR PHYTOTOXIC EFFECTS

APPENDIX K
GENERIC ASSESSMENT CRITERIA FOR PHYTOTOXIC EFFECTS

Several compounds can inhibit plant growth; hence it is important to have generic assessment criteria (GAC) to promote healthy plant growth. In the absence of other published GAC, the GAC have been obtained from legislation (UK and European) and guidance related to the use of sewage sludge on agricultural fields.

The Council of European Communities Sewage Sludge Directive (86/278/EEC) dated 1986, has been transposed into UK law by Statutory Instrument No. 1263, The Sludge (use in Agriculture) Regulations 1989 (Public Health England, Wales and Scotland), as ammended in 1990 and The Sludge (use in Agriculture) Regulations (Northern Ireland) SR No, 245, 1990. In addition the Department of Environment (DoE) produced a Code of Practice (CoP) (Updated 2nd Edition) in 2006 which provided guidance on the application of sewage sludge on agricultural land (however the status of this document is unclear as it is on the archive section of the Defra website).

The directive seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to "***prevent harmful effects on soil, vegetation, animals and man".*** To this end, it prohibits the use of untreated sludge on agricultural land unless it is injected or incorporated into the soil. Treated sludge is defined as having undergone "biological, chemical or heat treatment, long-term storage or any other appropriate process so as significantly to reduce its fermentability and the health hazards resulting from its use". To provide protection against potential health risks from residual pathogens, sludge must not be applied to soil in which fruit and vegetable crops are growing, or less than ten months before fruit and vegetable crops are to be harvested. Grazing animals must not be allowed access to grassland or forage land less than three weeks after the application of sludge.

The specified limits of concentrations of selected elements in soil are presented in Table 4 of the updated 2nd Edition of the DoE Code of Practice and are designed to protect plant growth. It is noted that these values are more stringent than the values set in current UK regulations. However since they were ammended following recommendations from the Independent Scientific Committee in 1993. (MAFF/DOE 1993). The GAC are presented in Table 1.

Table 1: Generic assessment criteria

Determinant	Generic assessment criteria (mg/kg)			
	pH 5.0 < 5.5	pH 5.5 < 6.0	pH 6.0 < 7.0	pH >7.0
Zinc	200	200	200	300
Copper	80	100	135	200
Nickel	50	60	75	110
Lead	300	300	300	300
Cadmium	3	3	3	3
Mercury	1	1	1	1
Note: Only compounds with assessment criteria documented within the Directive 86/278/EEC have been included, although criteria for 5 additional compounds have been presented within the 2006 CoP.				

APPENDIX L
GENERIC ASSESSMENT CRITERIA FOR POTABLE WATER SUPPLY PIPES

A range of pipe materials is available and careful selection, design and installation is required to ensure that water supply pipes are satisfactorily installed and meet the requirements of the Water Supply (Water Fittings) Regulations 1999 in England and Wales, the Byelaws 2000 in Scotland and the Northern Ireland Water Regulations. The regulations include a requirement to use only suitable materials when laying water pipes and laying water pipes without protection is not permitted at contaminated sites. The water supply company has a statutory duty to enforce the regulations.

Contaminants in the ground can pose a risk to human health by permeating potable water supply pipes. To fulfil their statutory obligation, UK water supply companies require robust evidence from developers to demonstrate either that the ground in which new plastic supply pipes will be laid is free from specific contaminants, or that the proposed remedial strategy will mitigate any existing risk. If these requirements cannot be demonstrated to the satisfaction of the relevant water company, it becomes necessary to specify an alternative pipe material on the whole development or in specific zones.

In 2010, UK Water Industry Research (UKWIR) published *Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites* (Report Ref. No. 10/WM/03/21). This report reviewed previously published industry guidelines and threshold concentrations adopted by individual water supply companies.

The focus of the UKWIR research project was to develop clear and concise procedures, which provide consistency in the pipe selection decision process. It was intended to provide guidance that can be used to ensure compliance with current regulations and to prevent water supply pipe failing prematurely due to the presence of contamination.

The report concluded that in most circumstances only organic contaminants pose a potential risk to plastic pipe materials and Table 3.1 of the report provides threshold concentrations for polyethylene (PE) and polyvinyl chloride (PVC) pipes for the organic contaminants of concern. The report also makes recommendations for the procedures to be adopted in the design of site investigations and sampling strategies, and the assessment of data, to ensure that the ground through which water supply pipes will be laid is adequately characterised.

Risks to water supply pipes have therefore been assessed against the threshold concentrations for PE and PVC pipe specified in Table 3.1 of Report 10/WM/03/21, which have been adopted as the GAC for this linkage and are reproduced in Table A3 below.

Since water supply pipes are typically laid at a minimum depth of 0.75 m below finished ground levels, sample results from depths between 0.5 m and 1.5 m below finished level are generally considered suitable for assessing risks to water supply. Samples outside these depths can be used, providing the stratum is the same as that in which water supply pipes are likely to be located. The report specifies that sampling should characterise the ground conditions to a minimum of 0.5 m below the proposed depth of the pipe.

It should be noted that the assessment provided in this report is a guide and the method of assessment and recommendations should be checked with the relevant water supply company.

Table Q1: Generic assessment criteria for water supply pipes

		Pipe material	
		GAC (mg/kg)	
	Parameter group	**PE**	**PVC**
1	Extended VOC suite by purge and trap or head space and GC-MS with TIC (Not including compounds within group 1a)	0.5	0.125
1a	• BTEX + MTBE	0.1	0.03
2	SVOCs TIC by purge and trap or head space and GC-MS with TIC (aliphatic and aromatic C_5–C_{10}) (Not including compounds within group 2e and 2f)	2	1.4
2e	• Phenols	2	0.4
2f	• Cresols and chlorinated phenols	2	0.04
3	Mineral oil C_{11}–C_{20}	10	Suitable
4	Mineral oil C_{21}–C_{40}	500	Suitable
5	Corrosive (conductivity, redox and pH)	Suitable	Suitable
Specific suite identified as relevant following site investigation			
2a	Ethers	0.5	1
2b	Nitrobenzene	0.5	0.4
2c	Ketones	0.5	0.02
2d	Aldehydes	0.5	0.02
6	Amines	Not suitable	Suitable
Notes: where indicated as 'suitable', the material is considered resistant to permeation or degradation and no threshold concentration has been specified by UKWIR.			

APPENDIX M
GENERIC ASSESSMENT CRITERIA FOR CONTROLLED WATERS

GENERIC ASSESSMENT CRITERIA FOR CONTROLLED WATERS

Protection of the water environment

The water environment in the United Kingdom is protected under a number of regulatory regimes. The relevant environmental regulator is consulted where there may be a risk that pollution of 'controlled waters' may occur or may have occurred in the past.

The term 'controlled waters' refers to coastal waters, inland freshwaters and groundwater. The EU Water Framework Directive (WFD) (2000/60/EC) is implemented via domestic regulations and guidance, covering aspects of groundwater and surface water protection as well as drinking water supply policy. Domestic legislation and guidance will vary across the United Kingdom. Therefore, the relevant legislation for England, Wales, Northern Ireland and Scotland should be reviewed, alongside guidance provided by the Environment Agency (EA), Natural Resource Wales (NRW), the Scottish Environmental Protection Agency (SEPA) or the Northern Ireland Environment Agency (NIEA), as appropriate.

The main objectives of the protection and remediation of groundwater under threat from land contamination are set out within "The Environment Agency's approach to groundwater protection", version 1.0 (March 2017)[1] and the associated guidance "Land contamination groundwater compliance points: quantitative risk assessments (March 2017)[1a] that have replaced the previous guidance document "Groundwater Principles and Practice (GP3)". When assessing risks to groundwater, the following need to be considered:

- Where pollutants have not yet entered groundwater, all necessary and reasonable measures must be taken to:
    - ***prevent*** *the input of* ***hazardous*** *substances into groundwater (see description of hazardous substances below)*
    - ***limit*** *the entry of other (non-hazardous) pollutants into groundwater to avoid pollution, deterioration in the status of groundwater bodies and to prevent sustained, upward trends in pollutant concentrations in groundwater.*
- Where pollutants have already entered groundwater, the priority is to take all necessary and reasonable measures to:
    - ***minimise*** *further entry of "contaminants" where there is a defined source*
    - ***limit the pollution*** *of groundwater or any effect on the status of the groundwater body from the future expansion of the 'plume', if necessary, by actively reducing its extent.*

Within the context of groundwater risk assessments on sites affected by land contamination, "reasonable" means feasible without involving disproportionate costs. What costs are "disproportionate" depends on site-specific circumstances, which may include:

- Considerations of technical feasibility such as identified by the remedial options appraisal, this may be due to the distribution or nature of the contamination and the available remedial methods to treat the identified contamination;
- Sustainability considerations.

DEFINITIONS AND SUBSTANCE CLASSIFICATIONS

Risks to surface waters:

When assessing risks to surface waters, the following list of definitions should be understood:

Priority substances (PS) are harmful substances originally identified under the Water Framework Directive (WFD) 2000/60/EC as substances 'presenting a significant risk to or via the aquatic environment' at a European level. Member States are required to incorporate the identified **PS** into their country-wide monitoring programmes. There are currently 33 **PS** defined within the Priority Substances Directive (2013/39/EU; Annex 1), with a further 12 additional substances due to come into force from 22 December 2018. Directive 2013/39/EU has been transposed into domestic legislation for England and Wales by The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

Under the umbrella of **PS**, there is a sub-set of substances identified as being "hazardous", and these are referred to as **Priority hazardous substances (PHS).** The list of **PHS** is defined at EU level within the Priority Substances Directive (2013/39/EU). The WFD defines hazardous substances as 'substances (or groups of substances) that are toxic, persistent and liable to bio-accumulate, and other substances or groups of substances that give rise to an equivalent level of concern.' There are currently 15 **PHS**, with a further 6 additional substances due to come into force from 22 December 2018.

There is also another group of substances defined at EU level and which are referred to as **other pollutants (OP)** in Directive 2013/39/EU**.** These are additional substances which although not **priority substances**, have EQS which are identical to those laid down in the legislation which applied prior to 13 January 2009 (Directive 2008/105/EU). The **OP** are listed along with the **priority substance (PS)** within the Priority Substances Directive (2013/39/EU),and their associated EQS are also listed therein. There are 6 **OP** defined within the Priority Substances Directive (2013/39/EU).

In addition to the EU level substances, there are also a group of pollutants defined at a Member State level, referred to as **Specific pollutants (SP)**. These substances are pollutants which are released in significant quantities into water bodies in each of the individual European Member States. Under the WFD, Member States are required to set their own EQS for these substances. An indicative list of **SP** is given in Annex VIII of the WFD. Many of the substances categorised as **SP** in the UK were formerly List 2 substances under the old Groundwater Directive (80/68/EEC). The **SP** are defined within Part 2 (Table 1) of The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

Risks to groundwater:

When assessing risks to groundwater, the following definitions should be understood:

Under the requirements of the Groundwater Daughter Directive (2006/118/EU), the UK has published a list of substances it considers to be **hazardous substances** with respect to groundwater. In their advisory capacity to the government, this list has been derived by the UK Joint Agencies Groundwater Directive Advisory Group (JAGDAG), of which the Environment Agency is a member. The JAGDAG list of **hazardous substances** was published in January 2017 and the Environment Agency will use the updated list of hazardous substances from this date for all new activities that may lead to the discharge of hazardous substances to groundwater. The list is extensive and can be found in full at:

https://www.wfduk.org/stakeholders/jagdag

Selecting the appropriate assessment criteria

When assessing the risks to controlled waters, various assessment criteria apply, depending on the nature of the assessment and the conceptual site model.

Where a surface water body is involved, then Environmental Quality Standards (EQS) are the relevant assessment criteria as they are designed to be protective of surface water ecology.

Where a public water supply or a Principal aquifer is involved, then the standards defined in The Water Supply (Water Quality) Regulations[2] are the primary source of assessment criteria. The Private Water Supplies Regulations[3] may also be applicable in some cases. For instances where there are no UK assessment criteria, then the World Health Organisation (WHO) drinking water guidelines[4] may be used.

This appendix presents the generic assessment criteria (GAC) that RSK considers suitable for assessing risks to controlled waters for our most commonly encountered determinants. A full list of EQS for England and Wales are included in The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

The RSK GAC for controlled waters are presented in **Table 1** and **Table 2**. In line with the Environment Agency's Remedial Targets Methodology, the GAC for controlled waters are termed 'target concentrations'.

The appropriate target concentrations should be selected with consideration to:

- the site conceptual model (i.e. the receptor at potential risk);
- whether the substance is already present in groundwater at the site;
- whether or not the substance is classified as a priority hazardous substance under the Priority Substances Directive (2013/39/EC) (see above), or as a hazardous substance according to the current list of JAGDAG determinations[5]; and
- background concentrations in the aquifer (if applicable).

It is important to remember that the WFD and Environment Agency guidance[1 & 1a] support a sustainable, risk-based approach be applied to groundwater contamination. Exceedance of any target concentration does not necessarily imply that an unacceptable risk exists or that remediation is inevitably required.

Target concentrations shaded in green are statutory values	Target concentrations shaded in orange are non-statutory values

Note: Units µg/l throughout (unless otherwise stated)

Table 1: Target concentrations for controlled waters (excluding TPH CWG fractions)

Substance classification		Determinant	Target concentrations (µg/l)			
					EQS or best equivalent	
Groundwater receptors[5]	Surface water receptors[6]		Minimum reporting value	UK drinking water standard (or best equivalent)	Freshwater	Transitional (estuaries) and coastal waters
Metals & other inorganics						
Hazardous substance	Specific pollutant	Arsenic	-	10[2]	50[6a]	25[6a]
Non-hazardous pollutant	Priority substance	Cadmium	0.1[7]	5[2]	≤0.08, 0.08, 0.09, 0.15, 0.25 [6b]	0.2[6a]
(Not determined)	-	Chromium (total)	-	50[2]	8.1 Sum values for chromium III and VI	-
(None	Specific pollutant	Chromium (III)	-	Use value for total chromium	4.7[6a]	-
Hazardous substance	Specific pollutant	Chromium (VI)			3.4[6a]	0.6[6a]

Substance classification		Determinant	Target concentrations (µg/l)			
			Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
Groundwater receptors[5]	Surface water receptors[6]				Freshwater	Transitional (estuaries) and coastal waters
(Not determined)	Specific pollutant	Copper	-	2,000[2]	1 bioavailable[6a]	3.76 dissolved, where DOC ≤1mg/l[6a] 3.76µg/l + (2.677µg/l x ((DOC/2) – 0.5µg/l)) dissolved, where DOC >1mg/l[6a]
Hazardous substance	Priority substance	Lead	-	10[2]	1.2 bioavailable[6a]	1.3[6a]
Hazardous substance	**Priority hazardous substance**	Mercury	0.01[7]	1[2]	0.07[6c]	0.07[6c]
Non-hazardous pollutant	Priority substance	Nickel	-	20[2]	4.0 bioavailable[6a]	8.6[6a]
Non-hazardous pollutant	-	Selenium	-	10[2]	-	-
Non-hazardous pollutant	Specific pollutant	Zinc	-	3,000[8]	10.9 bioavailable[6a]	6.8 dissolved [6a]
None	Specific pollutant	Iron	-	200[2]	1000[6a]*1	1000[6a])*1
None	Specific pollutant	Manganese	-	50[2] (0.05mg/l)	123 bioavailable[6a] (0.123mg/l)	-
(Not determined)	-	Aluminium	-	200[2]	-	-

Substance classification		Determinant	Target concentrations (µg/l)			
Groundwater receptors[5]	Surface water receptors[6]		Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
					Freshwater	Transitional (estuaries) and coastal waters
Hazardous substance	**Priority hazardous substance**	Tributyltin compounds (Tributyltin-cation)	0.001[7]	-	0.0002[6a]	0.0002[6a]
(Not determined)	-	Sodium	-	200,000[2] (200 mg/l)	-	-
Non-hazardous pollutant	Specific pollutant	Cyanide (Hydrogen cyanide)	-	50[2] (0.05 mg/l)	1[6a] (0.001 mg/l)	1[6a] (0.001 mg/l)
Non-hazardous pollutant	-	Total ammoniacal nitrogen[$]	-	500[2] (0.5 mg/l) as NH_4 (472 expressed as NH_3; 389 expressed as N)	300[6f] (0.3 mg/l) as N (364 expressed as NH_3; 386 expressed as NH_4)	-
Non-hazardous pollutant	Specific pollutant	Ammonia un-ionised (equilibrium ratio calculated) (NH_3)	-	-	-	21[6a] (0.021 mg/l)
Non-hazardous pollutant	Specific pollutant	Chlorine	-	-	2[6a] (0.002 mg/l)	10[6d] (0.01 mg/l)
(Not determined)	-	Chloride	-	250,000[2] (250 mg/l)	-	-
(Not determined)	-	Sulphate	-	250,000[2] (250 mg/l)	-	-
(Not determined)	-	Nitrate (as NO_3)	-	50,000[2] (50 mg/l)	-	-

Substance classification		Determinant	Target concentrations (µg/l)			
			Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
Groundwater receptors[5]	Surface water receptors[6]				Freshwater	Transitional (estuaries) and coastal waters
(Not determined)	-	Nitrite (as NO_2)	-	500[2] (0.5 mg/l)	10[9] (0.01 mg/l)	-
Volatile organic compounds (VOC)						
Non-hazardous pollutant	Other pollutant	Tetrachloroethene (tetrachloroethylene; PCE)	0.1[7]	10[2] sum of TCE and PCE	10[6a]	10[6a]
Hazardous substance	Other pollutant	Trichloroethene (trichloroethylene; TCE)	0.1[7]		10[6a]	10[6a]
None	Specific pollutant	Tetrachloroethane	-	-	140[6a]	-
Hazardous substance	Other pollutant	Carbon tetrachloride (tetrachloromethane)	0.1[7]	3.0[2]	12[6a]	12[6a]
Non-hazardous pollutant	Priority substance	1,2-Dichloroethane	1.0[7]	3.0[2]	10[6a]	10[6a]
Non-hazardous pollutant	-	1.2-Dichloroethene (DCE) sum of cis and trans	-	50.0[4]	-	-
Hazardous substance	-	Vinyl chloride (chloroethene)	-	0.5[2]	-	-
Non-hazardous pollutant	Priority substance	Dichloromethane	-	20[4]	20[6a]	20[6a]
Non-hazardous pollutant	Priority substance	Trichlorobenzenes	0.01[7]	-	0.4[6a]	0.4[(6a)]

Substance classification		Determinant	Target concentrations (µg/l)			
			Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
Groundwater receptors[5]	Surface water receptors[6]				Freshwater	Transitional (estuaries) and coastal waters
Hazardous substance	Priority substance	Trichloromethane (Chloroform)	0.1[7]	100[2a] (sum of **trihalomethanes** – chloroform, bromform, dibromochloromethane, bromodichloromethane)	2.5[6a]	2.5[6a]
(Not determined)	-	Bromoform	-		-	-
(Not determined)	-	Dibromochloromethane	-		-	-
(Not determined)	-	Bromodichloromethane	-		-	-
Non-hazardous pollutant	**Priority hazardous substance**	Di(2-ethylhexyl) phthalate (bis(2-ethylhexyl) phthalate, DEHP)	-	8[4]	1.3[6a]	1.3[6a]
None	Specific pollutant	Benzyl butyl phthalate	-	-	7.5[6a]	0.75[6e]
Hazardous substance	**Priority hazardous substance**	Hexachlorobutadiene (as a pesticide, but reported in a VOC suite)	0.005[7]	0.1[2]	0.6[6c]	0.6[6c]
Semi-volatile organic compounds (SVOC)						
(Not determined)	-	Acenaphthylene (Aro EC12-EC16)	-	-	5.8[10]	
Hazardous substance	**Priority hazardous substance**	Anthracene (Aro EC16-EC21)	-	-	0.1[6a]	0.1[6a]

Substance classification		Determinant	Target concentrations (µg/l)			
			Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
Groundwater receptors[5]	Surface water receptors[6]				Freshwater	Transitional (estuaries) and coastal waters
Non-hazardous pollutant	Priority substance	Naphthalene (Aro EC10-EC12)	-	-	2[6a]	2[6a]
Hazardous substance	Priority substance	Fluoranthene (Aro EC21-EC35) not used as an indicator for this EC band	-	-	0.0063[6a]	0.0063[6a]
Hazardous substance(s)	**Priority hazardous substance(s)**	Benzo(a)pyrene (Aro EC21-EC35)	-	0.01[2]	0.00017[6a]	0.00017[6a]
		Benzo(b)fluoranthene (Aro EC21-EC35)	-	0.1[2] sum of the concentration of the four specified compounds	No EQS for these substances. B(a)P should be used as the indicator compound instead.	
		Benzo(k)fluoranthene (Aro EC21-EC35)	-			
		Benzo(g,h,i)perylene (Aro EC21-EC35)	-			
		Indeno(1,2,3-cd) pyrene (Aro EC21-EC35)	-			
Non-hazardous pollutant	Specific pollutant	Phenol	-	-	7.7[6a]	7.7[6a]
Hazardous substance	Specific pollutant	2,4-Dichlorophenol	0.1[7]	-	4.2[6a]	0.42[6a]

Substance classification		Determinant	Target concentrations (µg/l)			
			Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
Groundwater receptors[5]	Surface water receptors[6]				Freshwater	Transitional (estuaries) and coastal waters
Hazardous substance	Priority substance	Pentachloro-phenol (PCP) (as a pesticide, but reported in an SVOC suite)	0.1[7]	0.1[2]	0.4[6a]	0.4[6a]
Petroleum hydrocarbons						
Hazardous substance	-	Total petroleum hydrocarbons	-	See Table 2 for individual (non-statutory) TPH CWG fractions with respect to drinking water receptors	See individual risk driving compounds (i.e. BTEX and PAH) for specific EQS	
Hazardous substance	Priority substance	Benzene (Aro EC5-EC7)	1[7]	1[2]	10[6a]	8[6a]
Hazardous substance	Specific pollutant	Toluene (Aro EC7-EC8)	4[7]	700[4]	74[6a]	74[6a]
Hazardous substance	-	Ethylbenzene (Aro EC8-EC10)	-	300[4]	300[11]	-
(Not determined)	-	Xylenes (Aro EC8-EC10)	3[7]	500[4]	30[11]	-
Non-hazardous pollutant	-	Methyl tertiary butyl ether (MTBE)	-	15[12]	-	

Substance classification		Determinant	Target concentrations (µg/l)			
			Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
Groundwater receptors[5]	Surface water receptors[6]				Freshwater	Transitional (estuaries) and coastal waters
Pesticides, fungicides, insecticides and herbicides						
(Not determined) – assume to be Hazardous Substance	-	Total pesticides	-	0.5[2]	-	-
(Not determined) - assume to be Hazardous Substance	-	Other individual pesticides (unless otherwise detailed below)	-	0.1[2]	-	-
Hazardous substance(s)	Other pollutant (Cyclodiene pesticides)	Aldrin	0.003[7]	0.03[2]	0.01[6a] (sum of all four)	0.005[6a] (sum of all four)
		Dieldrin	0.003[7]	0.03[2]		
		Endrin	0.003[7]	0.1[2b] ('other individual pesticide')		
		Isodrin*[2]	0.003[7]	0.1[2b] ('other individual pesticide')		
Hazardous substance	Other pollutant	DDT (total)	0.002[7]	0.1[2] ('other individual pesticide')	0.025[6a]	0.025[6a]
Hazardous substance	Specific pollutant	Carbendazim	-	0.1[2] ('other individual pesticide')	0.15[6a]	-

Substance classification		Determinant	Target concentrations (µg/l)			
Groundwater receptors[5]	Surface water receptors[6]		Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
					Freshwater	Transitional (estuaries) and coastal waters
Hazardous substance	Specific pollutant	Chlorothalonil	-	0.1[2] ('other individual pesticide')	0.035[6a]	-
Hazardous substance	Specific pollutant (until 22/12/18, after which it becomes a Priority substance)	Cypermethrin	-	0.1[2] ('other individual pesticide')	0.0001[6a] From 22/12/18: 8.0E^{-5}[6a]	0.0001[6a] From 22/12/18: 8.0E^{-6}[6a]
Hazardous substance	Specific pollutant	Dimethoate	0.01[7]	0.1[2] ('other individual pesticide')	0.48[6a]	0.48[6a]
(Not determined)	Specific pollutant	Glyphosate	-	0.1[2] ('other individual pesticide')	196[6a]	196[6a]
Hazardous substance	Specific pollutant	Linuron	-	0.1[2] ('other individual pesticide')	0.5[6a]	0.5[6a]
Non-hazardous pollutant	Specific pollutant	Mecoprop	0.04[7]	0.1[2] ('other individual pesticide')	18[6a]	18[6a]
Non-hazardous pollutant	Specific pollutant	Methiocarb	-	0.1[2] ('other individual pesticide')	0.01[6a]	-
Non-hazardous pollutant	Specific pollutant	Pendimethalin	-	0.1[2] ('other individual pesticide')	0.3[6a]	-

Substance classification		Determinant	Target concentrations (µg/l)			
Groundwater receptors[5]	Surface water receptors[6]		Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
					Freshwater	Transitional (estuaries) and coastal waters
Hazardous substance	Specific pollutant	Permethrin	0.001[7]	0.1[2] ('other individual pesticide')	0.001[6a]	0.0002[6a]
Hazardous substance	Priority substance	Alachlor	-	0.1[2] ('other individual pesticide')	0.3[6a]	0.3[6a]
Hazardous substance	Priority substance	Atrazine	0.03[7]	100[4] ('other individual pesticide')	0.6[6a]	0.6[6a]
Hazardous substance	Priority substance	Diuron	-	0.1[2] ('other individual pesticide')	0.2[6a]	0.2[6a]
Hazardous substance	**Priority hazardous substance**	Endosulphan	0.005[7]	0.1[2] ('other individual pesticide')	0.005[6a]	0.0005[6a]
Non-hazardous pollutant	Priority substance	Isoproturon	-	0.1[2] ('other individual pesticide')	0.3[6a]	0.3[6a]
Hazardous substance	Priority substance	Simazine	0.03[7]	0.1[2] ('other individual pesticide')	1[6a]	1 [6a]
Hazardous substance	**Priority hazardous substance**	Trifluralin	0.01[7]	0.1[2] ('other individual pesticide')	0.03[6a]	0.03[6a]

Substance classification		Determinant	Target concentrations (µg/l)			
Groundwater receptors[5]	Surface water receptors[6]		Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
					Freshwater	Transitional (estuaries) and coastal waters
(Not determined)	From 22/12/18: Priority substance	Dichlorvos	-	0.1[2] ('other individual pesticide')	From 22/12/18: 6.0E^{-4}[6a]	From 22/12/18: 6.0E^{-5}[6a]
Hazardous substance	From 22/12/18: Priority substance	Heptachlor and heptachlor epoxide	-	0.03[2]	From 22/12/18: 2.0E^{-7}[6a]	From 22/12/18: 1.0E^{-08}[6a]
Miscellaneous						
None	Specific pollutant	Triclosan (antibacterial agent)	-	-	0.1[6a]	0.1[6a]
Hazardous substance	**From 22/12/18: Priority hazardous substance**	Perfluoro-octane sulfonic acid (and its derivatives) (PFOS)	-	-	From 22/12/18: 6.5E^{-4}[6a]	From 22/12/18: 1.3E^{-4}[6a]
Hazardous substance	**From 22/12/18: Priority hazardous substance**	Hexabromo cyclododecane (HBCDD)	-	-	From 22/12/18: 0.0016[6a]	From 22/12/18: 0.0008[6a]

Substance classification		Determinant	Target concentrations (µg/l)			
Groundwater receptors[5]	Surface water receptors[6]		Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
					Freshwater	Transitional (estuaries) and coastal waters

Notes:

'-' A target concentration is not available.

$Please note that total ammonia (NH_4^+ and NH_3) is equivalent to ammoniacal nitrogen in laboratory reports

*1 Please note that although iron is listed in the 2015 Direction as 1.000 µg/l, the EQS remains at 1mg/l in Scotland and it is assumed this is an error and should read either 1,000 or 1000µg/l.

*2 Please note that although Isodrin is not listed in name within the group of "Cyclodiene pesticides" in Table 1 of Schedule 3 Part 3 of the 2015 Direction[6], the CAS number for Isodrin (465-73-6) **is** listed and therefore it is assumed that it has been missed off the named list of substances.

*3 Total petroleum hydrocarbons is used for consistency, but is an analytical method-defined measurement for a mixture of hydrocarbons subject to environmental analysis[11].

"Bioavailable" in relation to copper, zinc, nickel and manganese (but not lead) is the generic EQSbioavailable[6a] derived from the Metal Bioavailability Assessment Tool (M-BAT) developed by the Water Framework Directive UK Technical Advisory Group (WFDTAG). Exceedance of this value should prompt a site-specific assessment using the M-BAT with pH, DOC and Ca to derive a site-specific EQS termed the $PNEC_{dissolved}$. http://www.wfduk.org/resources/rivers-lakes-metal-bioavailability-assessment-tool-m-bat.

For zinc, if there is an exceedance of the EQSbioavailable in an initial GQRA, Tier 2 required that the EQS for zinc should also have the ambient background concentration of zinc added as well

Table 2: World Health Organization (WHO) guide values for TPH CWG fractions in drinking water[13] (as referenced in CL:AIRE, 2017[11])

TPH CWG fraction	WHO guide value for drinking water[13] (µg/l)
Aliphatic fractions:	
Aliphatic EC5-EC6	15,000
Aliphatic >EC6-EC8	15,000
Aliphatic >EC8-EC10	300
Aliphatic >EC10-EC12	300
Aliphatic >EC12-EC16	300
Aliphatic >EC16-EC21	-
Aliphatic >EC21-EC35	-
Aromatic fractions:	
Aromatic EC5-EC6	10 (benzene)
Aromatic >EC6-EC8	700 (toluene)
Aromatic >EC8-EC10	300 (ethyl benzene) 500 (xylenes)
Aromatic >EC10-EC12	90
Aromatic >EC12-EC16	90
Aromatic >EC16-EC21	90
Aromatic >EC21-EC35	90
Reference: World Health Organisation (WHO), 2008. Petroleum products in drinking-water. Background document for development of WHO guidelines for drinking water quality. WHO/SDE/WSH/05.08/123. World Health Organisation, Geneva[13].	

References

1. Environment Agency (2017), 'The Environment Agency's approach to groundwater protection', version 1.0, March 2017 (formerly contained within GP3) [accessed 29 March 2017]. https://www.gov.uk/government/collections/groundwater-protection

1a. Environment Agency (2017), 'Land contamination groundwater compliance points: quantitative risk assessments', March 2017 (formerly contained within GP3) [accessed 29 March 2017]. https://www.gov.uk/government/collections/groundwater-protection

2. The Water Supply (Water Quality) Regulations 2016 (SI 2016/619)
    2a. Sum of chloroform, bromoform, dibromochloromethane and bromodichloromethane
    2b. Standard applies to individual pesticides except aldrin, dieldrin, heptachlor and heptachlor epoxide, for which a separate standard is defined.
3. The Private Water Supplies (England) Regulations 2016. SI 2016 / 618
4. WHO (2011), *Guidelines for drinking-water quality*, 4th edn
5. JAGDAG hazard substance determinations: This list contains substances that are determined to be hazardous substances or non-hazardous pollutants for the purposes of the groundwater directive 2006/118/EC. The absence of an assessment or substance from the list means an assessment has not been done yet and is presented as 'Not yet determined'; if a substance has been assessed but does not fall into either category it is presented as 'None'. For further details on how substances are assessed, see the Joint Agencies Groundwater Directive Advisory Group (JAGDAG) 'Methodology for the determination of hazardous substances in groundwater for the purposes of the groundwater directive 2006/118/EC' which is available from the JAGDAG website. The methodology is a UK –wide framework that sets criteria for how to assess whether a substance is a hazardous substances in groundwater. The list of substances can be found at:

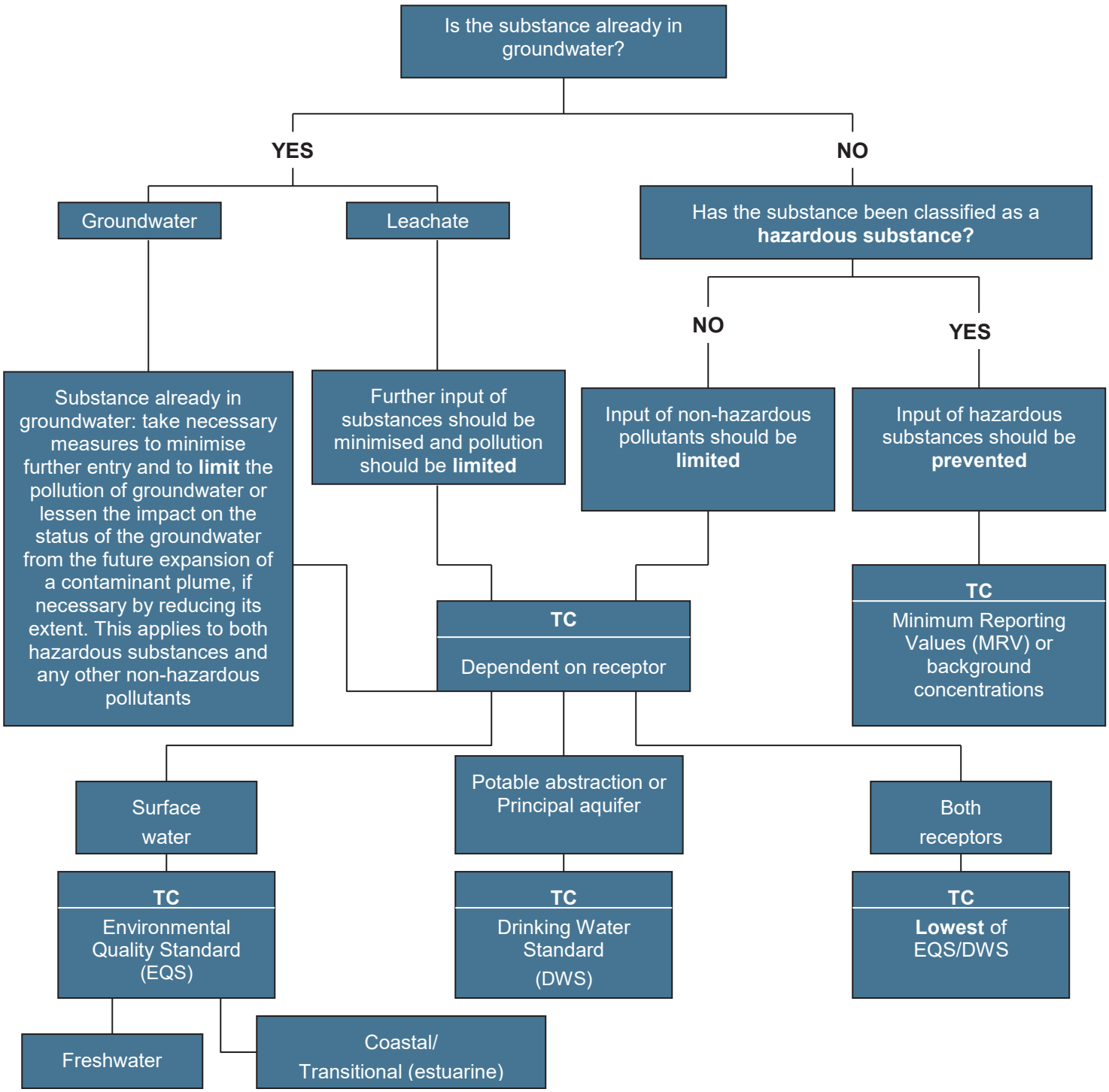
   https://www.wfduk.org/stakeholders/jagdag

6. The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.
    6a. The EQS for these substances are based on a "long term mean" or an "annual average (AA)" EQS.
    6b. For cadmium and its compounds the EQS values vary depending on the hardness of the water as specified in five class categories (Class 1: < 40 mg CaCO3/l, Class 2: 40 to < 50 mg CaCO3/l, Class 3: 50 to < 100 mg CaCO3/l, Class 4: 100 to < 200 mg CaCO3/l and Class 5: ≥ 200 mg CaCO3/l).
    6c. The EQS for Mercury and hexachlorobutadiene are based on a "maximum acceptable concentration (MAC)" EQS in absence of an "annual average (AA)" EQS.
    6d. The EQS for chlorine in saltwater is based on the 95th percentile concentration of total residual oxidant, which refers to the sum of all oxidising agents existing in water, expressed as available chlorine.
    6e. The recommended saltwater standard is derived using a safety factor of 100. Where the standard is failed, it is recommended that supporting evidence of ecological damage should be obtained before committing to expensive action.
    6f. EQS for total ammonia is as per Schedule 3, Part 1, Table 7 of of the above directions. EQS applies to river types 1, 2 and 4 and 6 (namely upland and low alkalinity). The EQS for a lowland and high alkalinity rivers (types 3, 5 and 7) is 600µg/l (0.6mg/l).

Additional information on the Metal Bioavailability Assessment Tool (M-BAT) is available at http://www.wfduk.org/resources/rivers-lakes-metal-bioavailability-assessment-tool-m-bat

7. Minimum reporting values listed at https://www.gov.uk/government/publications/values-for-groundwater-risk-assessments/hazardous-substances-to-groundwater-minimum-reporting-values (updated 13 January 2017; accessed 29 March 2017). Note target concentration for xylenes is 3 μg/l each for o-xylene and m/p xylene as it may not be possible to separate m- and p-xylene; 135 tcb, 124 tcb, 123 tcb each to 0.01 μg/l)
8. The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (as amended). SI 1996 / 3001
9. Council Directive on the Quality of Fresh Waters Needing Protection or Improvement in Order to Support Fish Life (Freshwater Fish Directive) (78/659/EEC)
10. WRc plc (2002), R&D Technical Report P45.
11. CL:AIRE, 2017. Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies. V1.1.
12. Drinking Water Inspectorate (London, UK). Environmental Information Request on MTBE in drinking water. Ref. DWI 1/10/18; dated 28 November 2006. Value is based on the odour threshold for MTBE, which is lower than a health-based guideline value
13. World Health Organisation (WHO), 2008. Petroleum products in drinking-water. Background document for development of WHO guidelines for drinking water quality. WHO/SDE/WSH/05.08/123. World Health Organisation, Geneva. [accessed 29 March 2017] http://www.who.int/water_sanitation_health/dwq/chemicals/petroleumproducts_2add_june2008.pdf

FLOW CHART TO ASSIST WITH SELECTION OF TARGET CONCENTRATIONS



TC = Target concentration

When leachate is being assessed the 'compliance point' is the groundwater body. Therefore dilution within the groundwater body may be applied with caution before comparing with the TC.

When directly assessing a receptor, e.g., a river, the appropriate TC should be selected.

APPENDIX N
WM3 ASSESSMENT

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Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name										
TP/WS/BH		WS201	WS201	WS203	WS203	WS204	WS205	WS205	WS207	WS208
Depth (m)		0.20	1.00	0.20	0.80	0.40	0.20	0.80	0.40	0.20
Envirolab reference		19/11914/1	19/11914/2	19/11914/3	19/11914/4	19/11914/6	19/11914/8	19/11914/9	19/11914/10	19/11914/12
% Moisture	%									
pH (soil)		7.52	7.63		8.09	9.35		9.04	8.93	13.05
pH (leachate)										
Arsenic	mg/kg	12	11		13	9		1	4	10
Cadmium	mg/kg	2	1		1	1		1	2	1
Copper	mg/kg	86	20		52	16		6	5	17
CrVI or Chromium	mg/kg	25	21		19	12		10	5	15
Lead	mg/kg	350	69		288	87		13	102	107
Mercury	mg/kg	2	0		1	1		1	1	0
Nickel	mg/kg	20	14		18	10		7	4	13
Selenium	mg/kg	1	1		1	1		1	1	1
Zinc	mg/kg	135	40		81	34		46	142	63
Barium	mg/kg									
Beryllium	mg/kg									
Vanadium	mg/kg									
Cobalt	mg/kg									
Manganese	mg/kg									
Molybdenum	mg/kg									
Antimony	mg/kg									
Aluminium	mg/kg									
Bismuth	mg/kg									
CrIII	mg/kg									
Iron	mg/kg									
Strontium	mg/kg									
Tellurium	mg/kg									
Thallium	mg/kg									
Titanium	mg/kg									
Tungsten	mg/kg									
Ammoniacal N	mg/kg									
ws Boron	mg/kg									
PAH (Input Total PAH **OR** individual PAH results)										
Acenaphthene	mg/kg	0.02	0.01		0.10	0.12		0.02	0.01	2.85
Acenaphthylene	mg/kg	0.04	0.01		0.29	0.17		0.01	0.01	10.10
Anthracene	mg/kg	0.15	0.02		0.66	0.45		0.02	0.02	15.50
Benzo(a)anthracene	mg/kg	0.66	0.04		2.83	3.44		0.05	0.04	27.20
Benzo(a)pyrene	mg/kg	0.59	0.04		2.90	3.71		0.06	0.04	18.50
Benzo(b)fluoranthene	mg/kg	0.75	0.05		3.60	4.11		0.08	0.05	20.10
Benzo(ghi)perylene	mg/kg	0.26	0.05		1.45	2.04		0.09	0.05	7.73
Benzo(k)fluoranthene	mg/kg	0.28	0.07		1.31	1.45		0.07	0.07	9.03
Chrysene	mg/kg	0.70	0.06		2.96	3.12		0.17	0.06	29.20
Dibenzo(ah)anthracene	mg/kg	0.05	0.04		0.31	0.40		0.04	0.04	2.00
Fluoranthene	mg/kg	1.63	0.08		6.03	5.55		0.08	0.08	64.60
Fluorene	mg/kg	0.03	0.01		0.22	0.15		0.09	0.01	8.99
Indeno(123cd)pyrene	mg/kg	0.31	0.03		1.75	2.31		0.03	0.03	9.86
Naphthalene	mg/kg	0.03	0.03		0.08	0.04		0.05	0.03	1.73
Phenanthrene	mg/kg	0.64	0.03		2.82	1.50		0.22	0.03	90.20
Pyrene	mg/kg	1.40	0.07		5.22	5.38		0.12	0.07	54.90
Coronene	mg/kg									
Total PAHs (16 or 17)	mg/kg	7.51	0.08		32.50	33.90		0.95	0.08	372.00
TPH										
Petrol	mg/kg									
Diesel	mg/kg									
Lube Oil	mg/kg									
Crude Oil	mg/kg									
White Spirit / Kerosene	mg/kg									
Creosote	mg/kg									
Unknown TPH with ID	mg/kg							1,600.0		2,680.0
Unknown TPHCWG	mg/kg	100.0	1.0		306.0	389.0			38.0	
Total Sulphide	mg/kg									
Complex Cyanide	mg/kg									
Free (or Total) Cyanide	mg/kg									
Thiocyanate	mg/kg									
Elemental/Free Sulphur	mg/kg									
Phenols Input Total Phenols HPLC **OR** individual Phenol results.										
Phenol	mg/kg									
Cresols	mg/kg									
Xylenols	mg/kg									
Resourcinol	mg/kg									
Phenols Total by HPLC	mg/kg									
BTEX Input Total BTEX **OR** individual BTEX results.										
Benzene	mg/kg	0.01	0.01		0.01	0.01		0.01	0.01	0.01
Toluene	mg/kg	0.01	0.01		0.01	0.01		0.01	0.01	0.01
Ethylbenzene	mg/kg	0.01	0.01		0.01	0.01		0.01	0.01	0.01
Xylenes	mg/kg	0.01	0.01		0.01	0.01		0.01	0.01	0.01
Total BTEX	mg/kg									
PCBs (POPs)										
PCBs Total (eg EC7/WHO12)	mg/kg									
PBBs (POPs)										
Hexabromobiphenyl (Total or PBB153; 2,2',4,4',5,5'- if only available)	mg/kg									

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Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name									
TP/WS/BH		WS201	WS201	WS203	WS203	WS204	WS205	WS205	WS207	WS208
Depth (m)		0.20	1.00	0.20	0.80	0.40	0.20	0.80	0.40	0.20
Envirolab reference		19/11914/1	19/11914/2	19/11914/3	19/11914/4	19/11914/6	19/11914/8	19/11914/9	19/11914/10	19/11914/12
POPs Dioxins and Furans Input Total Dioxins and Furans **OR** individual Dioxin and Furan results.										
2,3,7,8-TeCDD	mg/kg									
1,2,3,7,8-PeCDD	mg/kg									
1,2,3,4,7,8-HxCDD	mg/kg									
1,2,3,6,7,8-HxCDD	mg/kg									
1,2,3,7,8,9-HxCDD	mg/kg									
1,2,3,4,6,7,8-HpCDD	mg/kg									
OCDD	mg/kg									
2,3,7,8-TeCDF	mg/kg									
1,2,3,7,8-PeCDF	mg/kg									
2,3,4,7,8-PeCDF	mg/kg									
1,2,3,4,7,8-HxCDF	mg/kg									
1,2,3,6,7,8-HxCDF	mg/kg									
2,3,4,6,7,8-HxCDF	mg/kg									
1,2,3,7,8,9-HxCDF	mg/kg									
1,2,3,4,6,7,8-HpCDF	mg/kg									
1,2,3,4,7,8,9-HpCDF	mg/kg									
OCDF	mg/kg									
Total Dioxins and Furans	mg/kg									
Some Pesticides (POPs unless otherwise stated)										
Aldrin	mg/kg									
α Hexachlorocyclohexane (alpha-HCH) *(leave empty if total HCH results used)*	mg/kg									
β Hexachlorocyclohexane (beta-HCH) *(leave empty if total HCH results used)*	mg/kg									
α Cis-Chlordane (alpha) ***OR*** *Total Chlordane*	mg/kg									
δ Hexachlorocyclohexane (delta-HCH) *(leave empty if total HCH results used)*	mg/kg									
Dieldrin	mg/kg									
Endrin	mg/kg									
χ Hexachlorocyclohexane (gamma-HCH) (lindane) ***OR*** *Total HCH*	mg/kg									
Heptachlor	mg/kg									
Hexachlorobenzene	mg/kg									
o,p'-DDT *(leave empty if total DDT results used)*	mg/kg									
p,p'-DDT ***OR*** *Total DDT*	mg/kg									
χ Trans-Chlordane (gamma) *(leave empty if total Chlordane results used)*	mg/kg									
Chlordecone (kepone)	mg/kg									
Pentachlorobenzene	mg/kg									
Mirex	mg/kg									
Toxaphene (camphechlor)	mg/kg									
Tin										
Tin *(leave empty if Organotin and Tin excl Organotin results used)*	mg/kg									
Organotin										
Dibutyltin; DiBT	mg/kg									
Tributyltin; TriBT	mg/kg									
Triphenyltin; TriPT	mg/kg									
Tetrabutyltin; TeBT	mg/kg									
Tin excluding Organotin										
Tin excl Organotin	mg/kg									

Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name									
TP/WS/BH	WS201	WS201	WS203	WS203	WS204	WS205	WS205	WS207	WS208
Depth (m)	0.20	1.00	0.20	0.80	0.40	0.20	0.80	0.40	0.20
Envirolab reference	19/11914/1	19/11914/2	19/11914/3	19/11914/4	19/11914/6	19/11914/8	19/11914/9	19/11914/10	19/11914/12
Asbestos in Soil	Thresholds								
Asbestos detected in Soil (enter Y or N)	Y	N		N		N	N	N	N	N

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Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name									
TP/WS/BH		WS208							
Depth (m)		0.80							
Envirolab reference		19/11914/13							
% Moisture	%								
pH (soil)									
pH (leachate)									
Arsenic	mg/kg								
Cadmium	mg/kg								
Copper	mg/kg								
CrVI or Chromium	mg/kg								
Lead	mg/kg								
Mercury	mg/kg								
Nickel	mg/kg								
Selenium	mg/kg								
Zinc	mg/kg								
Barium	mg/kg								
Beryllium	mg/kg								
Vanadium	mg/kg								
Cobalt	mg/kg								
Manganese	mg/kg								
Molybdenum	mg/kg								
Antimony	mg/kg								
Aluminium	mg/kg								
Bismuth	mg/kg								
CrIII	mg/kg								
Iron	mg/kg								
Strontium	mg/kg								
Tellurium	mg/kg								
Thallium	mg/kg								
Titanium	mg/kg								
Tungsten	mg/kg								
Ammoniacal N	mg/kg								
ws Boron	mg/kg								
PAH (Input Total PAH **OR** individual PAH results)									
Acenaphthene	mg/kg								
Acenaphthylene	mg/kg								
Anthracene	mg/kg								
Benzo(a)anthracene	mg/kg								
Benzo(a)pyrene	mg/kg								
Benzo(b)fluoranthene	mg/kg								
Benzo(ghi)perylene	mg/kg								
Benzo(k)fluoranthene	mg/kg								
Chrysene	mg/kg								
Dibenzo(ah)anthracene	mg/kg								
Fluoranthene	mg/kg								
Fluorene	mg/kg								
Indeno(123cd)pyrene	mg/kg								
Naphthalene	mg/kg								
Phenanthrene	mg/kg								
Pyrene	mg/kg								
Coronene	mg/kg								
Total PAHs (16 or 17)	mg/kg								
TPH									
Petrol	mg/kg								
Diesel	mg/kg								
Lube Oil	mg/kg								
Crude Oil	mg/kg								
White Spirit / Kerosene	mg/kg								
Creosote	mg/kg								
Unknown TPH with ID	mg/kg								
Unknown TPHCWG	mg/kg								
Total Sulphide	mg/kg								
Complex Cyanide	mg/kg								
Free (or Total) Cyanide	mg/kg								
Thiocyanate	mg/kg								
Elemental/Free Sulphur	mg/kg								
Phenols Input Total Phenols HPLC **OR** individual Phenol results.									
Phenol	mg/kg								
Cresols	mg/kg								
Xylenols	mg/kg								
Resourcinol	mg/kg								
Phenols Total by HPLC	mg/kg								
BTEX Input Total BTEX **OR** individual BTEX results.									
Benzene	mg/kg								
Toluene	mg/kg								
Ethylbenzene	mg/kg								
Xylenes	mg/kg								
Total BTEX	mg/kg								
PCBs (POPs)									
PCBs Total (eg EC7/WHO12)	mg/kg								
PBBs (POPs)									
Hexabromobiphenyl (Total or PBB153; 2,2',4,4',5,5'- if only available)	mg/kg								

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Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name									
TP/WS/BH		WS208							
Depth (m)		0.80							
Envirolab reference		19/11914/13							

POPs Dioxins and Furans Input Total Dioxins and Furans **OR** individual Dioxin and Furan results.

2,3,7,8-TeCDD	mg/kg								
1,2,3,7,8-PeCDD	mg/kg								
1,2,3,4,7,8-HxCDD	mg/kg								
1,2,3,6,7,8-HxCDD	mg/kg								
1,2,3,7,8,9-HxCDD	mg/kg								
1,2,3,4,6,7,8-HpCDD	mg/kg								
OCDD	mg/kg								
2,3,7,8-TeCDF	mg/kg								
1,2,3,7,8-PeCDF	mg/kg								
2,3,4,7,8-PeCDF	mg/kg								
1,2,3,4,7,8-HxCDF	mg/kg								
1,2,3,6,7,8-HxCDF	mg/kg								
2,3,4,6,7,8-HxCDF	mg/kg								
1,2,3,7,8,9-HxCDF	mg/kg								
1,2,3,4,6,7,8-HpCDF	mg/kg								
1,2,3,4,7,8,9-HpCDF	mg/kg								
OCDF	mg/kg								
Total Dioxins and Furans	mg/kg								

Some Pesticides (POPs unless otherwise stated)

Aldrin	mg/kg								
α Hexachlorocyclohexane (alpha-HCH) *(leave empty if total HCH results used)*	mg/kg								
β Hexachlorocyclohexane (beta-HCH) *(leave empty if total HCH results used)*	mg/kg								
α Cis-Chlordane (alpha) ***OR*** *Total Chlordane*	mg/kg								
δ Hexachlorocyclohexane (delta-HCH) *(leave empty if total HCH results used)*	mg/kg								
Dieldrin	mg/kg								
Endrin	mg/kg								
χ Hexachlorocyclohexane (gamma-HCH) (lindane) ***OR*** *Total HCH*	mg/kg								
Heptachlor	mg/kg								
Hexachlorobenzene	mg/kg								
o,p'-DDT *(leave empty if total DDT results used)*	mg/kg								
p,p'-DDT ***OR*** *Total DDT*	mg/kg								
χ Trans-Chlordane (gamma) *(leave empty if total Chlordane results used)*	mg/kg								
Chlordecone (kepone)	mg/kg								
Pentachlorobenzene	mg/kg								
Mirex	mg/kg								
Toxaphene (camphechlor)	mg/kg								

Tin

Tin *(leave empty if Organotin and Tin excl Organotin results used)*	mg/kg								

Organotin

Dibutyltin; DiBT	mg/kg								
Tributyltin; TriBT	mg/kg								
Triphenyltin; TriPT	mg/kg								
Tetrabutyltin; TeBT	mg/kg								

Tin excluding Organotin

Tin excl Organotin	mg/kg								

Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name									
TP/WS/BH	WS208								
Depth (m)	0.80								
Envirolab reference	19/11914/13								

Asbestos in Soil	Thresholds								
Asbestos detected in Soil (enter Y or N)	Y								

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Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name										
TP/WS/BH		WS202	WS209	WS210	WS211	WS211				
Depth (m)		0.80	0.15	1.00	0.40	0.80				
Envirolab reference		19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6				
% Moisture	%									
pH (soil)		8.00	8.49	6.73	8.27	8.03				
pH (leachate)										
Arsenic	mg/kg	15	18	52	9	8				
Cadmium	mg/kg	1	1	2	1	1				
Copper	mg/kg	88	24	119	26	8				
CrVI or Chromium	mg/kg	17	18	26	16	15				
Lead	mg/kg	295	78	268	323	32				
Mercury	mg/kg	2	0	1	1	0				
Nickel	mg/kg	18	14	79	11	9				
Selenium	mg/kg	1	1	2	1	1				
Zinc	mg/kg	78	75	120	50	25				
Barium	mg/kg									
Beryllium	mg/kg									
Vanadium	mg/kg									
Cobalt	mg/kg									
Manganese	mg/kg									
Molybdenum	mg/kg									
Antimony	mg/kg									
Aluminium	mg/kg									
Bismuth	mg/kg									
CrIII	mg/kg									
Iron	mg/kg									
Strontium	mg/kg									
Tellurium	mg/kg									
Thallium	mg/kg									
Titanium	mg/kg									
Tungsten	mg/kg									
Ammoniacal N	mg/kg									
ws Boron	mg/kg									
PAH (Input Total PAH **OR** individual PAH results)										
Acenaphthene	mg/kg	0.02	0.04	0.01	0.02	0.01				
Acenaphthylene	mg/kg	0.07	0.04	0.01	0.04	0.01				
Anthracene	mg/kg	0.59	0.22	0.02	0.09	0.02				
Benzo(a)anthracene	mg/kg	1.44	0.86	0.04	0.55	0.10				
Benzo(a)pyrene	mg/kg	1.07	0.76	0.04	0.62	0.11				
Benzo(b)fluoranthene	mg/kg	1.02	0.73	0.05	0.57	0.11				
Benzo(ghi)perylene	mg/kg	0.58	0.56	0.05	0.40	0.09				
Benzo(k)fluoranthene	mg/kg	0.46	0.30	0.07	0.22	0.07				
Chrysene	mg/kg	1.21	0.79	0.06	0.60	0.12				
Dibenzo(ah)anthracene	mg/kg	0.17	0.11	0.04	0.09	0.04				
Fluoranthene	mg/kg	2.73	1.71	0.08	1.09	0.20				
Fluorene	mg/kg	0.06	0.04	0.01	0.02	0.01				
Indeno(123cd)pyrene	mg/kg	0.78	0.67	0.03	0.48	0.10				
Naphthalene	mg/kg	0.03	0.03	0.03	0.03	0.03				
Phenanthrene	mg/kg	1.08	0.72	0.08	0.41	0.10				
Pyrene	mg/kg	2.24	1.48	0.07	0.95	0.18				
Coronene	mg/kg									
Total PAHs (16 or 17)	mg/kg	13.50	9.06	0.08	6.15	1.13				
TPH										
Petrol	mg/kg									
Diesel	mg/kg									
Lube Oil	mg/kg									
Crude Oil										
White Spirit / Kerosene	mg/kg									
Creosote	mg/kg									
Unknown TPH with ID	mg/kg	74.0	69.0	121.0	69.0	6.0				
Unknown TPHCWG	mg/kg									
Total Sulphide	mg/kg									
Complex Cyanide	mg/kg									
Free (or Total) Cyanide	mg/kg									
Thiocyanate	mg/kg									
Elemental/Free Sulphur	mg/kg									
Phenols Input Total Phenols HPLC **OR** individual Phenol results.										
Phenol	mg/kg									
Cresols	mg/kg									
Xylenols	mg/kg									
Resourcinol	mg/kg									
Phenols Total by HPLC	mg/kg									
BTEX Input Total BTEX **OR** individual BTEX results.										
Benzene	mg/kg	0.01	0.01	0.05	0.01	0.01				
Toluene	mg/kg	0.01	0.01	0.05	0.01	0.01				
Ethylbenzene	mg/kg	0.01	0.01	0.05	0.01	0.01				
Xylenes	mg/kg	0.01	0.01	0.05	0.01	0.01				
Total BTEX	mg/kg									
PCBs (POPs)										
PCBs Total (eg EC7/WHO12)	mg/kg									
PBBs (POPs)										
Hexabromobiphenyl (Total or PBB153; 2,2',4,4',5,5'- if only available)	mg/kg									

Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name									
TP/WS/BH		WS202	WS209	WS210	WS211	WS211				
Depth (m)		0.80	0.15	1.00	0.40	0.80				
Envirolab reference		19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6				
POPs Dioxins and Furans Input Total Dioxins and Furans **OR** individual Dioxin and Furan results.										
2,3,7,8-TeCDD	mg/kg									
1,2,3,7,8-PeCDD	mg/kg									
1,2,3,4,7,8-HxCDD	mg/kg									
1,2,3,6,7,8-HxCDD	mg/kg									
1,2,3,7,8,9-HxCDD	mg/kg									
1,2,3,4,6,7,8-HpCDD	mg/kg									
OCDD	mg/kg									
2,3,7,8-TeCDF	mg/kg									
1,2,3,7,8-PeCDF	mg/kg									
2,3,4,7,8-PeCDF	mg/kg									
1,2,3,4,7,8-HxCDF	mg/kg									
1,2,3,6,7,8-HxCDF	mg/kg									
2,3,4,6,7,8-HxCDF	mg/kg									
1,2,3,7,8,9-HxCDF	mg/kg									
1,2,3,4,6,7,8-HpCDF	mg/kg									
1,2,3,4,7,8,9-HpCDF	mg/kg									
OCDF	mg/kg									
Total Dioxins and Furans	mg/kg									
Some Pesticides (POPs unless otherwise stated)										
Aldrin	mg/kg									
α Hexachlorocyclohexane (alpha-HCH) *(leave empty if total HCH results used)*	mg/kg									
β Hexachlorocyclohexane (beta-HCH) *(leave empty if total HCH results used)*	mg/kg									
α Cis-Chlordane (alpha) ***OR*** *Total Chlordane*	mg/kg									
δ Hexachlorocyclohexane (delta-HCH) *(leave empty if total HCH results used)*	mg/kg									
Dieldrin	mg/kg									
Endrin	mg/kg									
χ Hexachlorocyclohexane (gamma-HCH) (lindane) ***OR*** *Total HCH*	mg/kg									
Heptachlor	mg/kg									
Hexachlorobenzene	mg/kg									
o,p'-DDT *(leave empty if total DDT results used)*	mg/kg									
p,p'-DDT ***OR*** *Total DDT*	mg/kg									
χ Trans-Chlordane (gamma) *(leave empty if total Chlordane results used)*	mg/kg									
Chlordecone (kepone)	mg/kg									
Pentachlorobenzene	mg/kg									
Mirex	mg/kg									
Toxaphene (camphechlor)	mg/kg									
Tin										
Tin *(leave empty if Organotin and Tin excl Organotin results used)*	mg/kg									
Organotin										
Dibutyltin; DiBT	mg/kg									
Tributyltin; TriBT	mg/kg									
Triphenyltin; TriPT	mg/kg									
Tetrabutyltin; TeBT	mg/kg									
Tin excluding Organotin										
Tin excl Organotin	mg/kg									

Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name									
TP/WS/BH	WS202	WS209	WS210	WS211	WS211				
Depth (m)	0.80	0.15	1.00	0.40	0.80				
Envirolab reference	19/11968/1	19/11968/2	19/11968/4	19/11968/5	19/11968/6				
Asbestos in Soil	Thresholds								
Asbestos detected in Soil (enter Y or N)	Y	N	N	N	N				

APPENDIX O
DISCOVERY STRATEGY

DISCOVERY STRATEGY

Managing Unexpected Contamination

This Discovery Strategy sets out in principle the proposed methods for identifying and managing site specific risks in the event that suspected or potential land contamination is uncovered during redevelopment.

The Contractor appointed to carry out the works will be responsible for implementing the procedures outlined in this document. However, before taking investigative or remedial action the Contractor will prepare a method statement to the satisfaction of the Client's Consultant, who in turn will also consult the Local Authority.

This Discovery Strategy is a working document. The Contractor should consult the Environmental Consultant in the event that suspicious ground conditions or/and unexpected contamination are uncovered. There may be a requirement to review the procedures and consult the Local Authority in the event that unforeseen conditions are encountered.

Revised or new procedures to deal with suspicious ground conditions or/and unexpected contamination may require approval from the Local Authority before works can proceed. The materials observed and tested during the ground investigation represent only a small proportion of the materials present onsite. There may be other conditions prevailing at the site that have not been revealed by these investigations and which have therefore not been taken into account. The Discovery Strategy is designed to address this issue.

Identification of potential contaminated material

All operatives and ground workers should remain vigilant for unforeseen or suspicious ground conditions. Initial identification will be based on visual and or olfactory assessment. General indicators of possible contamination could be arisings that quickly change appearance or appear inconsistent with the general soil profile outlined within the RSK previous report. Potential unexpected contamination and/or suspicious ground conditions may include the following examples:

- Hydrocarbons in the form of oily (or free phase) pockets;
- Strong odours or/and discolouration associated with the underlying soils itself;
- Cement bound debris suspected of containing asbestos;
- Fibrous materials; and
- Unexploded ordnance (UXOs).

Managing Suspicious Ground Conditions

On the discovery of the suspicious material/unexpected contamination during excavation works, the following sequence should be adopted:

1. Contractor should assess the requirement for any additional health and safety or environmental management control measures;
2. Contractor's suitably experienced person should take note of the nature and extent of 'contamination' and immediately inform the Environmental Consultant and the Local Authority;
3. Working area will be cordoned off and works will cease in the vicinity;
4. Environmental Consultant will attend site to undertake sampling regime with subsequent laboratory testing and attempt to quantify volume;
5. Findings will be discussed with the Local Authority along with the provision of the test records;
6. Remedial action, if necessary, and programming of the works are agreed with the Local Authority;
7. Contractor is informed of the remedial action required;
8. Contractor prepares a Method Statement that details how the agreed remedial action will be carried out;
9. Method Statement is agreed by Environmental Consultant; and
10. Evidence of work carried out is collated for inclusion in the validation report.

Asbestos Containing Materials (ACMs)

In addition to the above sequence of procedures, should any non licensable asbestos containing materials (ACMs) be encountered, a watching brief should be maintained and a programme of handpicking should be undertaken by competent persons and be disposed off site in line with 'Duty of Care', Waste Management Legislation. Any areas where asbestos is suspected in soils the Principal Contractor will obtain a sample and submit for quantified asbestos analysis.

Should sampling and analysis of any suspect materials reveal the presence of significant notifiable asbestos containing materials, such as lagging or fibreboard, then the continuation of works may require the use of licensed asbestos contactors to handle the materials. In this instance the HSE would need to be notified of the works via the submission of an ASB5 notification.

APPENDIX P
SOIL OBJECTIVES

Table 1 Soil contamination objectives for imported material

General Suite of Determinands	Mean Concentration not Exceeding (mg/kg)	Rational
Arsenic	37	RSK GAC adopted for the protection of human health (with home grown produce)
Cadmium	30	RSK GAC adopted for the protection of human health (with home grown produce)
Chromium (VI)	21	RSK GAC adopted for the protection of human health (with home grown produce)
Lead	200	RSK GAC adopted for the protection of human health (with home grown produce)
Mercury	1	Soil Code (1998) adopted for potential phytotoxic effects
Selenium	258	RSK GAC adopted for the protection of human health (with home grown produce)
Copper	200	Soil Code (1998) adopted for potential phytotoxic effects
Nickel	110	Soil Code (1998) adopted for potential phytotoxic effects
Zinc	300	Soil Code (1998) adopted for potential phytotoxic effects
pH value	>pH5	Conservative value
Asbestos	None	Conservative value
TPH with column clean up[*1]	100	Conservative trigger value adopted for the protection of human health
Semi Volatile Organic Compounds (1% SOM)		
Phenols (total)	180	RSK GAC adopted for the protection of human health (with home grown produce)
Acenaphthene	230	RSK GAC adopted for the protection of human health (with home grown produce)

General Suite of Determinands	Mean Concentration not Exceeding (mg/kg)	Rational
Acenaphthylene	180	RSK GAC adopted for the protection of human health (with home grown produce)
Benzo(a)anthracene	7	RSK GAC adopted for the protection of human health (with home grown produce)
Chrysene	15	RSK GAC adopted for the protection of human health (with home grown produce)
Fluoranthene	280	RSK GAC adopted for the protection of human health (with home grown produce)
Fluorene	170	RSK GAC adopted for the protection of human health (with home grown produce)
Phenanthrene	100	RSK GAC adopted for the protection of human health (with home grown produce)
Naphthalene	13	RSK GAC adopted for the protection of human health (with home grown produce)
Benzo-a-pyrene	5	RSK GAC adopted for the protection of human health (with home grown produce)
Dibenzo(a,h)anthracene	0.25	RSK GAC adopted for the protection of human health (with home grown produce)
Indeno(1,2,3-cd)pyrene	27	RSK GAC adopted for the protection of human health (with home grown produce)

*1 Further assessments of individual aliphatic and aromatic bands recommended to confirm suitability for use if in excess of initial screening value. Individual fractions will be assessed against RSK GAC for human health with home grown produce.

Table 2 Soil contamination objectives for validation of formation level

General Suite of Determinands	Mean Concentration not Exceeding (mg/kg)	Rational
Arsenic	40	RSK GAC adopted for the protection of human health (without home grown produce)
Cadmium	149	RSK GAC adopted for the protection of human health (without home grown produce)
Chromium (VI)	21	RSK GAC adopted for the protection of human health (without home grown produce)
Lead	310	RSK GAC adopted for the protection of human health (without home grown produce)
Mercury	9	RSK GAC adopted for the protection of human health (without home grown produce)

General Suite of Determinands	Mean Concentration not Exceeding (mg/kg)	Rational
Selenium	430	RSK GAC adopted for the protection of human health (without home grown produce)
Copper	7100	RSK GAC adopted for the protection of human health (without home grown produce)
Nickel	180	RSK GAC adopted for the protection of human health (without home grown produce)
Zinc	40000	RSK GAC adopted for the protection of human health (without home grown produce)
Asbestos	None	RSK GAC adopted for the protection of human health (without home grown produce)
TPH with column clean up[*1]	100	Conservative trigger value adopted for the protection of human health
Semi Volatile Organic Compounds (1% SOM)		
Phenols (total)	440	RSK GAC adopted for the protection of human health (without home grown produce)
Acenaphthene	6600	RSK GAC adopted for the protection of human health (without home grown produce)
Acenaphthylene	6600	RSK GAC adopted for the protection of human health (without home grown produce)
Benzo(a)anthracene	11	RSK GAC adopted for the protection of human health (without home grown produce)
Chrysene	30	RSK GAC adopted for the protection of human health (without home grown produce)
Fluoranthene	1500	RSK GAC adopted for the protection of human health (without home grown produce)
Fluorene	2800	RSK GAC adopted for the protection of human health (without home grown produce)
Phenanthrene	1300	RSK GAC adopted for the protection of human health (without home grown produce)
Naphthalene	23	RSK GAC adopted for the protection of human health (without home grown produce)
Benzo-a-pyrene	5.3	RSK GAC adopted for the protection of human health (without home grown produce)
Dibenzo(a,h)anthracene	0.31	RSK GAC adopted for the protection of human health (without home grown produce)

General Suite of Determinands	Mean Concentration not Exceeding (mg/kg)	Rational
Indeno(1,2,3-cd)pyrene	45	RSK GAC adopted for the protection of human health (with home grown produce)

*1 Further assessments of individual aliphatic and aromatic bands recommended to confirm suitability for use if in excess of initial screening value. Individual fractions will be assessed against RSK GAC for human health without home grown produce.