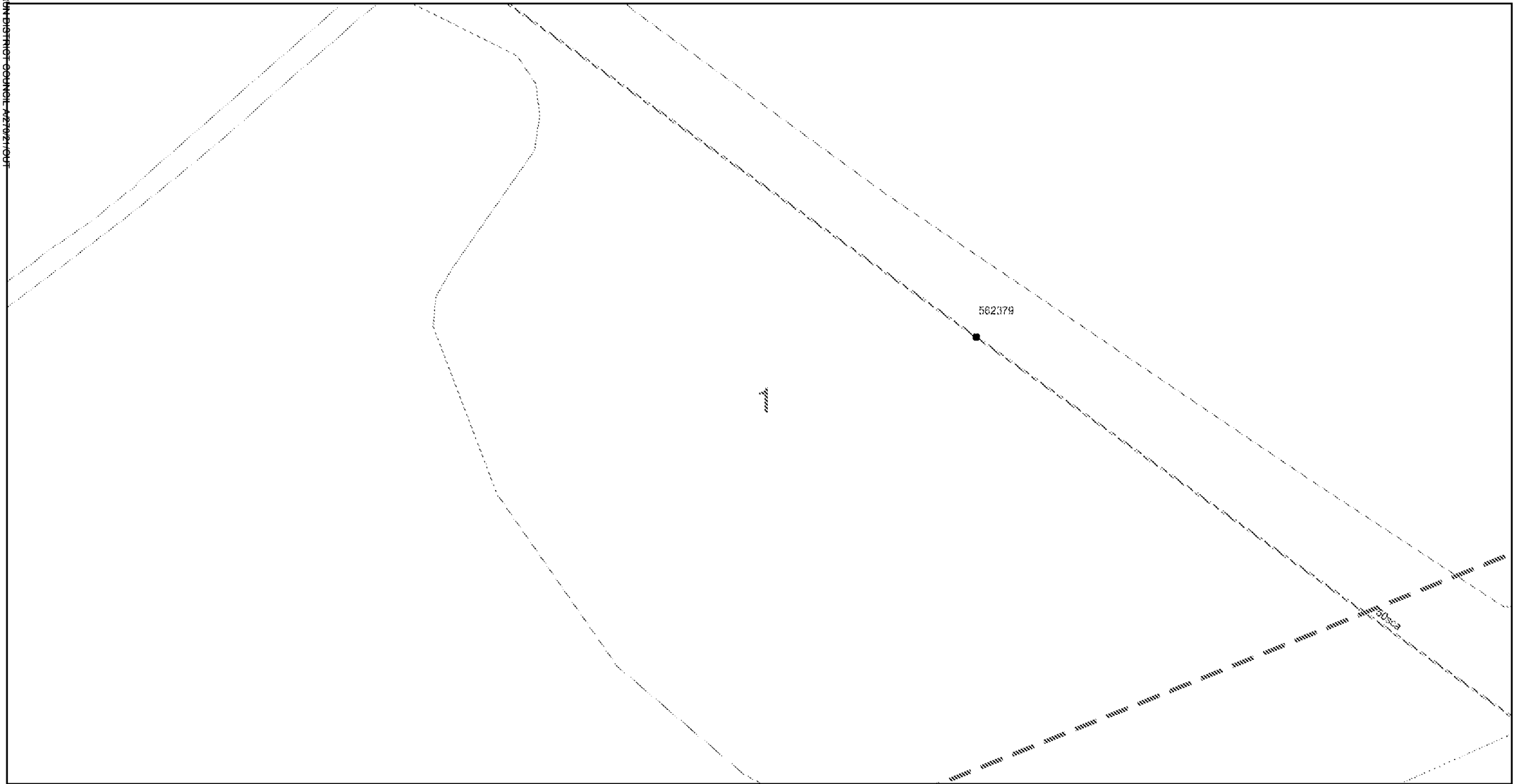


Dig Sites Area: Line:

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Date Requested: 25/ 08/ 2017
Job Reference: 11086846
Site Location: 506096 105002
Requested by: Mrs Lisa Simmons

Your Scheme/ Reference:
LKS/ Angmering 2017-84
Scale: 1:500 (When plotted at A4)

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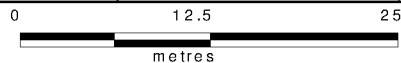
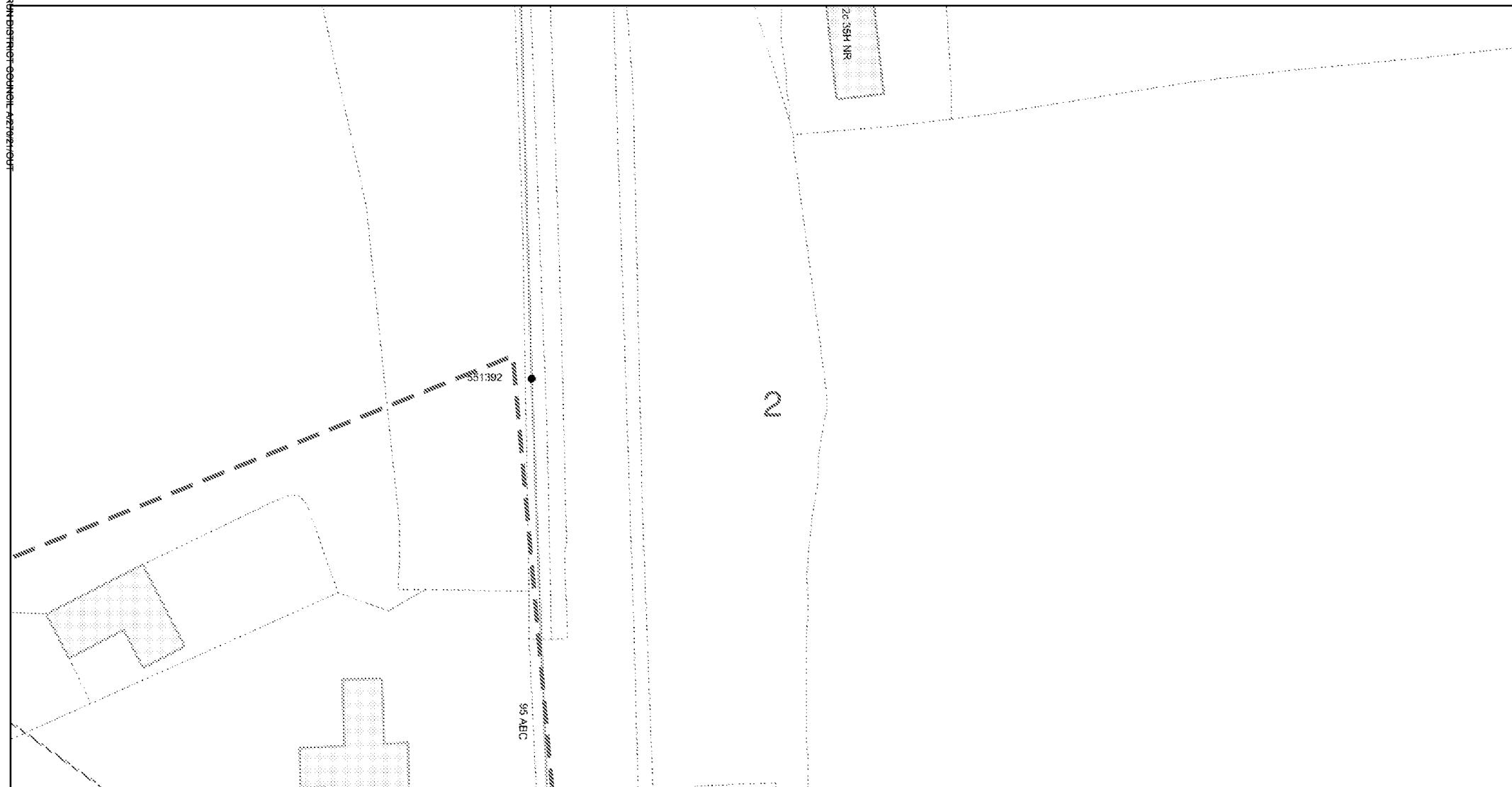
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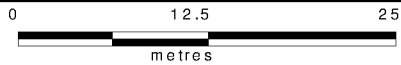
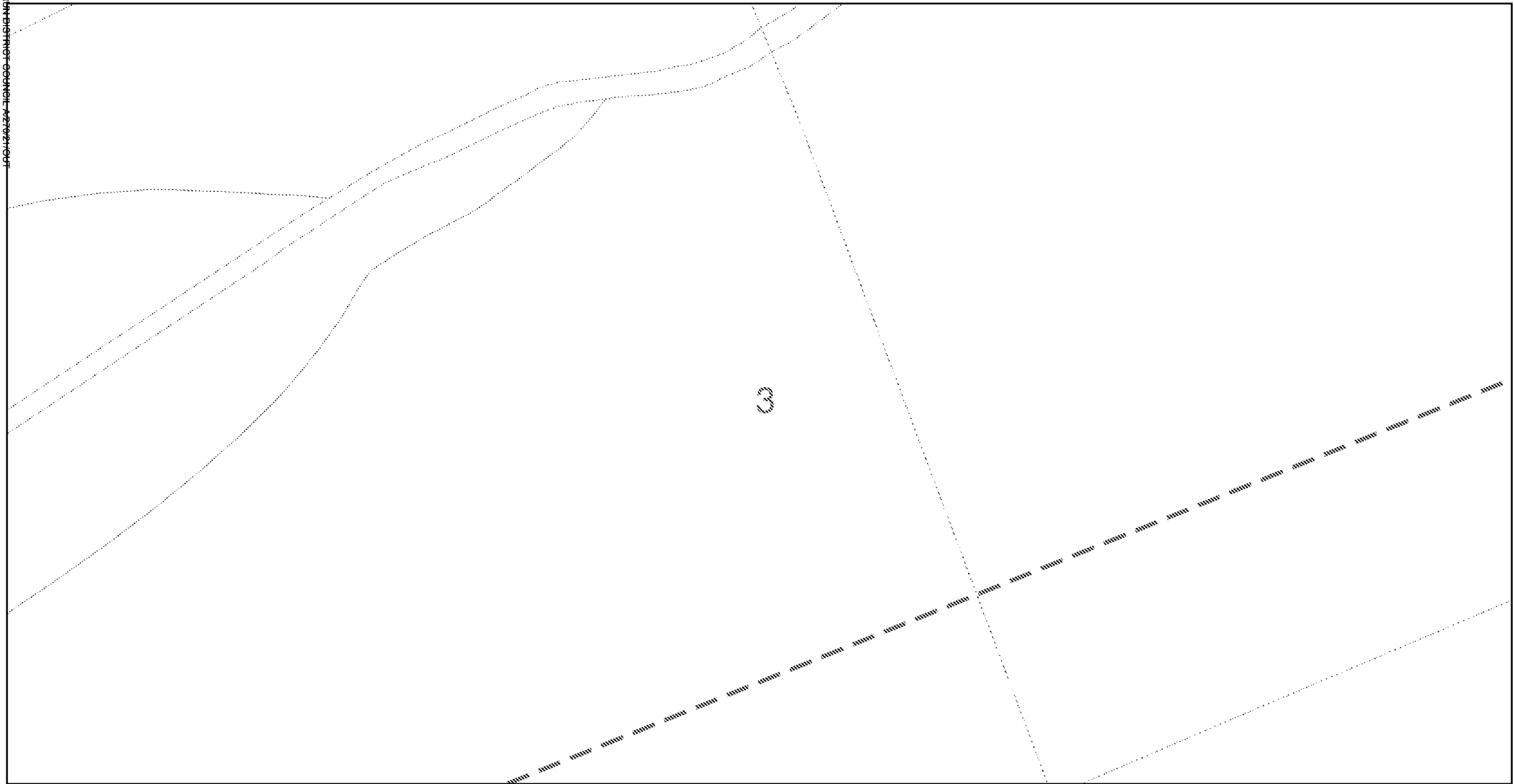
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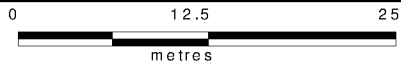
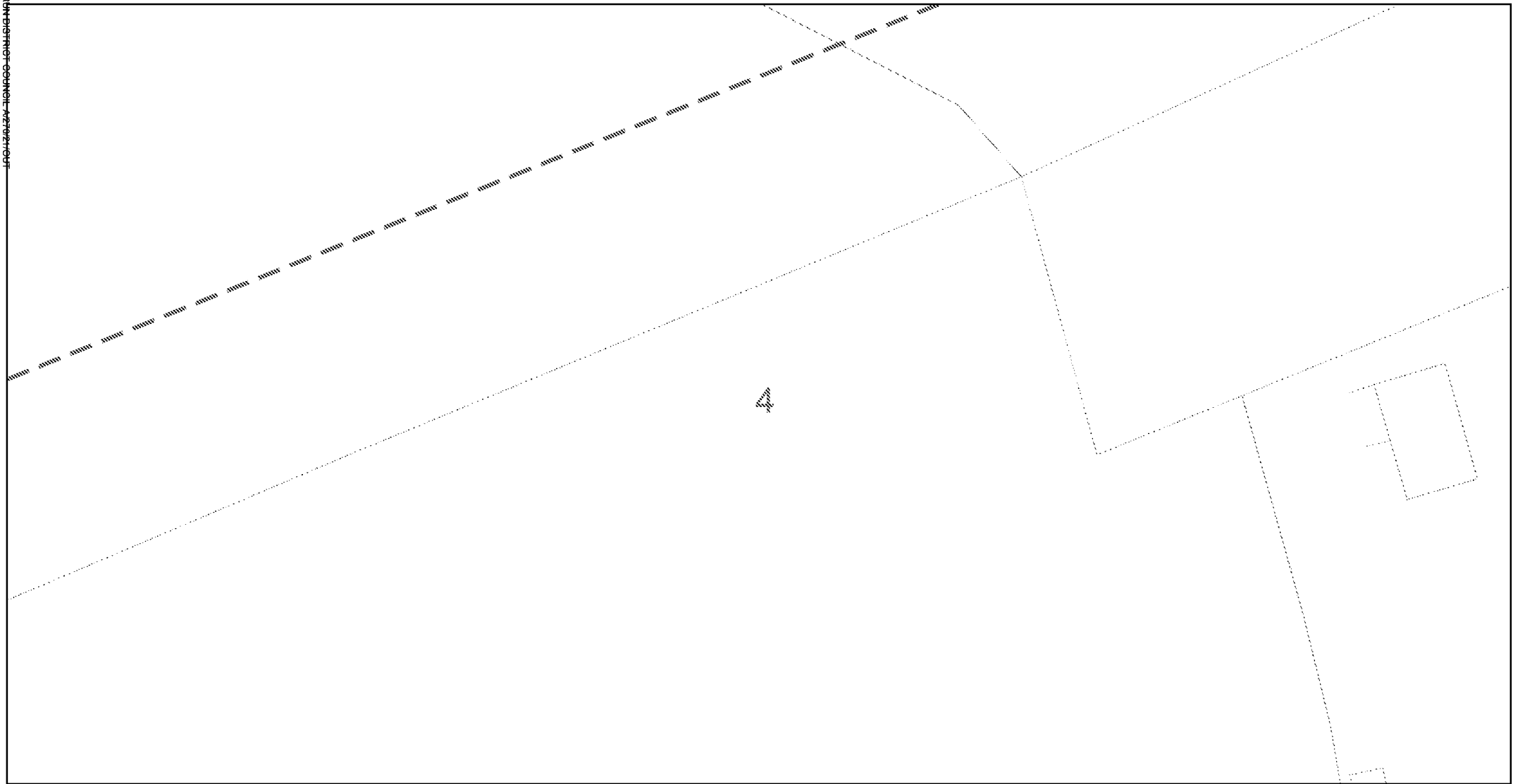
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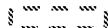
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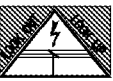
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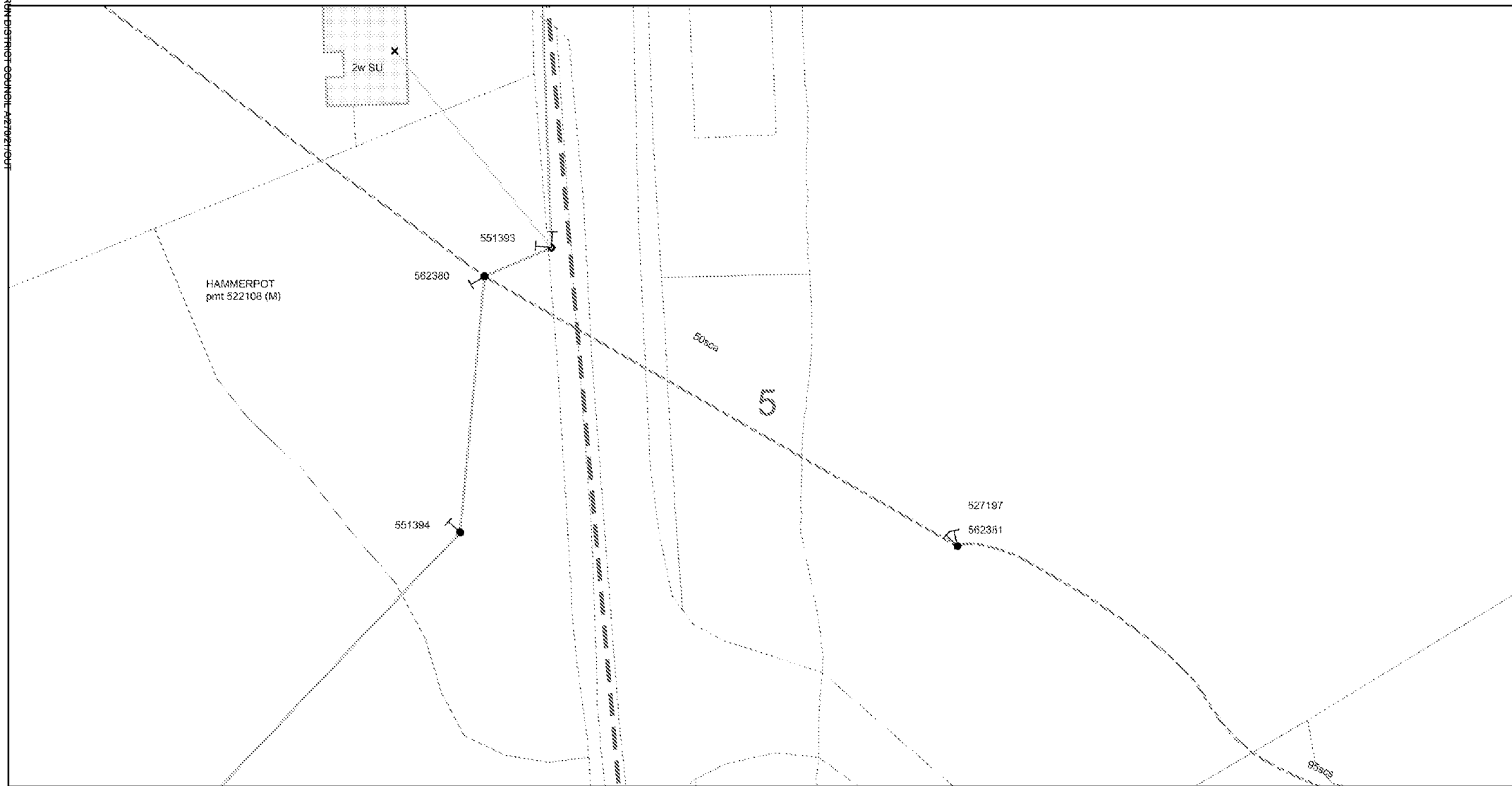
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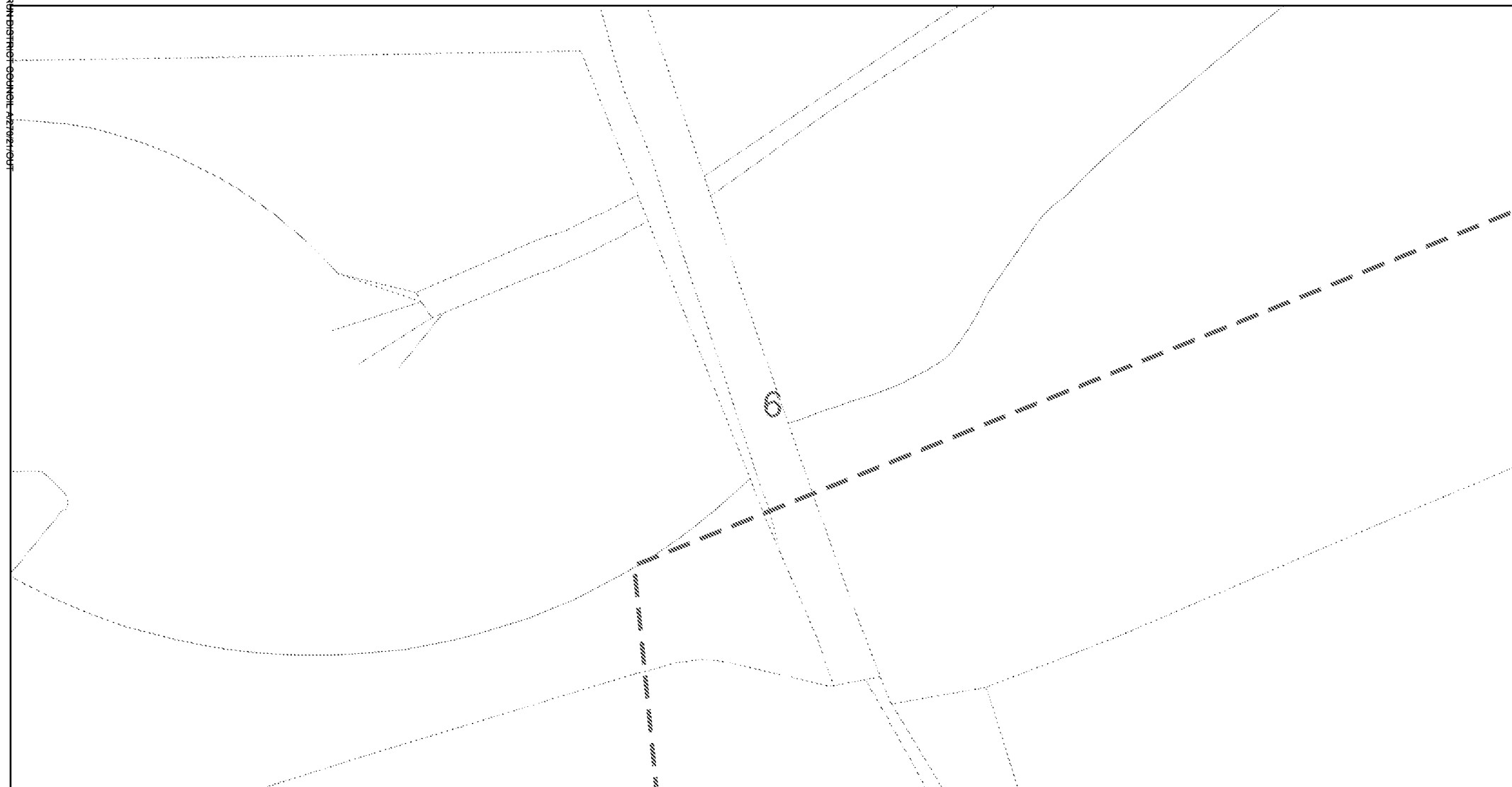
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012.525 metres Dig Sites Area: Line:		The quality and accuracy of any print will depend on your printer, your computer and its print settings. Measurements scaled from this plan may not match measurements between the same points on the ground.		N E S W UK Power Networks			
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UK
Power
Networks

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Job Reference: 11086846

Site Location: 506096 105002
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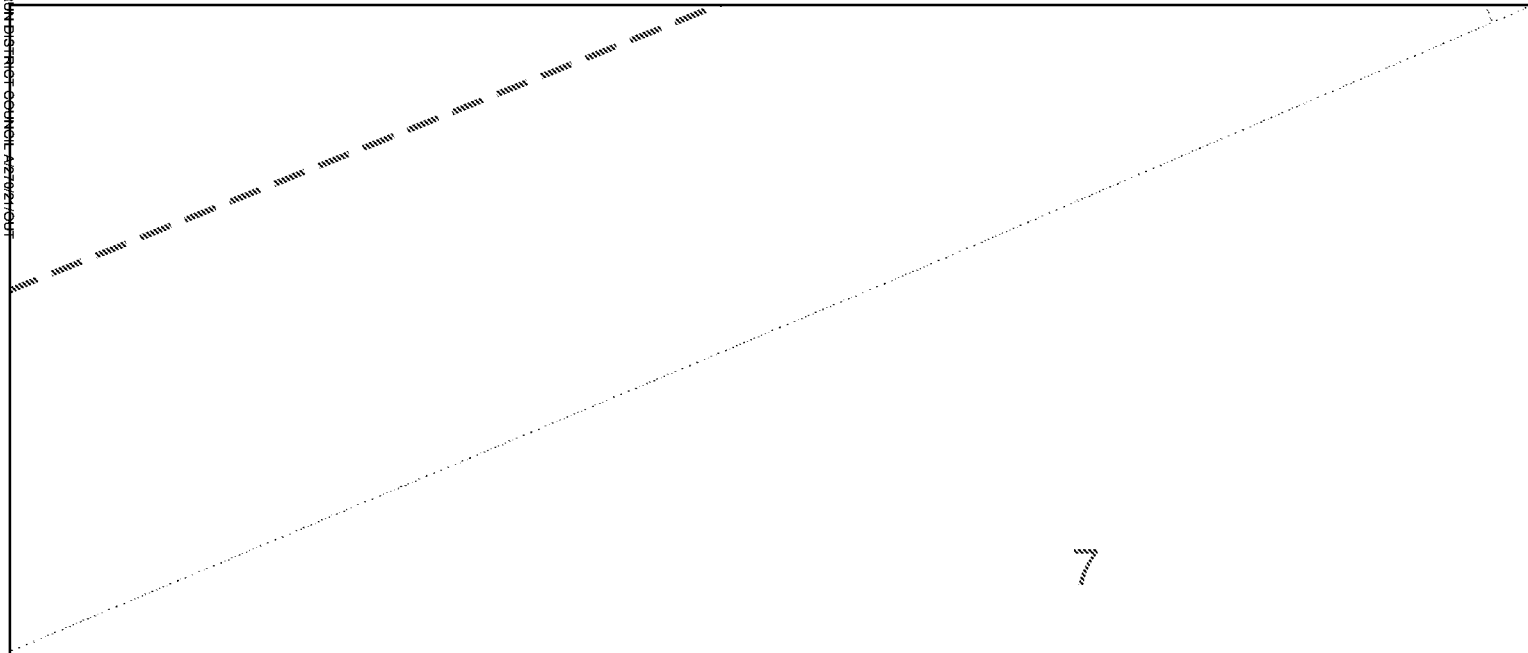
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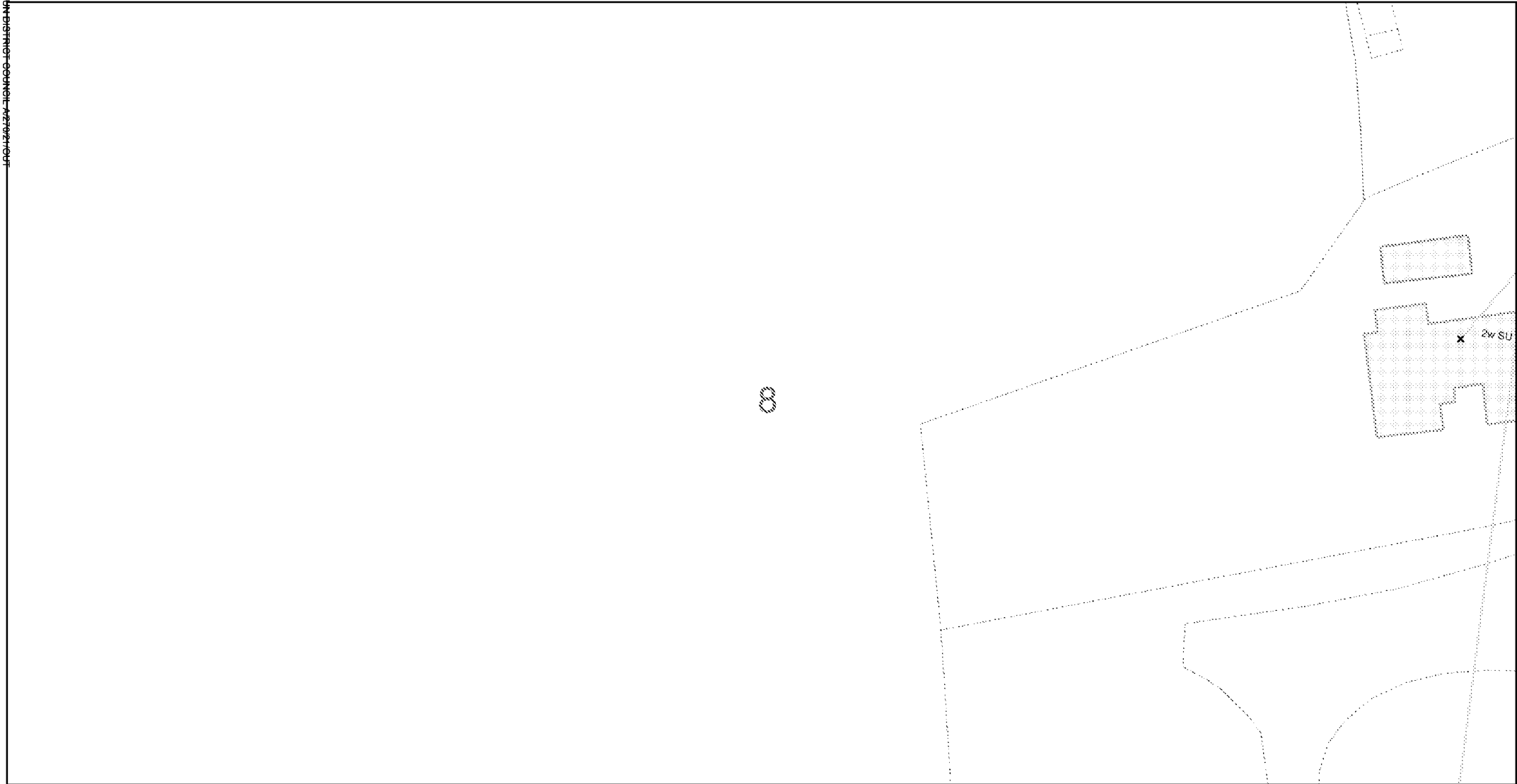
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012.525metres

Dig Sites

Area:

Line:

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Site Location: 506096 105002

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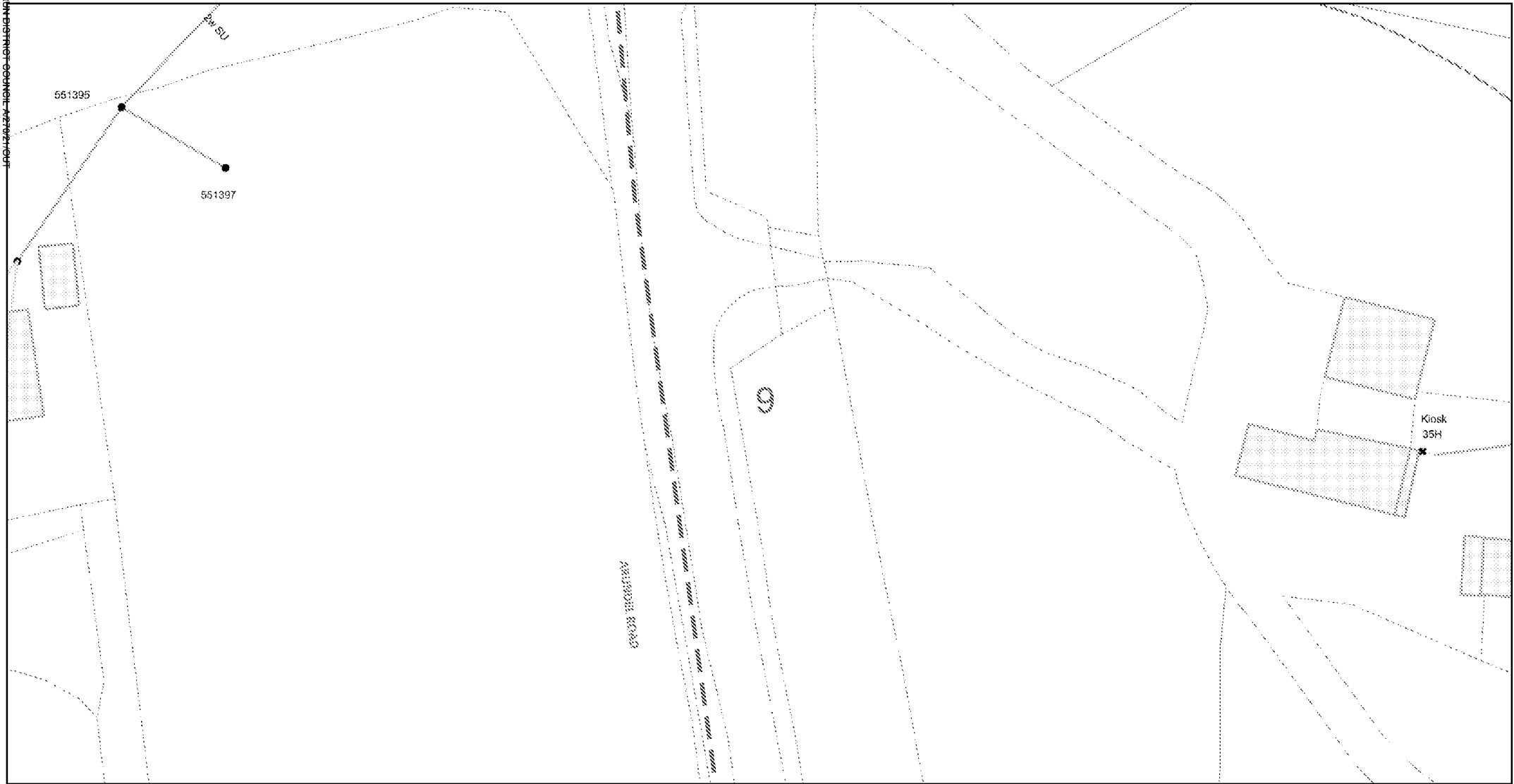
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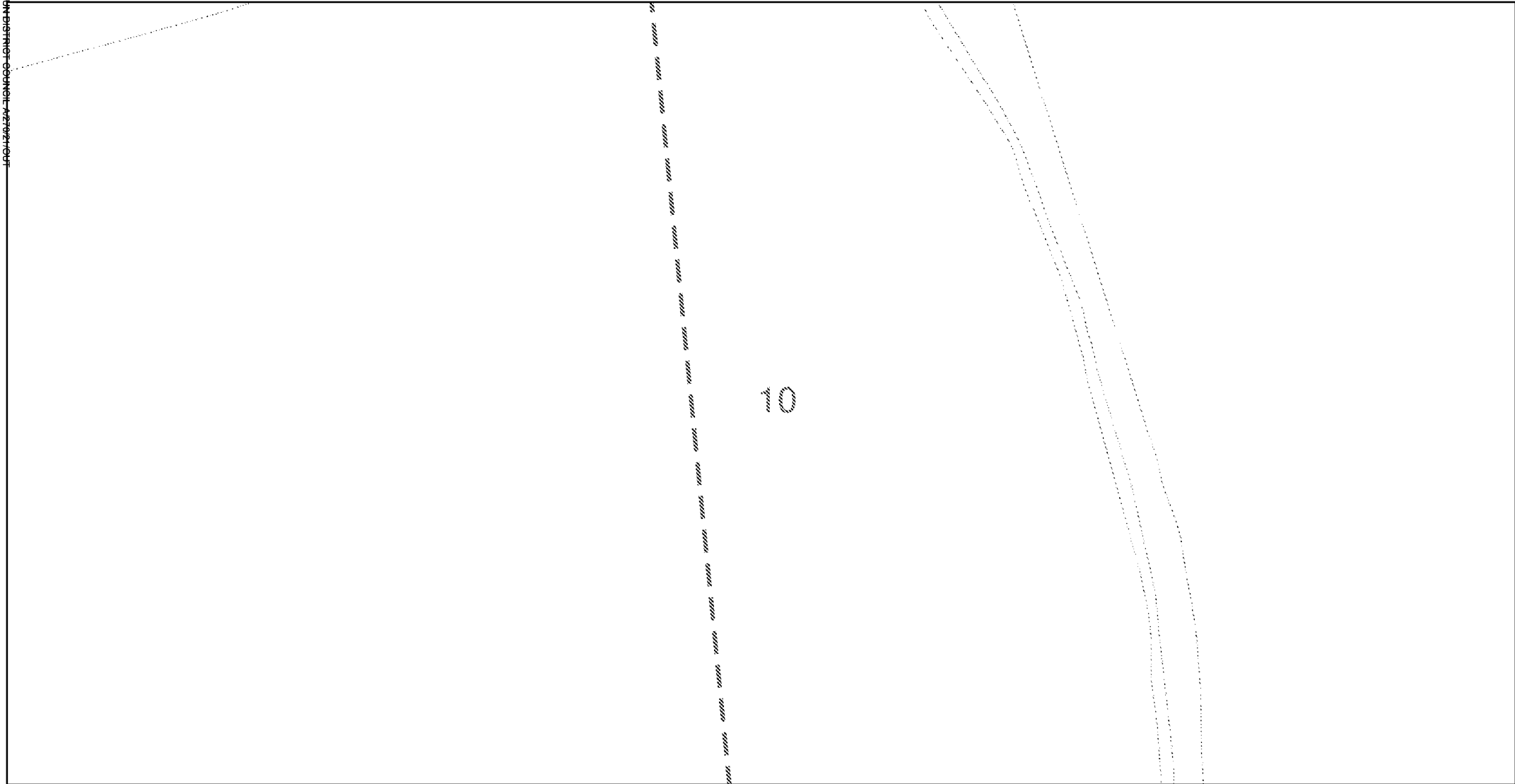
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Your Scheme/ Reference: LKS/ Angmering 2017-84 Scale: 1:500 (When plotted at A4)	1. UK Power Networks does not warrant that the information provided to you is correct. You rely upon it at your own risk. 2. UK Power Networks does not exclude or limit 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.		ALWAYS LOOK UP BEFORE YOU START WORK Refer to HSE Guidance note GS6
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012.525metres

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Date Requested: 25/ 08/ 2017
Job Reference: 11086846
Site Location: 506096 105002
Requested by: Mrs Lisa Simmons

Your Scheme/ Reference:
LKS/ Angmering 2017-84
Scale: 1:500 (When plotted at A4)

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012.525metres

Dig Sites

Area:

Line:

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Site Location: 506096 105002
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Your Scheme/ Reference:

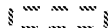
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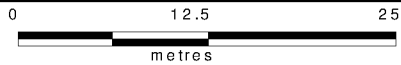
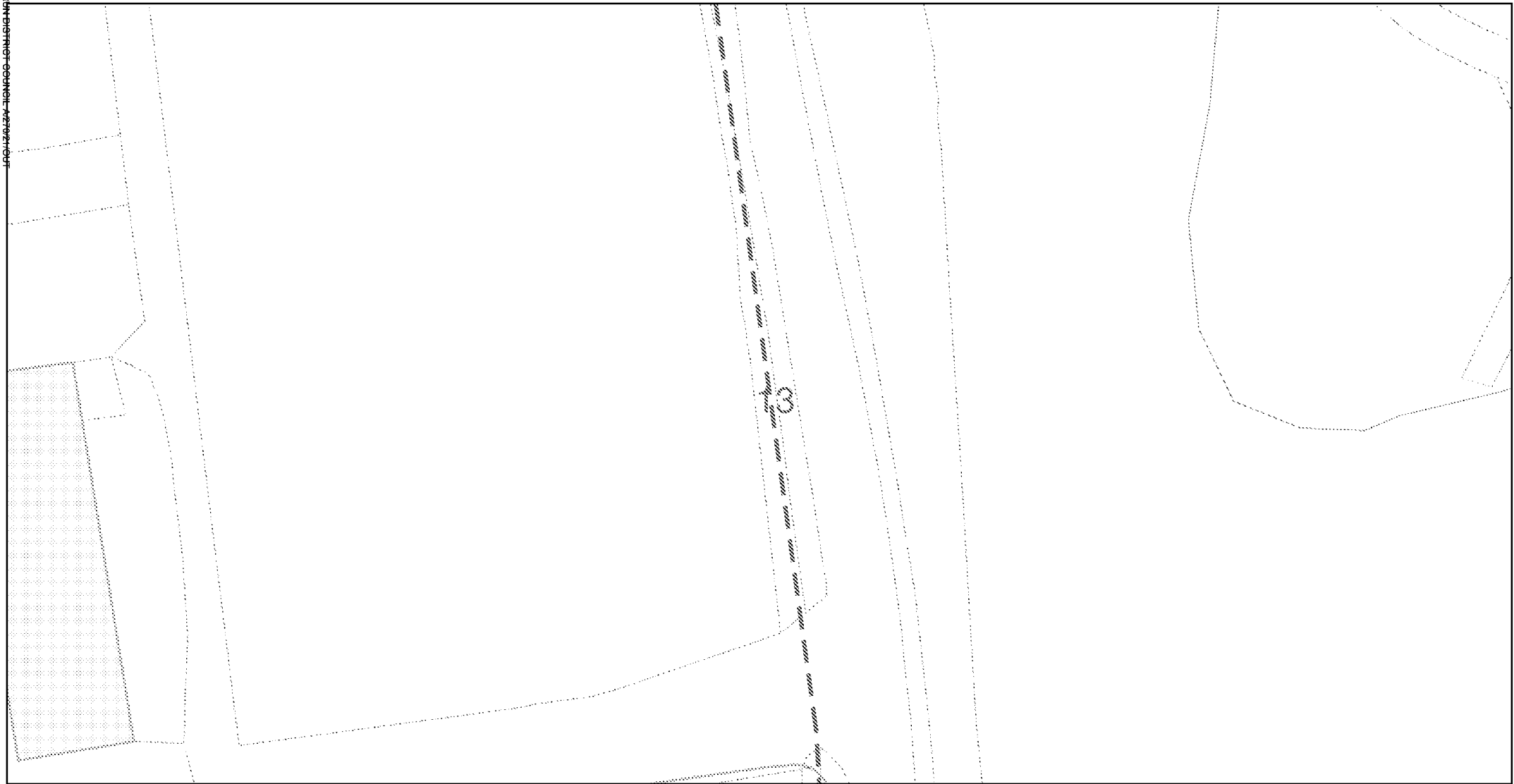


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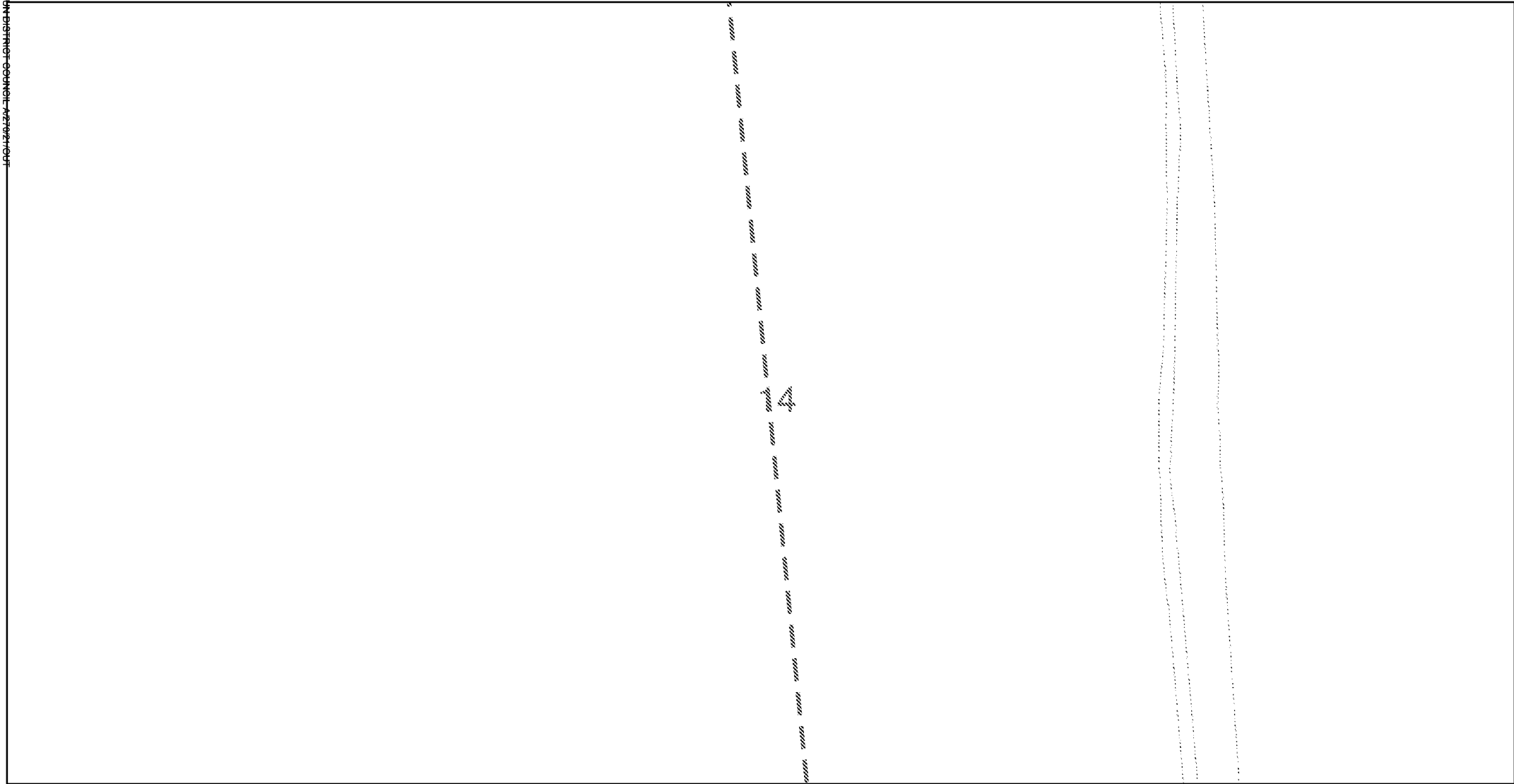
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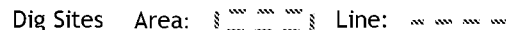
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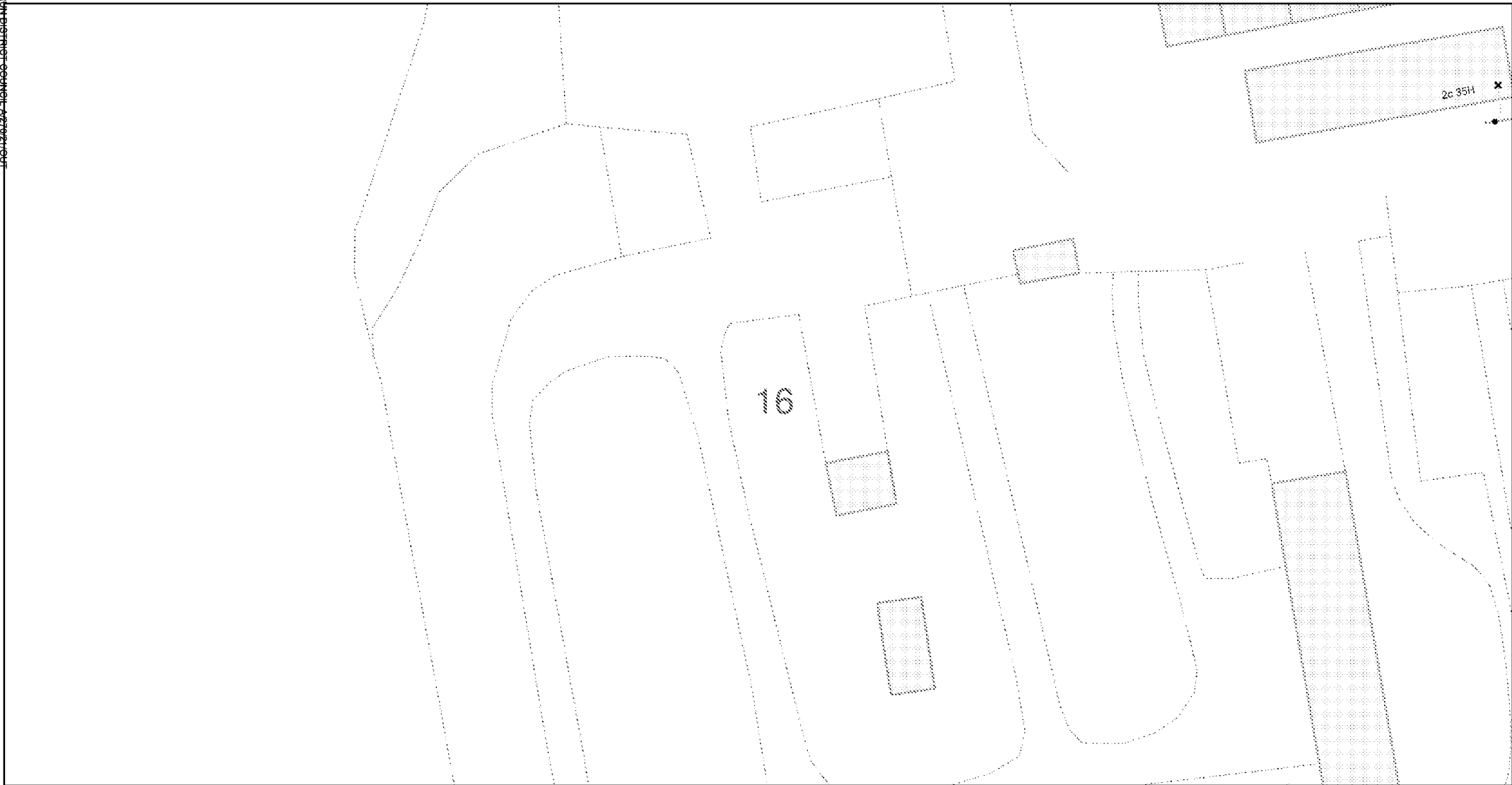
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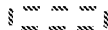
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Date Requested: 25/ 08/ 2017
Job Reference: 11086846
Site Location: 506096 105002
Requested by: Mrs Lisa Simmons

Your Scheme/ Reference:
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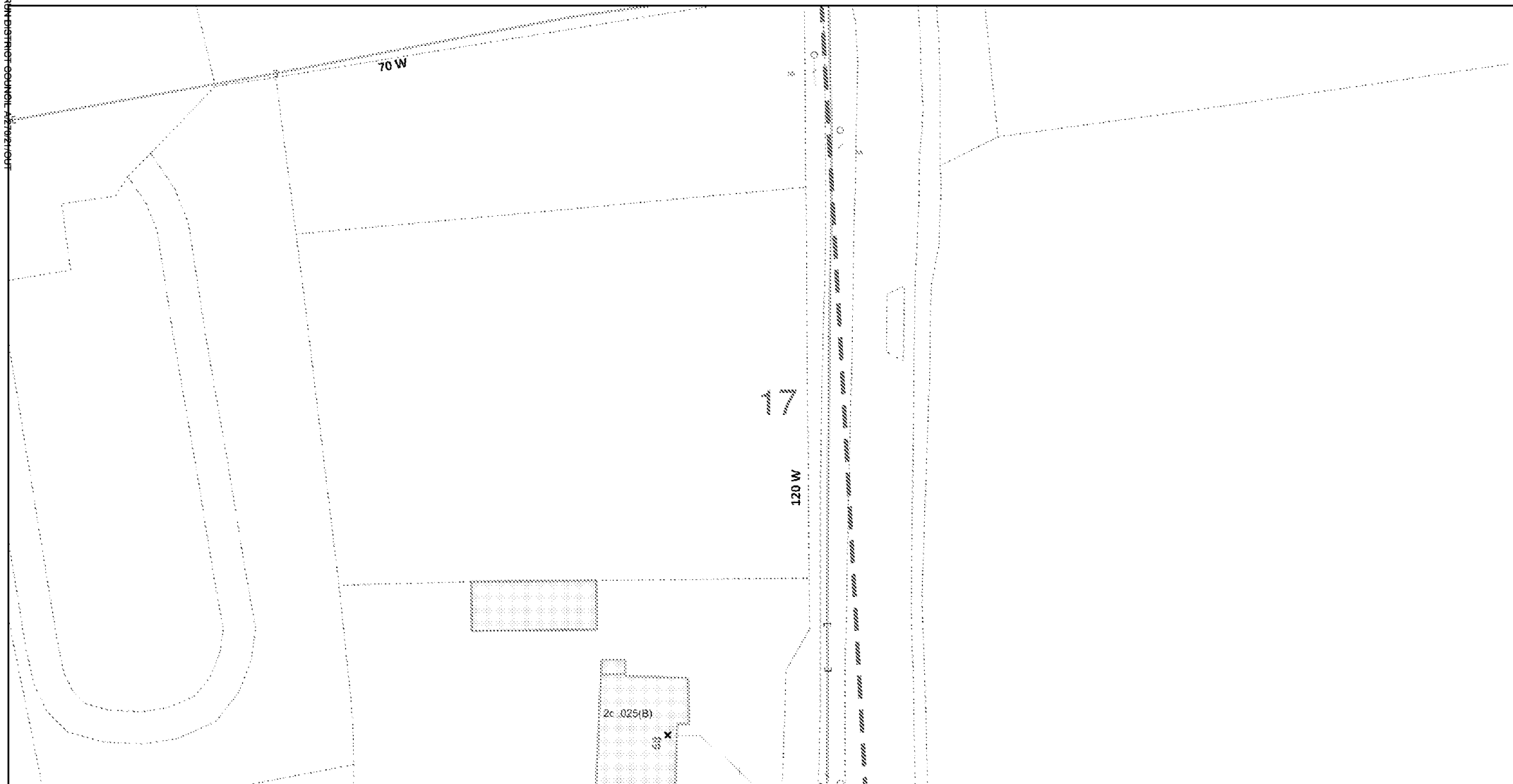
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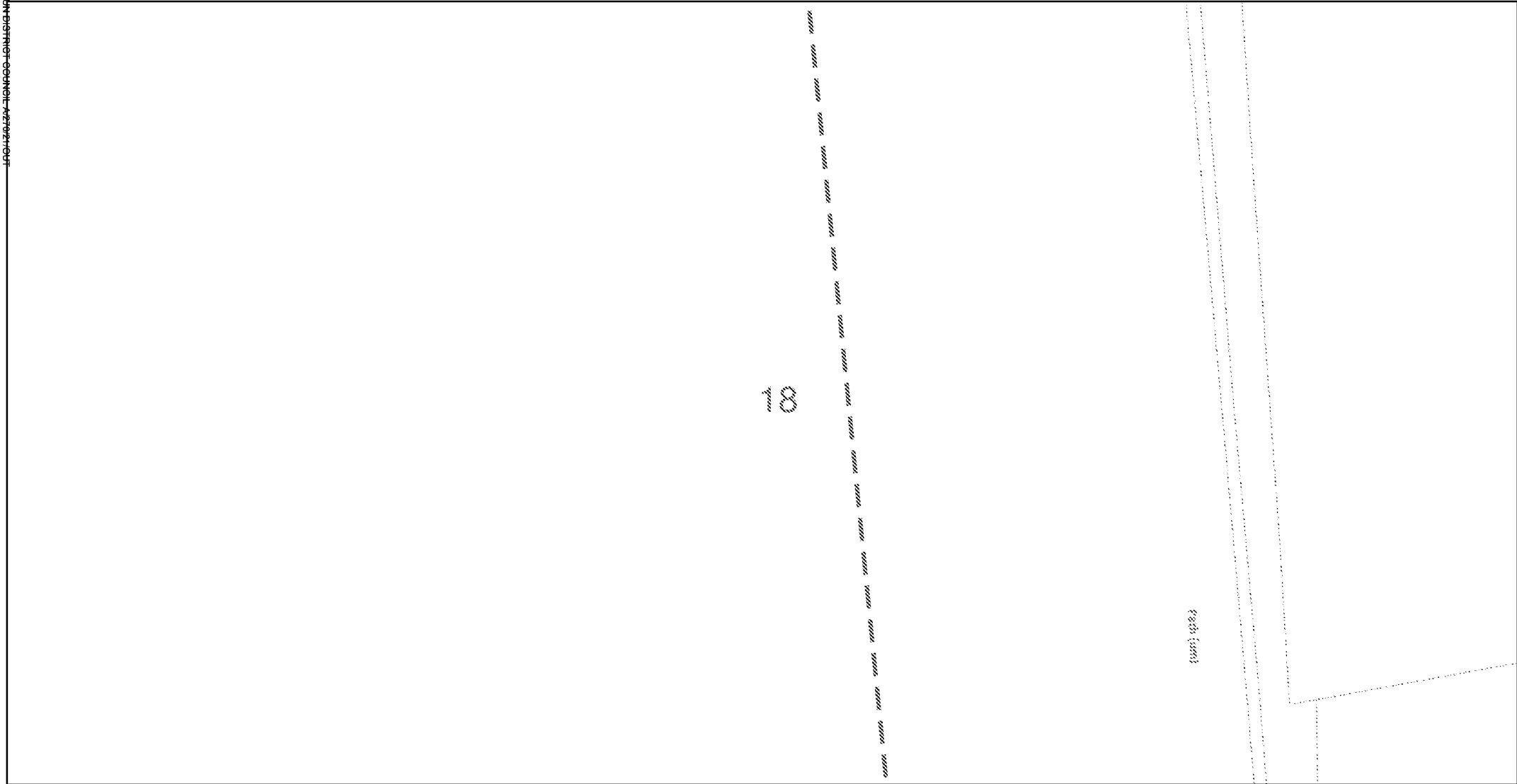


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012.525metres

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Job Reference: 11086846

Site Location: 506096 105002

Requested by: Mrs Lisa Simmons

Your Scheme/ Reference: LKS/ Angmering 2017-84

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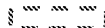
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Plans generated by DigSAFE Pro™ software provided by LinesearchbeforeUdig.

012.525metres

Dig Sites

Area: 

Line: 

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

Date Requested: 25/ 08/ 2017

Job Reference: 11086846

Site Location: 506096 105002

Requested by: Mrs Lisa Simmons

Your Scheme/ Reference: LKS/ Angmering 2017-84

Scale: 1:500 (When plotted at A4)

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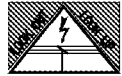


IF IN DOUBT - ASK! PHONE 0800 056 5866

EMERGENCY - If you damage a cable or line

Phone 0800 783 8838 (24hrs)

URGENTLY



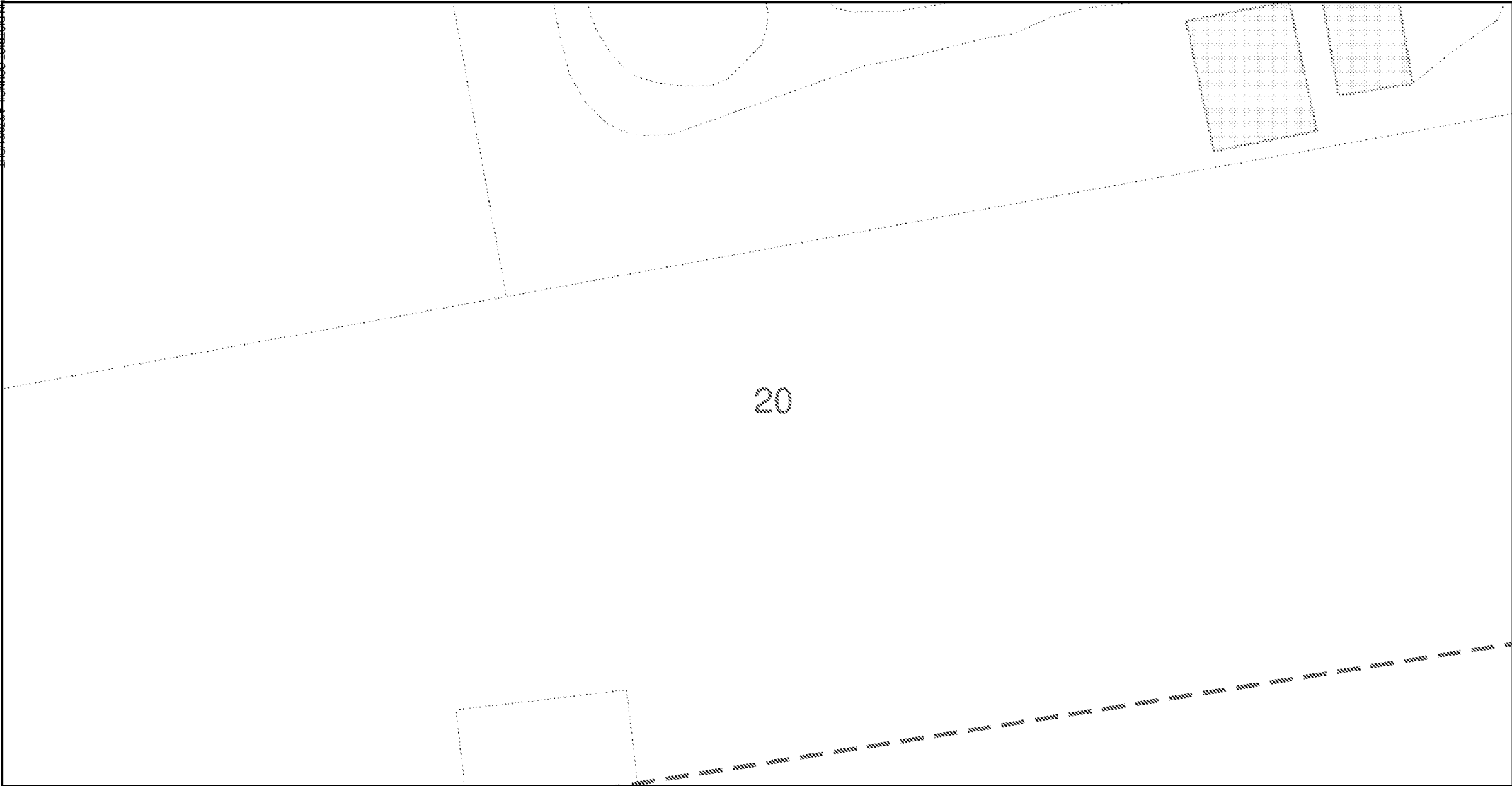
ALWAYS LOOK UP BEFORE YOU START WORK

Refer to HSE Guidance note GS6

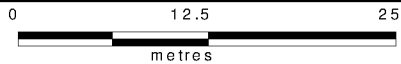
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20



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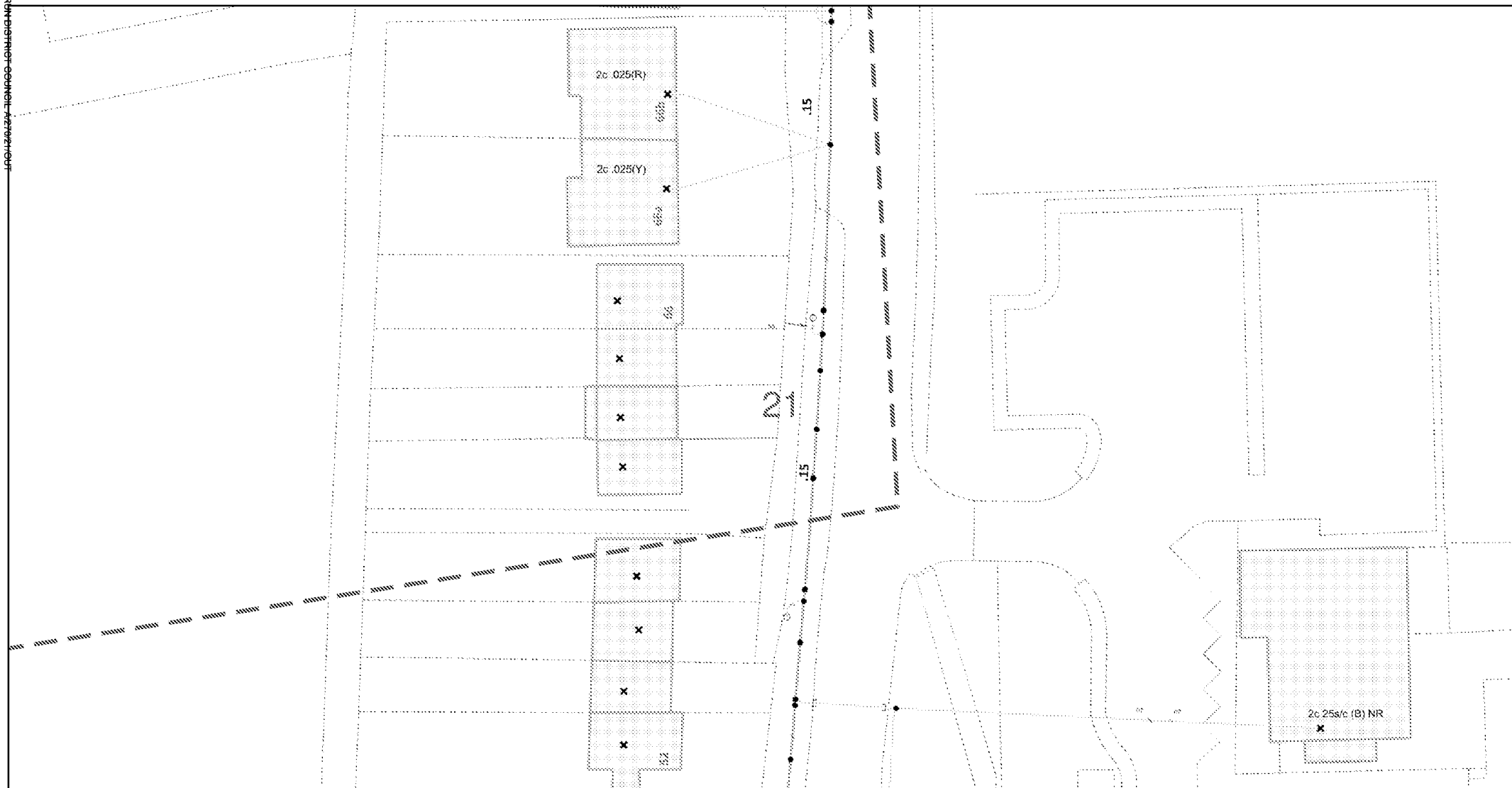


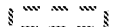
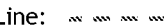
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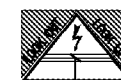
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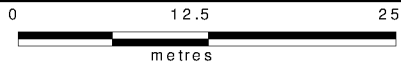
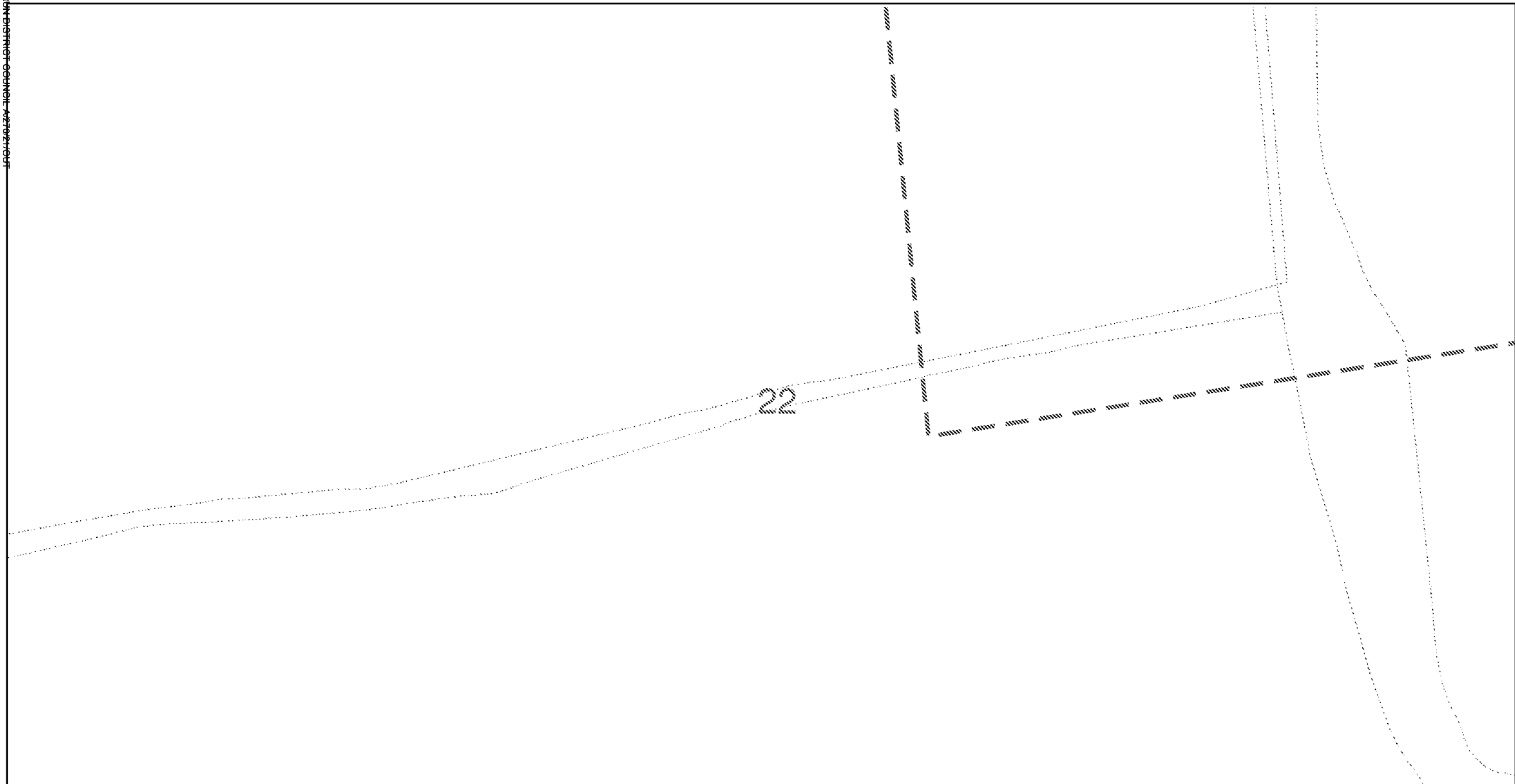
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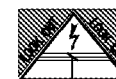
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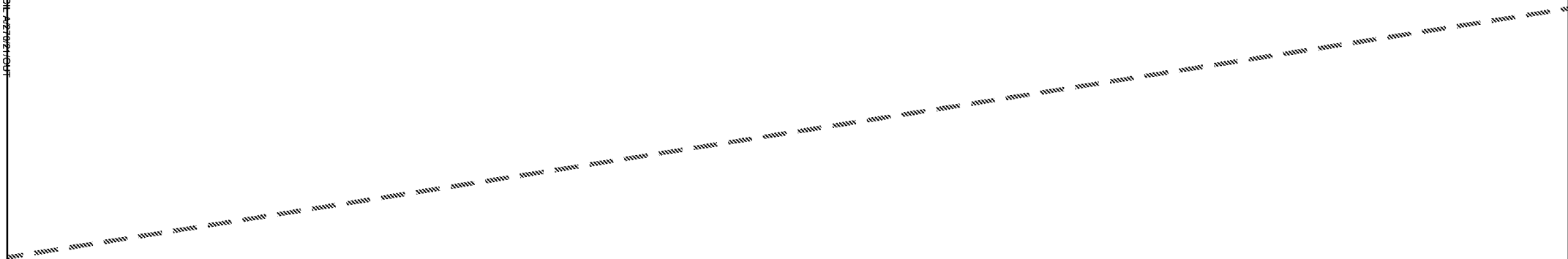


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23

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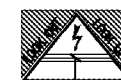


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Lisa Simmons
Gladman Developments Ltd
Gladman House
Alexandria Way
Congleton Business Park
Congleton
Cheshire
CW12 1LB

Date: 24/08/2017
Our Ref: XX_XX_3SWX_357418
Your Ref: LKS/Six Hills 2 2017-79
RE: Proposed Works, land south of Six Hills Lane, Six Hills, Melton Mowbray

Thank you for your enquiry which was received on 24/08/2017.
An assessment has been carried out with respect to Cadent Gas Ltd, National Grid Electricity Transmission plc's and National Grid Gas 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.

Searches based on your enquiry have identified that there is no record of apparatus in the vicinity of your enquiry.

As your works are at a "proposed" stage, any maps and guidance provided are for information purposes only. This is not approval to commence work. You must submit a "Scheduled Works" enquiry at the earliest opportunity and failure to do this may lead to disruption to your plans and works. Plant Protection will endeavour to provide an initial assessment within 14 days of receipt of a Scheduled Works enquiry and dependent on the outcome of this, further consultation may be required.

In any event, for safety and legal reasons, works must not be carried out until a Scheduled Works enquiry has been completed and final response received.

Plant Protection
Cadent
Block 1; Floor 1
Brick Kiln Street
Hinckley
LE10 0NA

National Gas Emergency Number:

National Grid Electricity Emergency Number:

* Available 24 hours, 7 days/week.
Calls may be recorded and monitored.

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 Ltd, National Grid Electricity Transmission plc (NGET) and National Grid Gas plc (NGG) 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 the National Grid Website (<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589934982>).

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 Ltd, NGG 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

GUIDANCE

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 Website:

<http://www.nationalgrid.com/uk/Gas/Safety/work/downloads/>

ENQUIRY SUMMARY

Received Date

24/08/2017

Your Reference

LKS/Six Hills 2 2017-79

Location

Centre Point: 465956, 321170

X Extent: 1465

Y Extent: 1140

Postcode: LE14 3LY

Location Description: land south of Six Hills Lane, Six Hills, Melton Mowbray

Map Options

Paper Size: A3

Orientation: LANDSCAPE

Requested Scale: 10000

Actual Scale: N/A

Real World Extents: N/A

Recipients

I.simmons@gladman.co.uk

Enquirer Details

Organisation Name: Gladman Developments Ltd

Contact Name: Lisa Simmons



Address: Gladman House, Alexandria Way, Congleton Business Park, Congleton, Cheshire, CW12 1LB

Description of Works

plans only. plans only

Enquiry Type

Proposed Works

Activity Type

Development Project

Work Types

Work Type: Plans Only

Map Symbols

VALVE OPEN	VALVE CLOSED	GOVERNOR	END CLOSURE	SYPHON	REDUCER	TEE
TEST POINT	CATHODIC PROTECTION	GENERAL REFERENCE	FLOW MEASURE	DIP POINT	MONO ETHYLENE GLYCOL	OILING POINT
FLOW STOP	PRESSURE MEASUREMENT	STAND PIPE	OFFICIAL MINISTRY RECORD	PURGE POINT	GAS CONDITIONER	DRAIN POINT
					LP MAINS	
SKETCH BUBBLE	DEPTH OF COVER	METER	MATERIAL CHANGE		MP MAINS	
					IP MAINS	
					LHP MAINS	
					HISTORY DATA	
					SSSI	
PIG TRAP	CROSSOVER CONNECTION	CHANGE OF DIAMETER	PIPE JOINT		CONTACT ZONE	
						LTS



Our Ref: 11086846 Your Ref: LKS/Angmering 2017-84

Thursday, 24 August 2017

Lisa Simmons
Gladman House Alexandria Way
Congleton
Cheshire
CW12 1LB

Dear Lisa Simmons

Thank you for your enquiry dated Thursday, 24 August 2017

Please find an extract from our mains records for your proposed work area, any SGN assets are described in the map legend. On some occasions blank maps may be sent to you, this is due to your proposed work being in a no gas area but within our operational boundaries.

This mains record only shows the pipes owned by SGN in our role as a Licensed Gas Transporter (GT). Please note that privately owned gas pipes or pipes owned by other GTs may be present in this area and information regarding those pipes needs to be requested from the owners. If we know of any other pipes in the area we will note them on the plans as a shaded area and/or a series of x's.

The information shown on this plan is given without obligation or warranty and the accuracy cannot be guaranteed. Service pipes, valves, siphons, stub connections etc. are not shown but their presence should be anticipated. Your attention is drawn to the information and disclaimer on these plans. The information included on the plan is only valid for 28 days.

On the mains record you may see the low/medium/intermediate pressure gas main near your site. There should be no mechanical excavations taking place above or within 0.5m of a low/medium pressure system or above or within 3.0m of an intermediate pressure system. You should, where required confirm the position using hand dug trial holes.

A colour copy of these plans and the gas safety advice booklet enclosed should be passed to the senior person on site in order to prevent damage to our plant and potential direct or consequential costs to your organisation.

Safe digging practices in accordance with HSE publication HSG47 "Avoiding Danger from Underground Services" must be used to verify and establish the actual position of the 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 relevant people (direct labour or contractors) working for you on or near gas pipes.

It must be stressed that both direct and consequential damage to gas plant can be dangerous for your employees and the general public and repairs to any such damage will incur a charge to you or the organisation carrying out work on your behalf. Your works should be carried out in such a manner that we are able to gain access to our apparatus throughout the duration of your operations.

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

Yours sincerely,
The Safety Admin Team

For more information, visit our Dig Safely pages on sgn.co.uk



Smell gas?
Call 0800 111 999

SGN is a brand name of Scotia Gas Networks Limited
Registered in England & Wales No. 04958135
Registered Office: St Lawrence House | Station Approach | Horley | Surrey RH6 9HJ

Authorized and regulated by the Financial Conduct Authority



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Contact Us

SGN Safety Admin Team:
0800 912 1722
Email:
plantlocation@sgn.co.uk

Low Pressure Mains

Medium Pressure Mains

Intermediate Pressure Mains

High Pressure Mains

Some Examples Of Plant Items

Valve



Syphon



Depth of
Cover



Diameter
Change



Material
Change



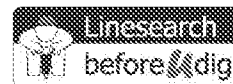
History Data

LAs

GTs

SSSIs

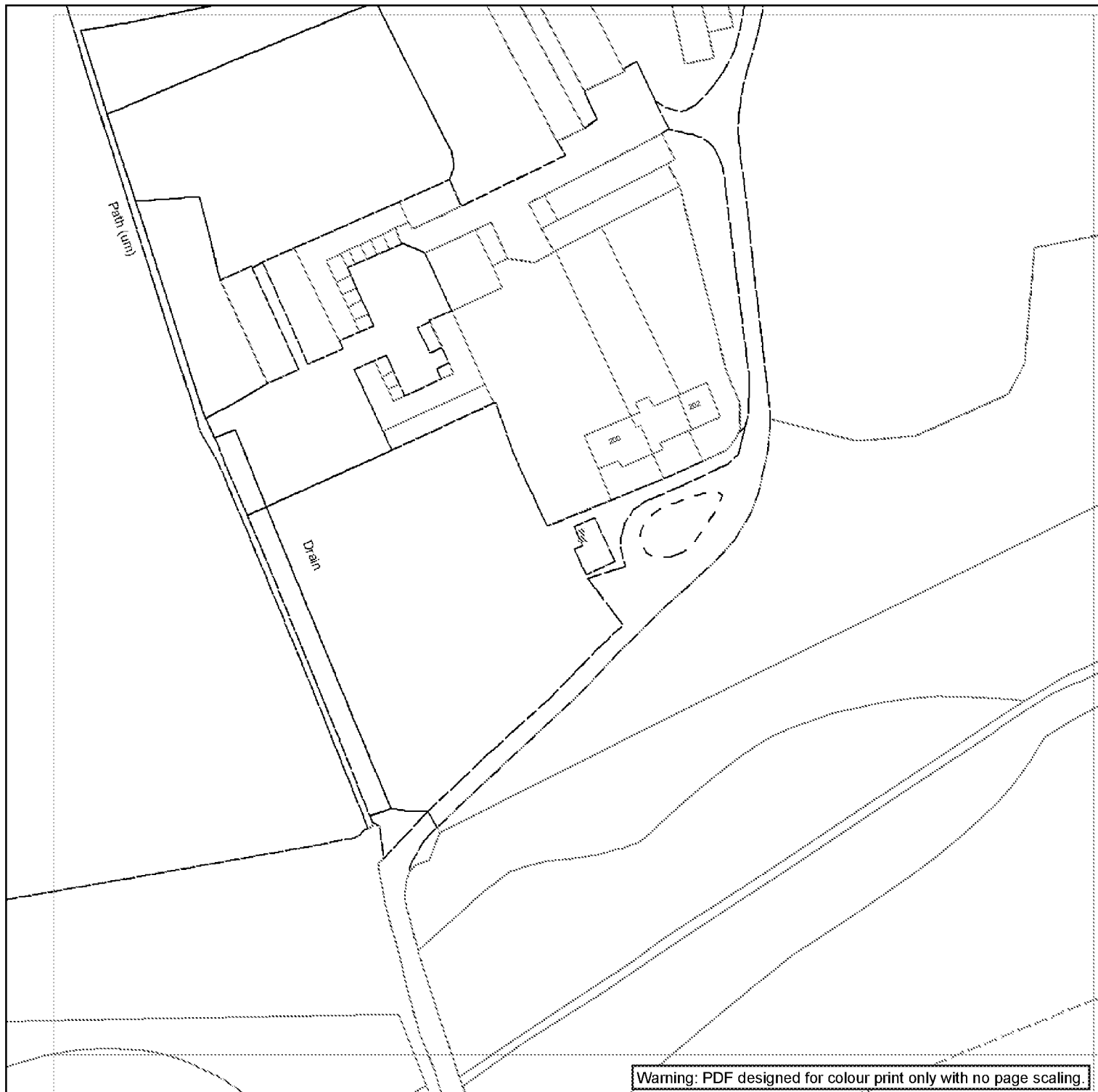
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Report damage immediately -- KEEP EVERYONE AWAY FROM THE AREA
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Low Pressure Mains

Medium Pressure Mains

Intermediate Pressure Mains

High Pressure Mains

Some Examples Of Plant Items

Valve



Syphon



Depth of Cover



Diameter Change



Material Change



History Data

LAs

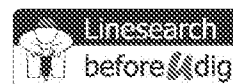
GTs



SSSIs



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Exact Scales:
1:1000 Area or Circle dig site
1:1000 Line dig site



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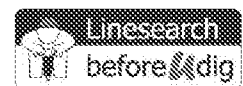


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plantlocation@sgn.co.uk

Low Pressure Mains		History Data	
Medium Pressure Mains		LAs	
Intermediate Pressure Mains		GTs	
High Pressure Mains		SSSIs	
Some Examples Of Plant Items			
Valve		Syphon	
Depth of Cover		Diameter Change	
		Material Change	

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Date Requested: 24/08/2017
Job Reference: 11086846
Site Location: 506535 105331
Requested by:
Mrs Lisa Simmons
Your Scheme/Reference:
LKS/Angmering 2017-84

Exact Scales:
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Low Pressure Mains

Medium Pressure Mains

Intermediate Pressure Mains

High Pressure Mains

Some Examples Of Plant Items

Valve



Syphon



Depth of Cover



Diameter Change



Material Change



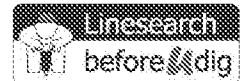
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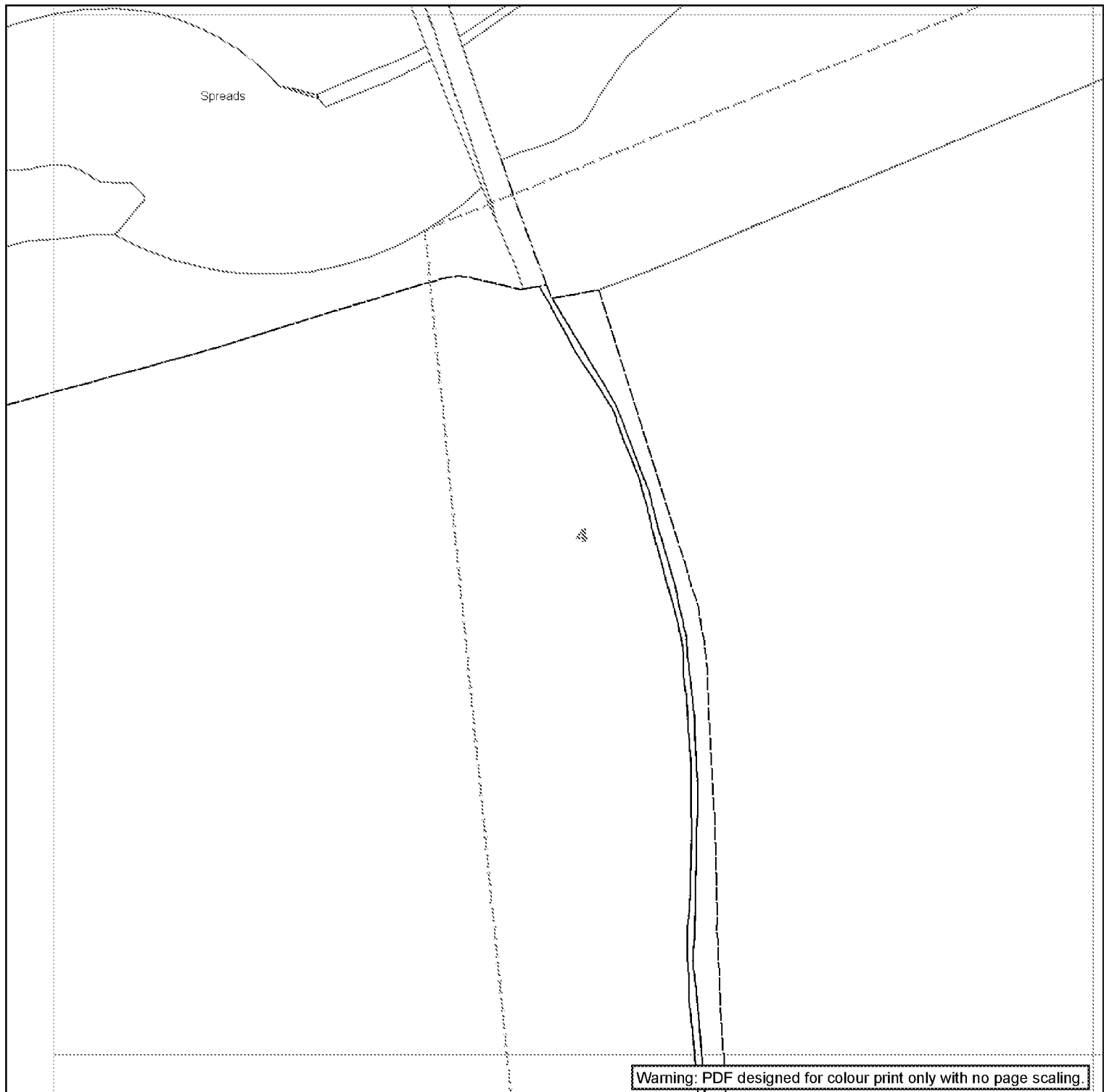
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Low Pressure Mains

Medium Pressure Mains

Intermediate Pressure Mains

High Pressure Mains

Some Examples Of Plant Items

Valve



Syphon



Depth of Cover



Diameter Change



Material Change



History Data

LAs

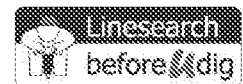
GTs



SSSIs



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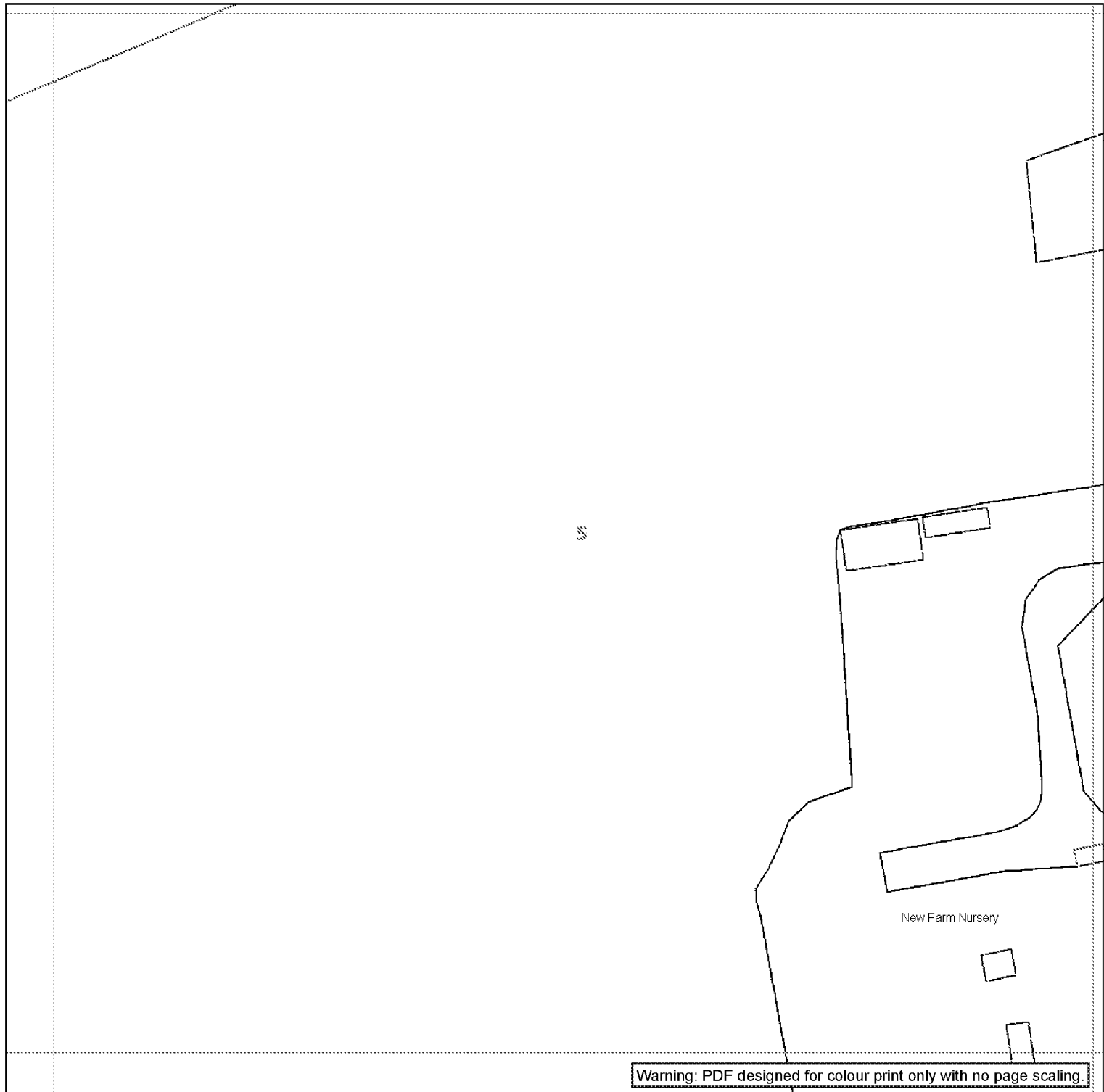
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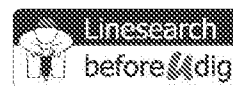


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Low Pressure Mains		History Data	
Medium Pressure Mains		LAs	
Intermediate Pressure Mains		GTs	
High Pressure Mains		SSSIs	
Some Examples Of Plant Items			
Valve		Syphon	
		Depth of Cover	
		Diameter Change	
		Material Change	

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Low Pressure Mains

Medium Pressure Mains

Intermediate Pressure Mains

High Pressure Mains

Some Examples Of Plant Items

Valve



Syphon



Depth of
Cover



Diameter
Change



Material
Change



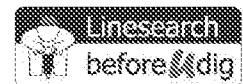
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Exact Scales:
1:1000 Area or Circle dig site
1:1000 Line dig site

ARUN DISTRICT COUNCIL A/270/21/OUT



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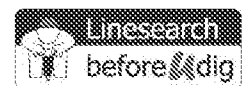


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Low Pressure Mains		History Data	
Medium Pressure Mains		LAs	
Intermediate Pressure Mains		GTs	
High Pressure Mains		SSSIs	
Some Examples Of Plant Items			
Valve		Syphon	
Depth of Cover		Diameter Change	
		Material Change	

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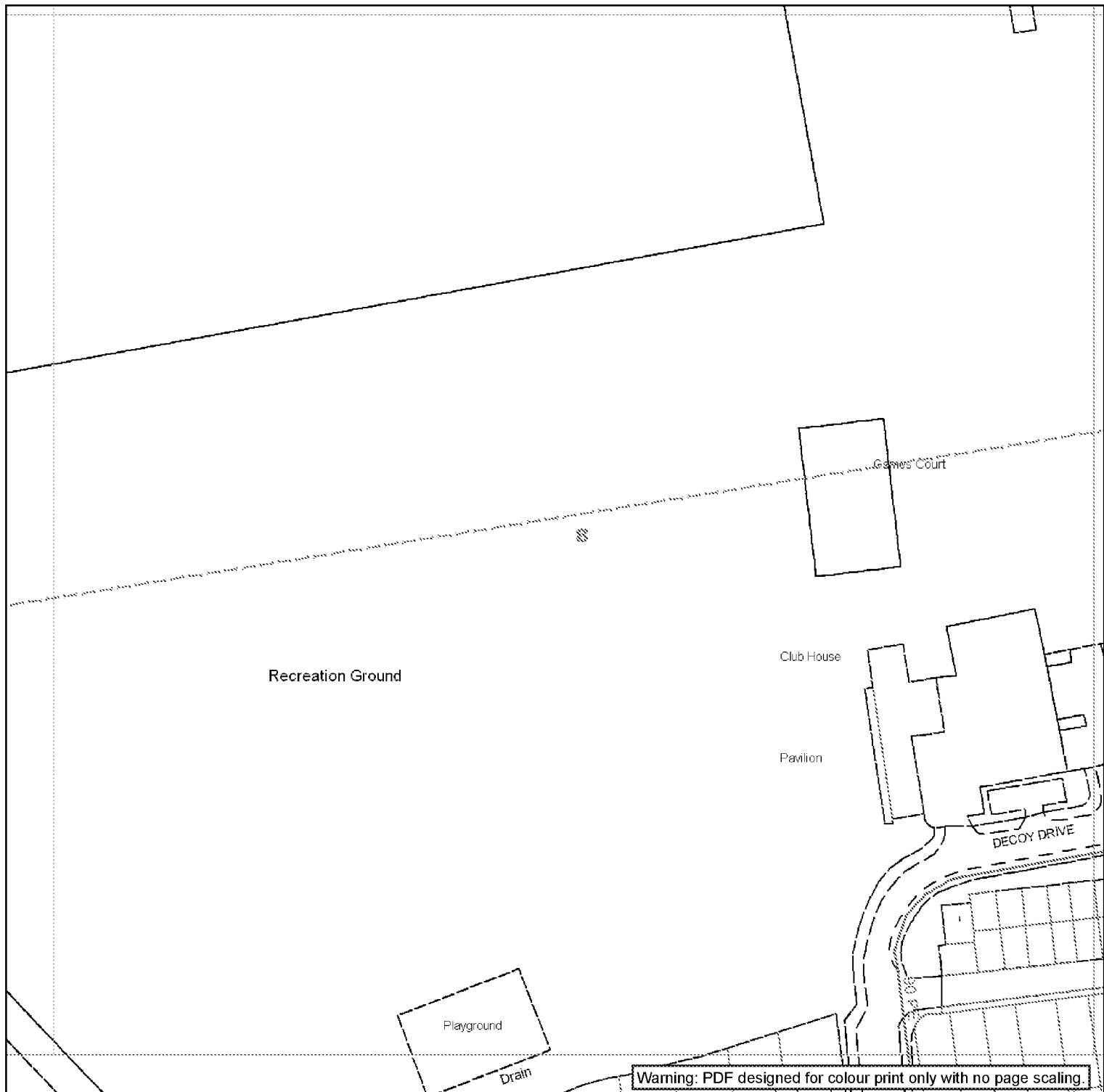
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Low Pressure Mains

Medium Pressure Mains

Intermediate Pressure Mains

High Pressure Mains

Some Examples Of Plant Items

Valve



Syphon



Depth of
Cover



Diameter
Change



Material
Change



History Data

LA's

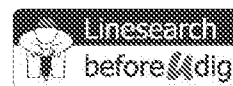
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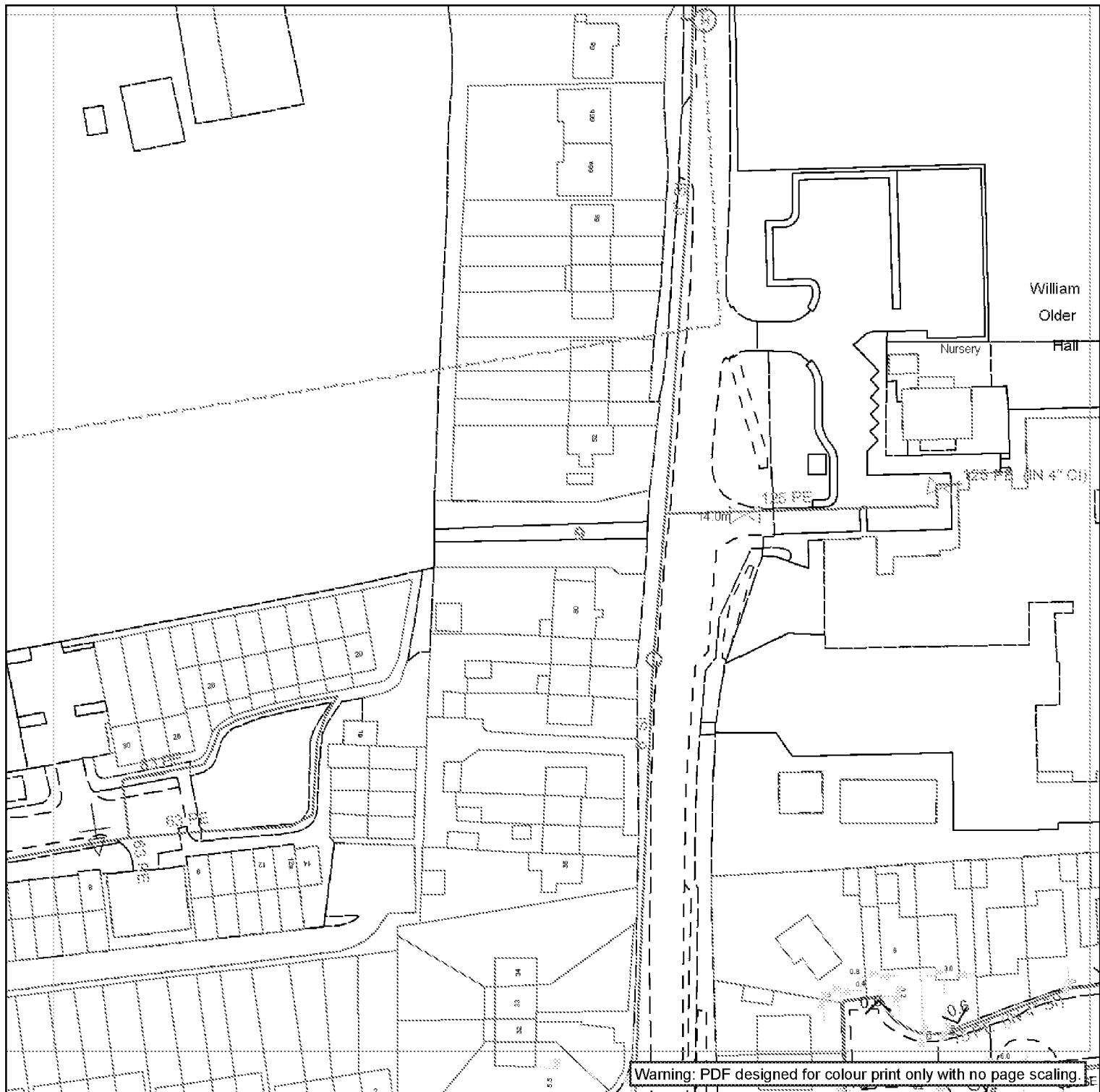
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Syphon



Depth of Cover



Diameter Change



Material Change



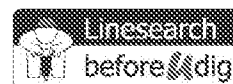
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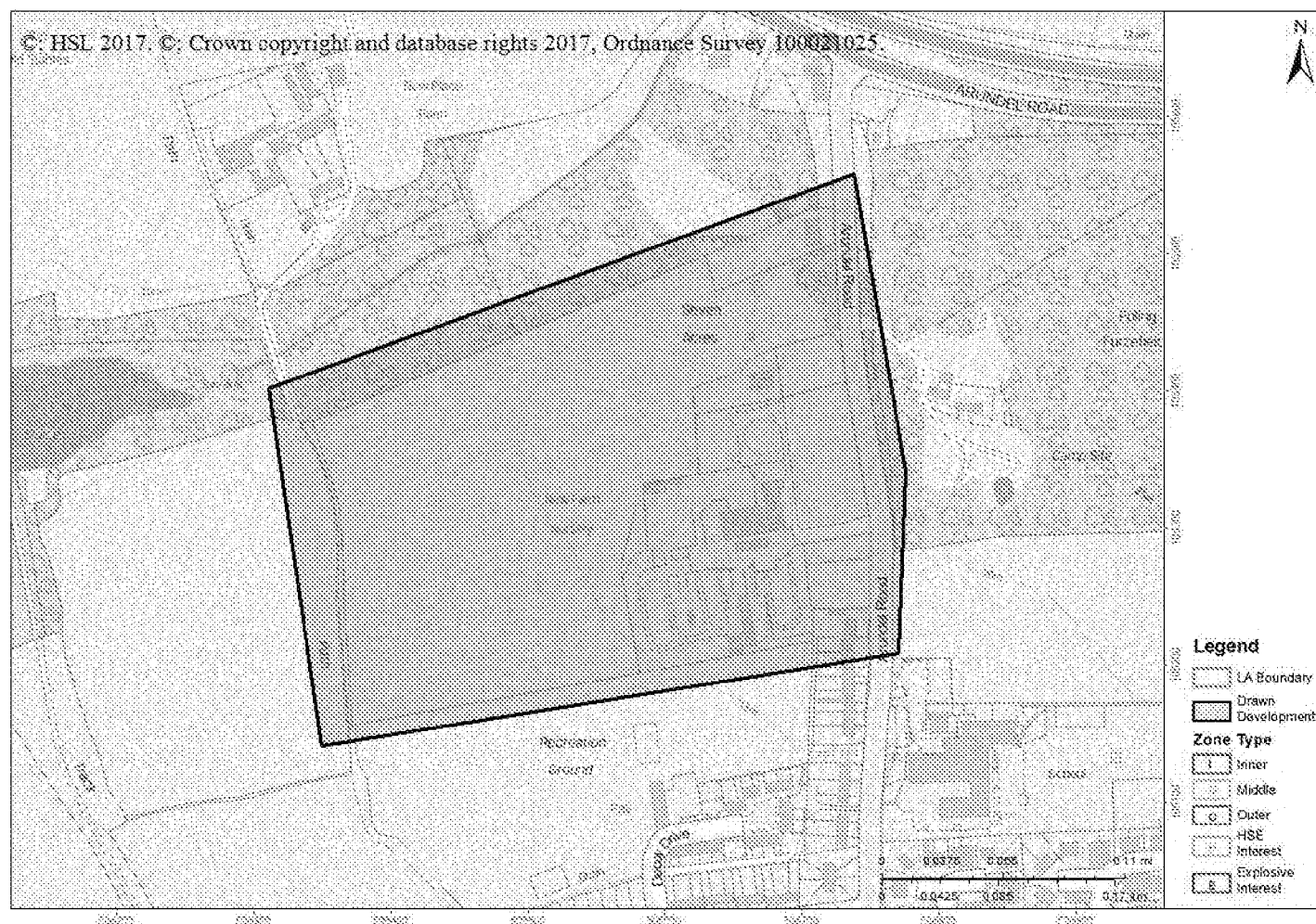
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1:1000 Area or Circle dig site
1:1000 Line dig site

Advice : HSL-170824123813-382 Does Not Cross Any Consultation Zones

Your Ref: LKS/Angmering 2017-84

Development Name:

Comments:



The proposed development site which you have identified does not currently lie within the consultation distance (CD) of a major hazard site or major accident hazard pipeline; therefore at present HSE does not need to be consulted on any developments on this site. However, should there be a delay submitting a planning application for the proposed development on this site, you may wish to approach HSE again to ensure that there have been no changes to CDs in this area in the intervening period.

This advice report has been generated using information supplied by Lisa Simmons at Gladman Group on 24 August 2017.

Enquirer			
Name	Mrs Lisa Simmons	Phone	01260 288949
Company	Gladman Developments Ltd	Mobile	Not Supplied
		Fax	Not Supplied
Address	Gladman House Alexandria Way Congleton Cheshire CW12 1LB		
Email	[REDACTED]		
Notes	Please ensure your contact details are correct and up to date on the system in case the LSBUD Members need to contact you.		

Enquiry Details			
Scheme/Reference	LKS/Angmering 2017-84		
Enquiry type	Initial Enquiry	Work category	Development Projects
Start date	25/08/2018	Work type	Housing
End date	27/08/2019	Site size	141626 metres square
Searched location	XY= 506583, 105339 Easting/Northing	Work type buffer*	25 metres
Confirmed location	506531 105344		

* The WORK TYPE BUFFER is a distance added to your search area based on the Work type you have chosen.



Asset Owners

Terms and Conditions. Please note that this enquiry is subject always to our standard terms and conditions available at www.linesearchbeforeudig.co.uk ("Terms of Use") and the disclaimer at the end of this document. Please note that in the event of any conflict or ambiguity between the terms of this Enquiry Confirmation and the Terms of Use, the Terms of Use shall take precedence.

Validity and search criteria. The results of this enquiry are based on the confirmed information you entered and are valid only as at the date of the enquiry. It is your responsibility to ensure that the Enquiry Details are correct, and LineSearchbeforeUdig accepts no responsibility for any errors or omissions in the Enquiry Details or any consequences thereof. LSBUD Members update their asset information on a regular basis so you are advised to consider this when undertaking any works. It is your responsibility to choose the period of time after which you need to resubmit any enquiry but the maximum time (after which your enquiry will no longer be dealt with by the LSBUD Helpdesk and LSBUD Members) is 28 days. If any details of the enquiry change, particularly including, but not limited to, the location of the work, then a further enquiry must be made.

Asset Owners & Responses. Please note the enquiry results include the following:

1. "LSBUD Members" who are asset owners who have registered their assets on the LSBUD service.
2. "Non LSBUD Members" are asset owners who have not registered their assets on the LSBUD service but LSBUD is aware of their existence. Please note that there could be other asset owners within your search area.

Below are three lists of asset owners:

1. LSBUD Members who have assets registered within your search area. ("Affected")
 - a. These LSBUD Members will either:
 - i. Ask for further information ("Email Additional Info" noted in status). The additional information includes: Site contact name and number, Location plan, Detailed plan (minimum scale 1:2500), Cross sectional drawings (if available), Work Specification.
 - ii. Respond directly to you ("Await Response"). In this response they may either send plans directly to you or ask for further information before being able to do so, particularly if any payments or authorisations are required.
2. LSBUD Members who do not have assets registered within your search area. ("Not Affected")
3. Non LSBUD Members who may have assets within your search area. Please note that this list is not exhaustive and all details are provided as a guide only. It is your responsibility to identify and consult with all asset owners before proceeding.

National Grid. Please note that the LSBUD service only contains information on National Grid's Gas above 7 bar asset, all National Grid Electricity Transmission assets and National Grid's Gas Distribution Limited above 2 bar asset.

For National Grid Gas Distribution Ltd below 2 bar asset information please go to www.beforeyoudig.nationalgrid.com

Enquiry Confirmation

LSBUD Ref: 11086846

Date of enquiry: 24/08/2017

Time of enquiry: 12:56

LSBUD Members who have assets registered on the LSBUD service within the vicinity of your search area.

List of affected LSBUD members			
Asset Owner	Phone/Email	Emergency Only	Status
SGN	08009121722	0800111999	Await response
UK Power Networks	08000565866	08000565866	Await response

LSBUD Members who do not have assets registered on the LSBUD service within the vicinity of your search area. Please be aware that LSBUD Members make regular changes to their assets and this list may vary for new enquiries in the same area.

List of not affected LSBUD members		
AWE Pipeline	Esso Petroleum Company Limited	Petroineos
BOC Limited (A Member of the Linde Group)	Fulcrum Pipelines Limited	Phillips 66
BP Midstream Pipelines	Gamma	Premier Transmission Ltd (SNIP)
BPA	Gateshead Energy Company	Prysmian Cables & Systems Ltd (c/o Western Link)
Carrington Gas Pipeline	Gigaclear PLC	Redundant Pipelines - LPDA
CATS Pipeline c/o Wood Group PSN	Humbly Grove Energy	RWEnpower (Little Barford and South Haven)
Cemex	IGas Energy	SABIC UK Petrochemicals
Centrica Energy	INEOS Manufacturing (Scotland and TSEP)	Scottish Power Generation
Centrica Storage Ltd	INOVYN Enterprises Limited	Seabank Power Ltd
CLH Pipeline System Ltd	Intergen (Coryton Energy or Spalding Energy)	Shell (St Fergus to Mossmorran)
Concept Solutions People Ltd	Mainline Pipelines Limited	Shell Pipelines
ConocoPhillips (UK) Ltd	Manchester Jetline Limited	SSE (Peterhead Power Station)
DIO (MOD Abandoned Pipelines)	Manx Cable Company	Total (Finaline, Colnbrook & Colwick Pipelines)
Dong Energy (UK) Ltd	Marchwood Power Ltd (Gas Pipeline)	Transmission Capital
E.ON UK CHP Limited	Melbourn Solar Limited	Uniper UK Ltd
EirGrid	National Grid Gas (Above 7 bar), National Grid Gas Distribution Limited (Above 2 bar) and National Grid Electricity Transmission	Vattenfall
Electricity North West Limited	Northumbrian Water Group	Veolia ES SELCHP Limited
ENI & Himor c/o Penspen Ltd	NPower CHP Pipelines	Western Power Distribution
ESP Utilities Group	Oikos Storage Limited	Wingas Storage UK Ltd
ESSAR	Perenco UK Limited (Purbeck Southampton Pipeline)	Zayo Group UK Ltd c/o JSM Group Ltd

The following Non-LSBUD Members may have assets in your search area. It is YOUR RESPONSIBILITY to contact them before proceeding. Please be aware this list is not exhaustive and it is your responsibility to identify and contact all asset owners within your search area.

Non-LSBUD members (Asset owners not registered on LSBUD)			
Asset Owner	Preferred contact method	Phone	Status
BT	https://www.swns.bt.com/pls/mbe/welcome.home	08009173993	Not Notified
CityFibre	asset.team@cityfibre.com	033 3150 7282	Not Notified
Colt	plantenquiries@catelecomuk.com	01227768427	Not Notified
Energetics Electricity	plantenquiries@energetics-uk.com	01698404646	Not Notified
ENGIE	nrswa@cofely-gdfsuez.com	01293 549944	Not Notified
GTC	https://pe.gtc-uk.co.uk/PlantEnqMembership	01359240363	Not Notified
GTT (formerly Hibernia Networks)	owen.maguire@gtt.net	01704 322 300	Not Notified
Interoute	interoute.enquiries@plancast.co.uk	02070259000	Not Notified
KPN (c/-Instalcom)	kpn.plantenquiries@instalcom.co.uk	n/a	Not Notified
Level 3 Communications UK Ltd (C/-Instalcom)	plantenquiries@instalcom.co.uk	02087314613	Not Notified
Mobile Broadband Network Limited	mbnl.plant.enquiries@turntown.com	01212 621 100	Not Notified
Sky UK Limited	nrswa@sky.uk	02070323234	Not Notified
Southern Water	searches@southernwater.co.uk	08452700212	Not Notified
Tata (c/-McNicholas)	plantenquiries@mcnicholas.co.uk	03300558469	Not Notified
Utility assets Ltd	assetrecords@utilityassets.co.uk		Not Notified
Verizon Business	osp-team@uk.verizonbusiness.com	01293611736	Not Notified
Virgin Media	http://www.digdat.co.uk	08708883116	Not Notified
Vodafone	osm.enquiries@atkinsglobal.com	01454662881	Not Notified
Vtesse Networks	https://plant.interoute.com/plant-enquiries/	01992532100	Not Notified

Disclaimer

Please refer to LineSearchbeforeUdig's Terms of Use for full terms of use available at www.lineSearchbeforeUdig.co.uk

The results of this Enquiry are personal to the Enquirer and shall not be shared with or relied upon by any other party. The asset information on which the Enquiry results are based has been provided by LSBUD Members, therefore LineSearchbeforeUdig will provide no guarantee that such information is accurate or reliable nor does it monitor such asset information for accuracy and reliability going forward. There may also be asset owners which do not participate in the enquiry service operated by LineSearchbeforeUdig, including but not exclusively those set out above. Therefore, LineSearchbeforeUdig cannot make any representation or give any guarantee or warranty as to the completeness of the information contained in the enquiry results or accept any responsibility for the accuracy of the mapping images used. LineSearchbeforeUdig and its employees, agents and consultants accept no liability (save that nothing in this Enquiry Confirmation excludes or limits our liability for death or personal injury arising from our negligence, or our fraud or fraudulent misrepresentation, or any other liability that cannot be excluded or limited by English law) arising in respect thereof or in any other way for errors or omissions including responsibility to any person by reason of negligence.

APPENDIX D EXPLORATORY HOLE RECORDS AND INSITU TESTS RESULTS



STRUCTURAL SOILS LTD

INSITU TESTING REPORT



1774

Report No. 749615R.01(00)

Date 01-September-2020 Contract Angmering

Client RSK Environment Ltd
Address Spring Lodge
172 Chester Road
Helsby
Cheshire
WA6 0AR

For the Attention of Augustus Awoyomi

Order received	20-August-2020
Testing Started	26-August-2020
Testing Completed	27-August-2020

Client Reference	52207
Client Order No.	None
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

7no. Insitu CBR tests carried out at locations specified by client.

Not UKAS Accredited Tests

3no. Soakaway tests carried out at locations specified by client.

The results represent the ground conditions at the specified locations and depths at the time of testing.

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 1a Princess Street Bedminster Br

TESTING VERIFICATION CERTIFICATE



1774

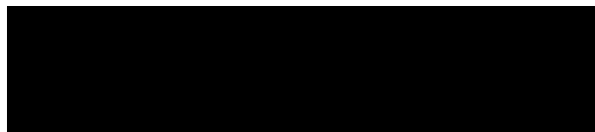
The test results included in this report are certified as:-

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: **01/09/2020 11:38:51**.

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



Approved Signatory
Sam Handcock (Site Testing 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:

Angmering

Job No:

749615



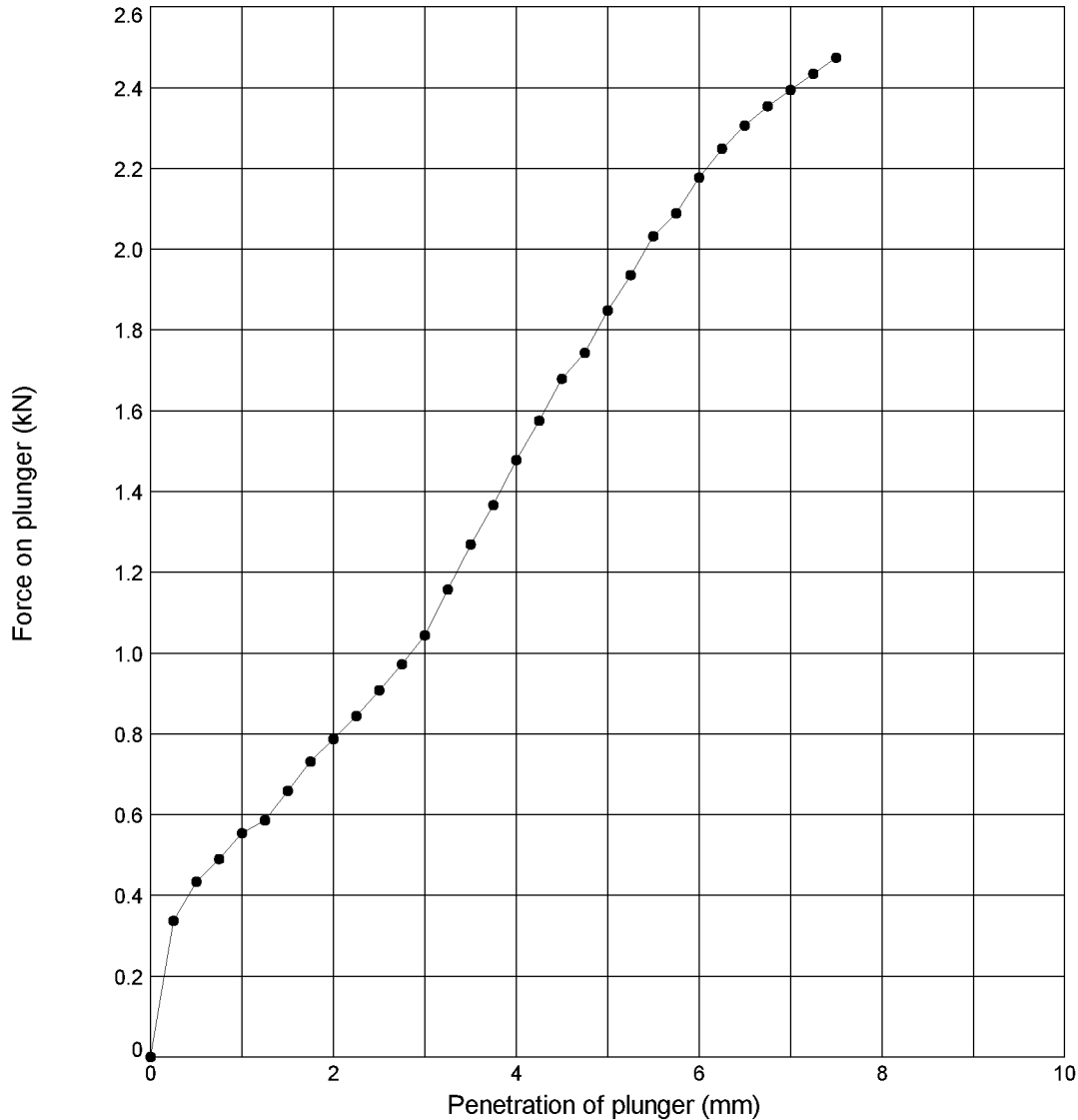
IN SITU CALIFORNIA BEARING RATIO TEST

In accordance with BS1377:Part 9:1990

Position Ref: **CBR1/TP17**

Depth (m): **0.33**

Date: **27/08/20**



Test Details	Test Conditions	Test Results
Kentledge : Toyota Hilux Surcharge (kg) : 4.52 Surcharge Pressure (kPa) : 1	Weather : Sunny Temperature (°C) : 18.6	CBR Value (%) : 9.2 Moisture Content (%) : 12
Sample Description	Test Notes	
Brown slightly gravelly sandy CLAY	Estimated particles >20 mm (%) : 2 Size and position of particles >20mm in relation to the plunger : Unknown	

 STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	<i>K. Limacher</i>	KATIE LIMACHER	01/09/20
	Contract	Contract Ref:	
	Angmering	749615	
			

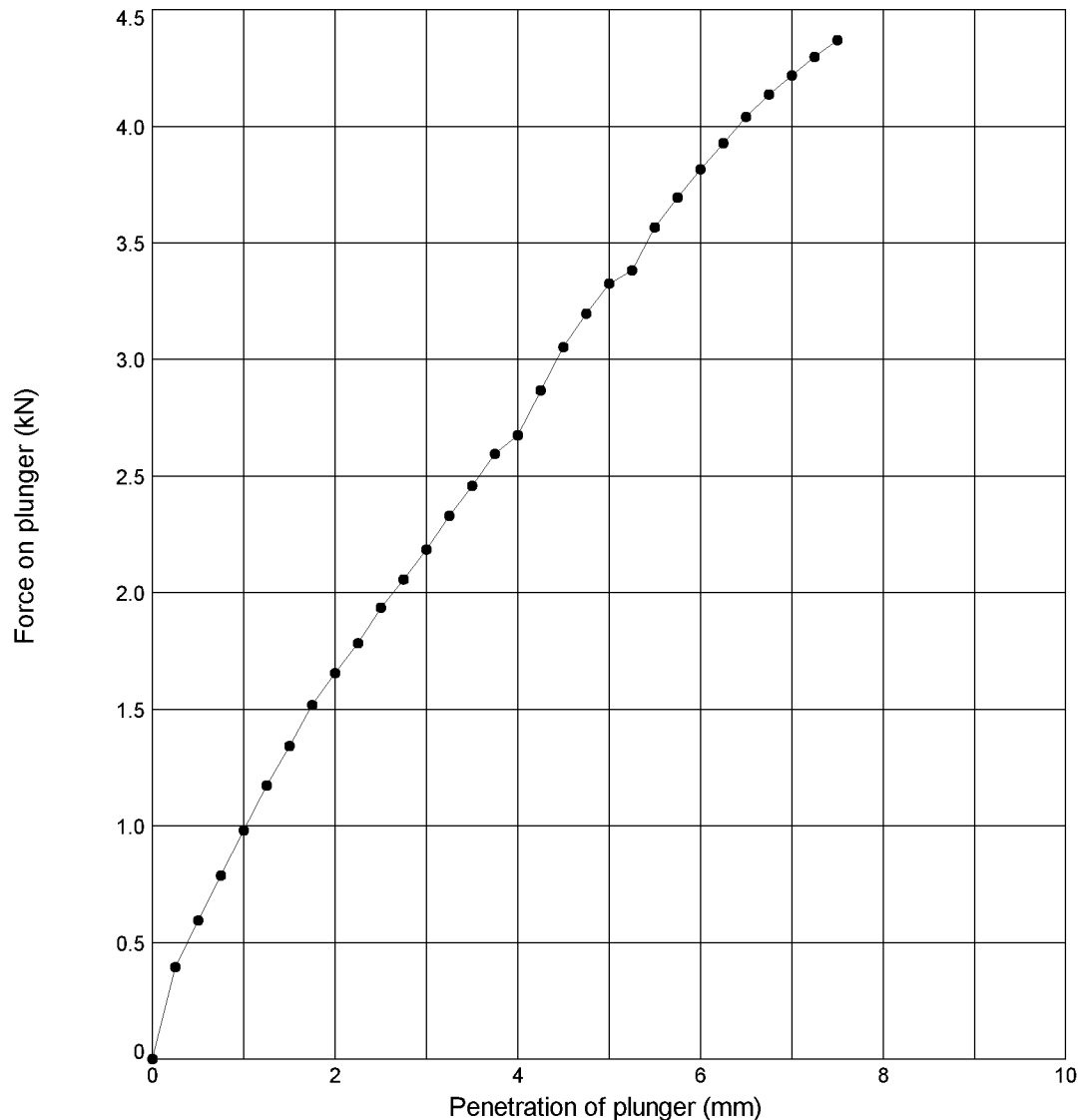
IN SITU CALIFORNIA BEARING RATIO TEST

In accordance with BS1377:Part 9:1990

Position Ref: **CBR2/TP18**

Depth (m): **0.30**

Date: **27/08/20**



Test Details	Test Conditions	Test Results
Kentledge : Toyota Hilux Surcharge (kg) : 4.52 Surcharge Pressure (kPa) : 1	Weather : Sunny Temperature (°C) : 19.2	CBR Value (%) : 17 Moisture Content (%) : 12
Sample Description	Test Notes	
Brown slightly gravelly sandy CLAY	Estimated particles >20 mm (%) : 2 Size and position of particles >20mm in relation to the plunger : Unknown	

 STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	<i>K. Limacher</i>	KATIE LIMACHER	01/09/20
	Contract	Contract Ref:	
	Angmering	749615	
			

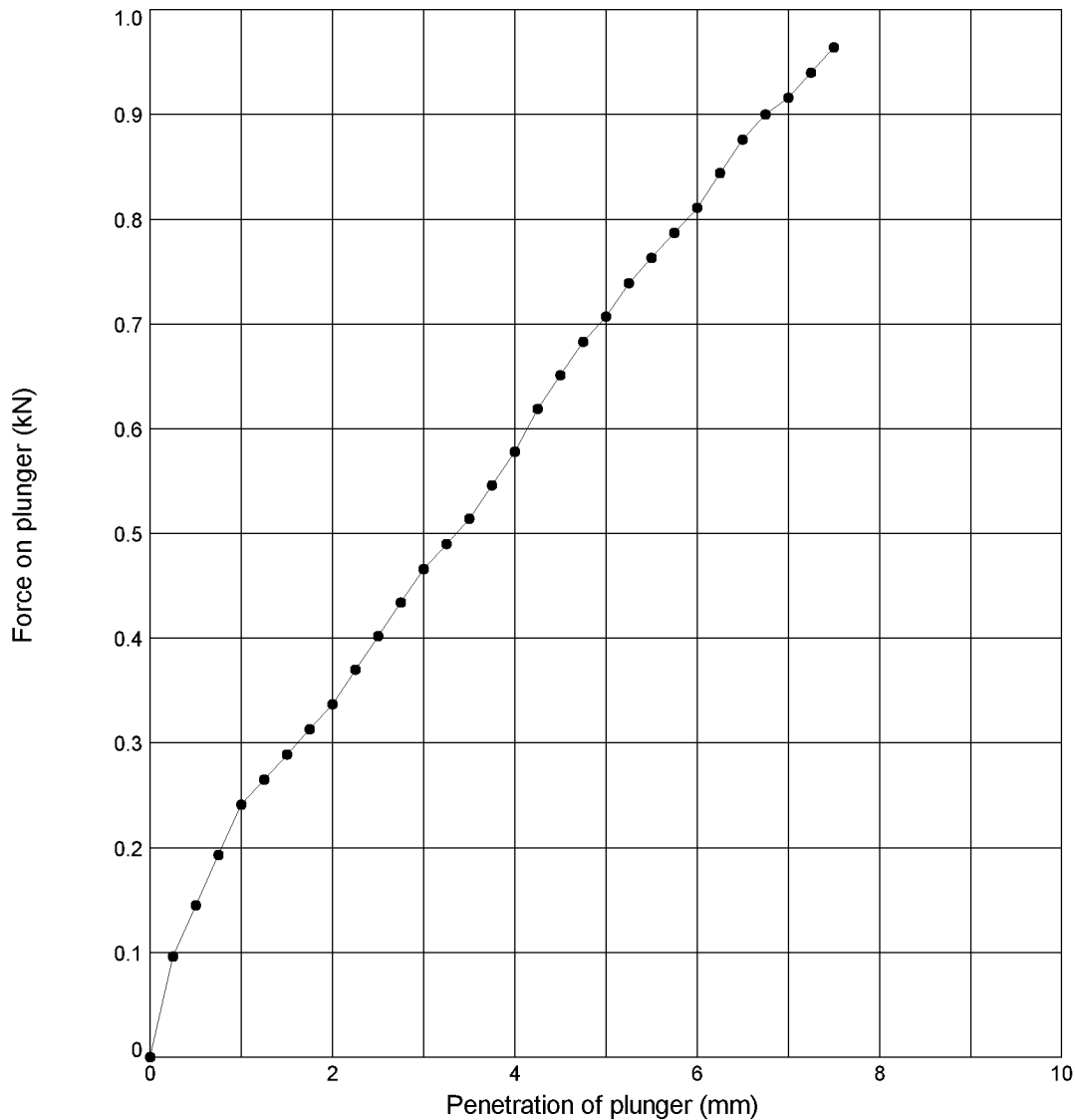
IN SITU CALIFORNIA BEARING RATIO TEST

In accordance with BS1377:Part 9:1990

Position Ref: **CBR3/TP20**

Depth (m): **0.35**

Date: **27/08/20**



Test Details	Test Conditions	Test Results
Kentledge : Toyota Hilux Surcharge (kg) : 4.52 Surcharge Pressure (kPa) : 1	Weather : Overcast Temperature (°C) : 23.5	CBR Value (%) : 3.5 Moisture Content (%) : 17
Sample Description	Test Notes	
Brown slightly gravelly sandy CLAY	Estimated particles >20 mm (%) : 1 Size and position of particles >20mm in relation to the plunger : Unknown	

 STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	<i>K. Limacher</i>	KATIE LIMACHER	01/09/20
	Contract	Contract Ref:	
	Angmering	749615	
			

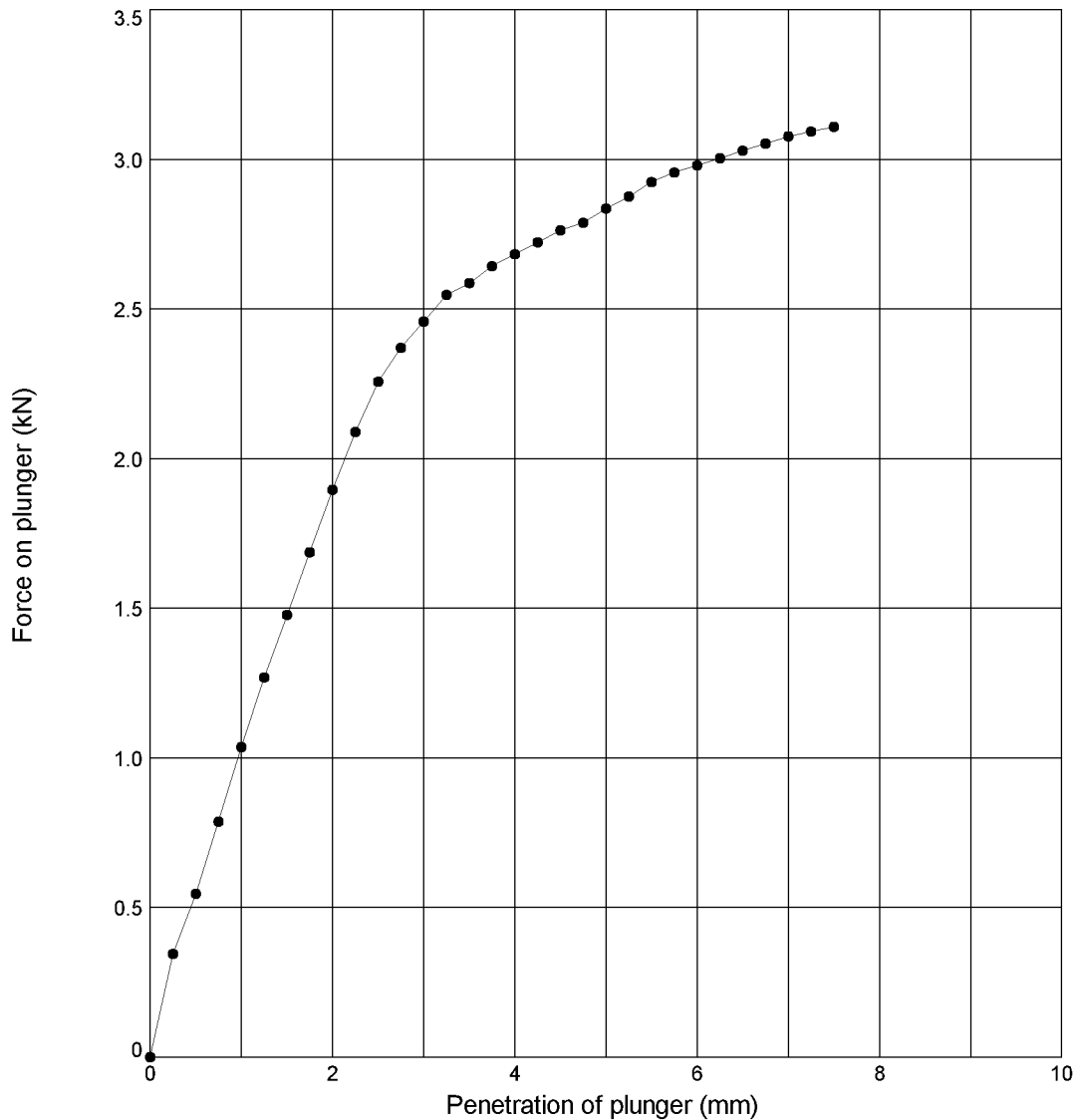
IN SITU CALIFORNIA BEARING RATIO TEST

In accordance with BS1377:Part 9:1990

Position Ref: **CBR4/TP21**

Depth (m): **0.30**

Date: **27/08/20**



Test Details	Test Conditions	Test Results
Kentledge : Toyota Hilux Surcharge (kg) : 4.52 Surcharge Pressure (kPa) : 1	Weather : Overcast Temperature (°C) : 24.1	CBR Value (%) : 17 Moisture Content (%) : 13
Sample Description	Test Notes	
Brown slightly gravelly sandy CLAY	Estimated particles >20 mm (%) : 2 Size and position of particles >20mm in relation to the plunger : Unknown	

 STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	<i>K. Limacher</i>	KATIE LIMACHER	01/09/20
	Contract	Contract Ref:	
	Angmering	749615	
			

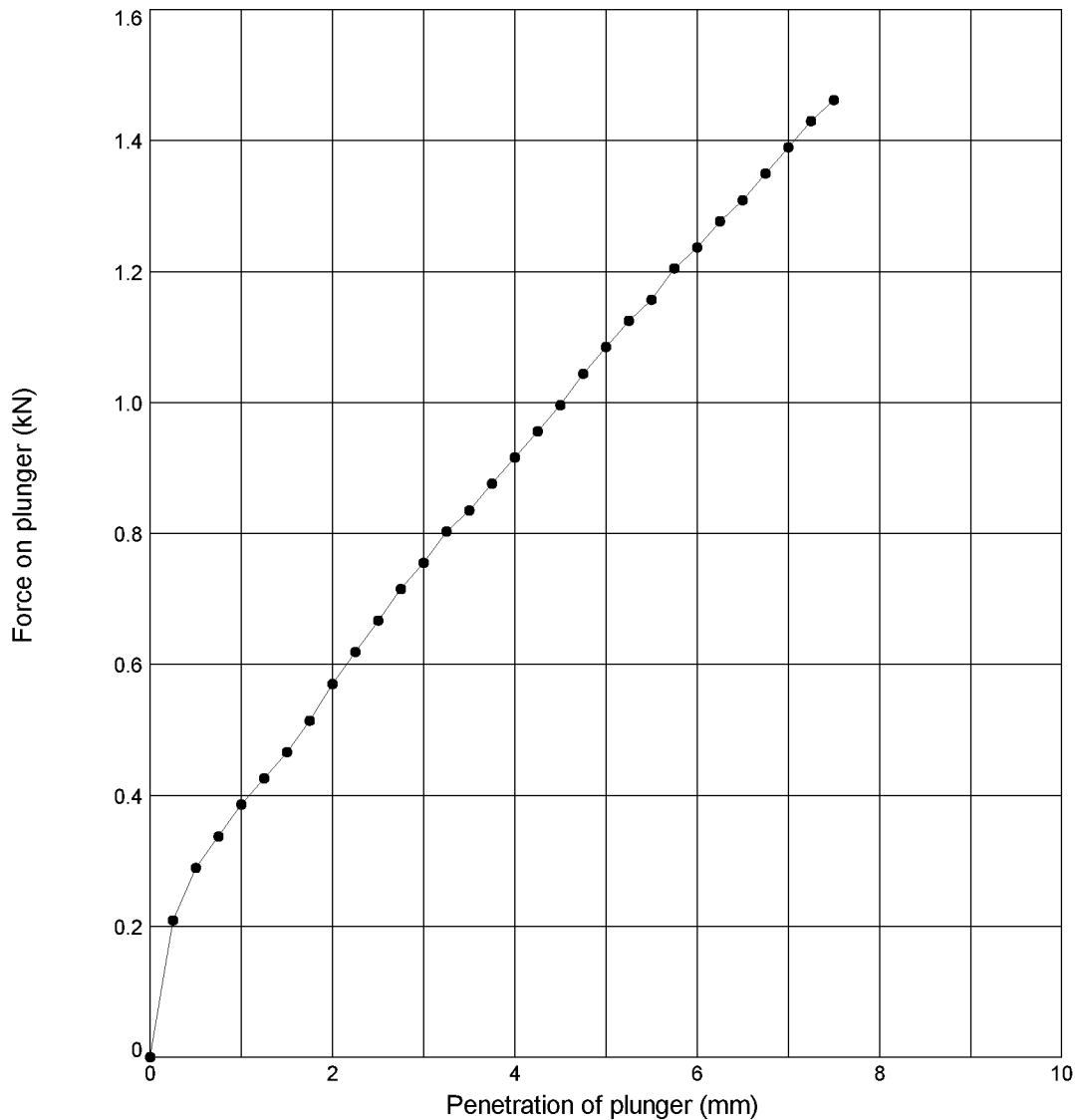
IN SITU CALIFORNIA BEARING RATIO TEST

In accordance with BS1377:Part 9:1990

Position Ref: **CBR5/TP19**

Depth (m): **0.33**

Date: **27/08/20**



Test Details	Test Conditions	Test Results
Kentledge : Toyota Hilux Surcharge (kg) : 4.52 Surcharge Pressure (kPa) : 1	Weather : Overcast Temperature (°C) : 22.5	CBR Value (%) : 5.4 Moisture Content (%) : 14
Sample Description	Test Notes	
Brown sandy CLAY	Estimated particles >20 mm (%) : 1 Size and position of particles >20mm in relation to the plunger : Unknown	

 STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	<i>K. Limacher</i>	KATIE LIMACHER	01/09/20
	Contract	Contract Ref:	
	Angmering	749615	
			

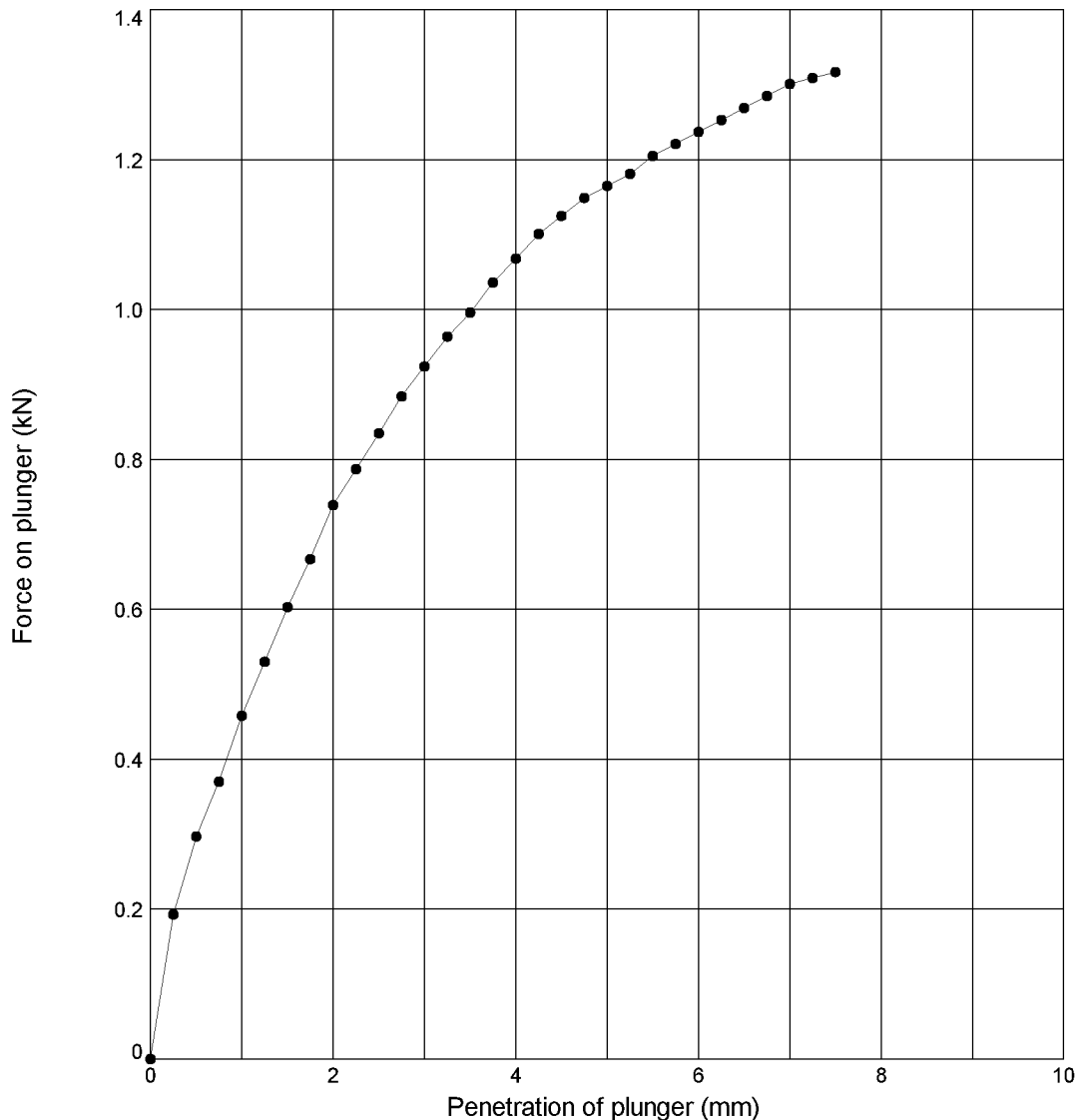
IN SITU CALIFORNIA BEARING RATIO TEST

In accordance with BS1377:Part 9:1990

Position Ref: **CBR6/TP16**

Depth (m): **0.40**

Date: **26/08/20**



Test Details	Test Conditions	Test Results
Kentledge : Toyota Hilux Surcharge (kg) : 4.52 Surcharge Pressure (kPa) : 1	Weather : Sunny Temperature (°C) : 24.7	CBR Value (%) : 6.3 Moisture Content (%) : 26
Sample Description	Test Notes	
Brown sandy CLAY	Estimated particles >20 mm (%) : 1 Size and position of particles >20mm in relation to the plunger : Unknown	

 STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	<i>K. Limacher</i>	KATIE LIMACHER	01/09/20
	Contract	Contract Ref:	
	Angmering	749615	
			

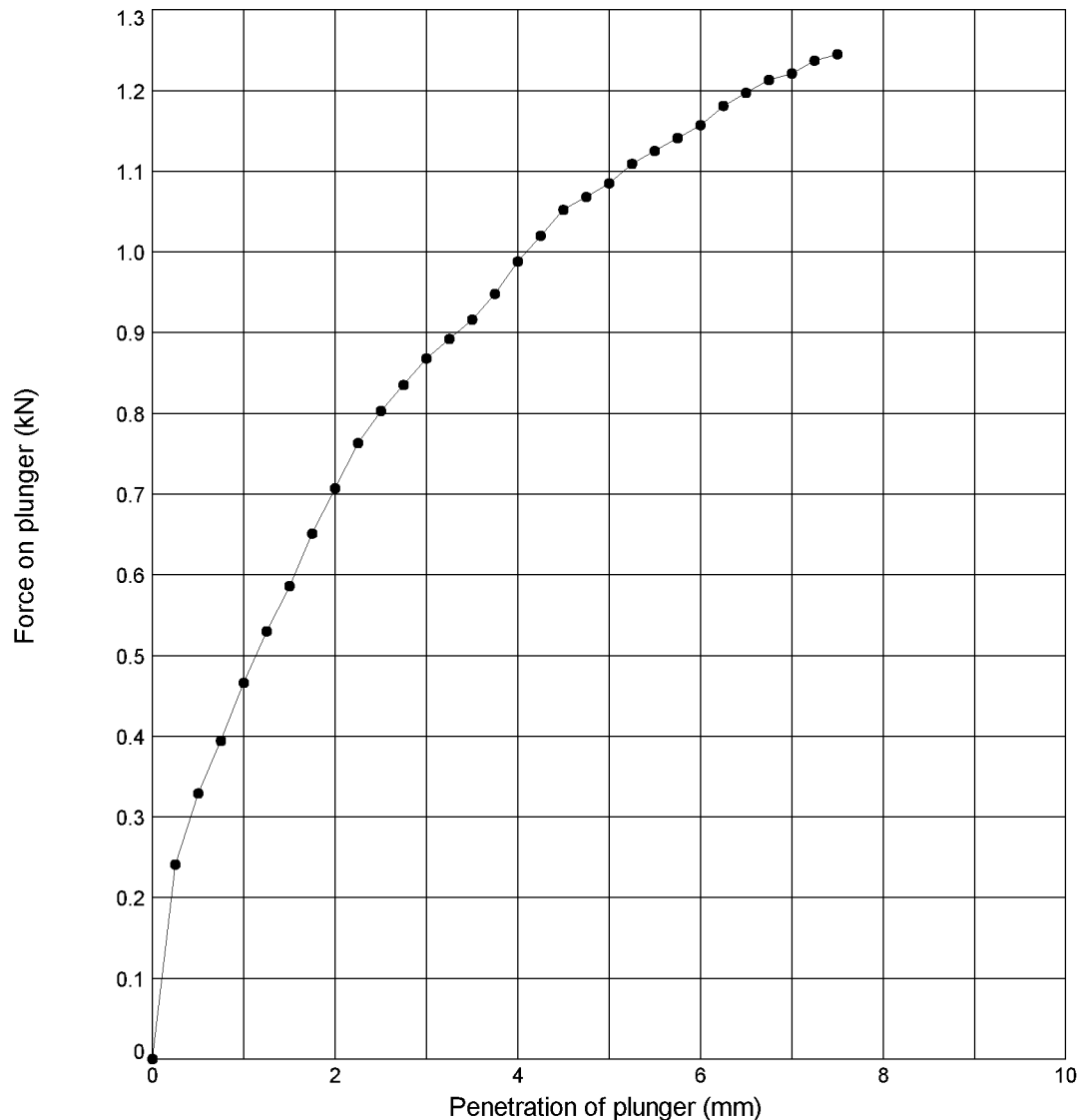
IN SITU CALIFORNIA BEARING RATIO TEST

In accordance with BS1377:Part 9:1990

Position Ref: **CBR7/TP15**

Depth (m): **0.50**

Date: **26/08/20**



Test Details	Test Conditions	Test Results
Kentledge : Toyota Hilux Surcharge (kg) : 4.52 Surcharge Pressure (kPa) : 1	Weather : Sunny Temperature (°C) : 24.1	CBR Value (%) : 6.1 Moisture Content (%) : 26
Sample Description	Test Notes	
Brown CLAY	Estimated particles >20 mm (%) : 1 Size and position of particles >20mm in relation to the plunger : Unknown	

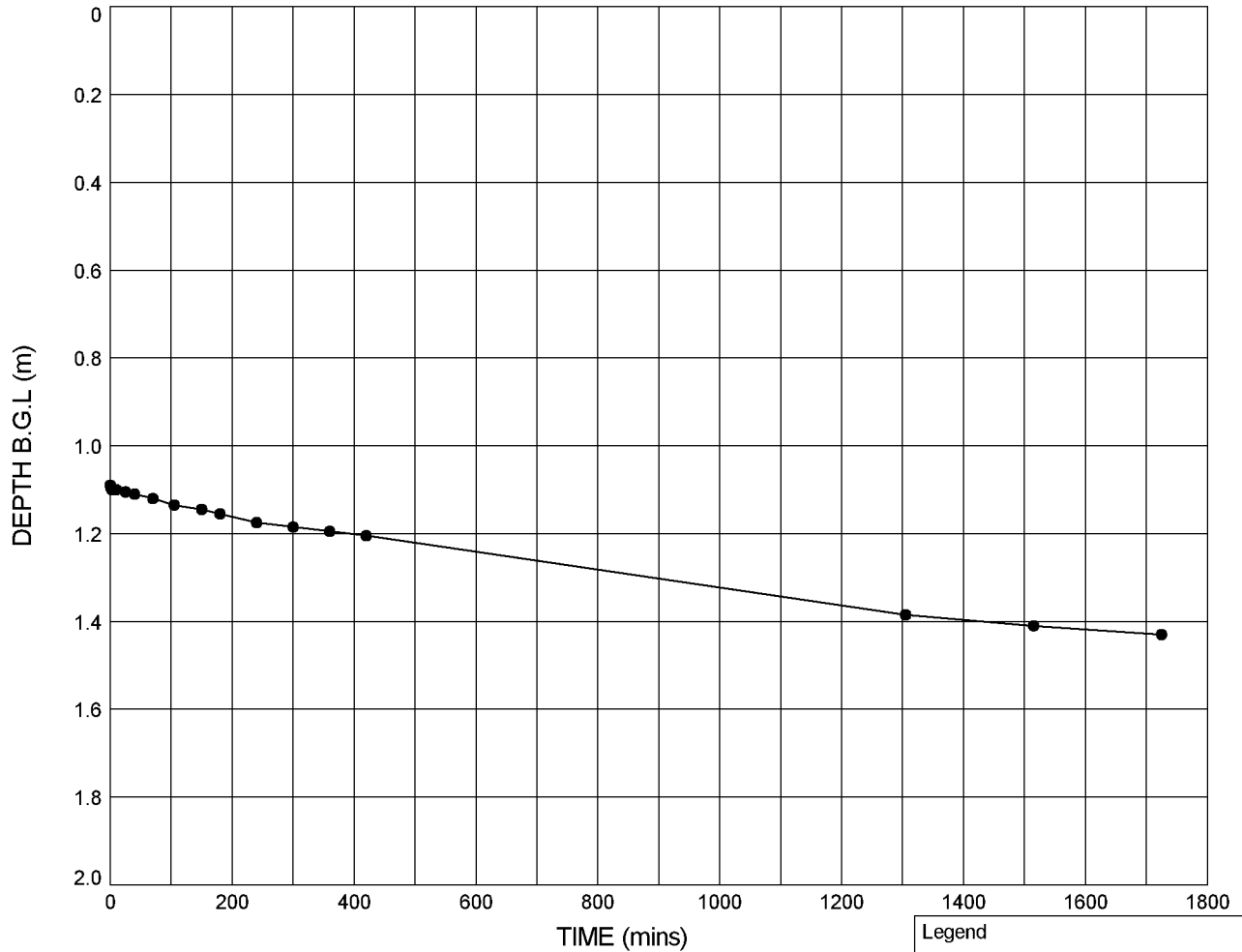
 STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	<i>K. Limacher</i>	KATIE LIMACHER	01/09/20
	Contract	Contract Ref:	
	Angmering	749615	
			

FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : **TPSA1**

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



Test 1

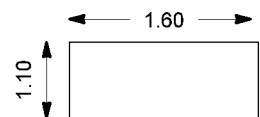
Pit start depth: = **2.00** m
 Pit final depth: = **1.95** m
 Effective depth, D_e = **0.86** m
 Effective storage volume, V_{p75-25} = **0.7568** m³
 Surface area, a_{p50} = **4.0820** m²
 Time, t_{p75-25} = **240950** secs
 Infiltration rate, f = **7.69×10^{-7}** m/s

Please note test data was extrapolated to obtain $t_{p75-tp25}$.

Legend

● Test 1 (26.08.20)

Plan (Not to scale)



No Bearing Taken



STRUCTURAL SOILS
 1a Princess Street
 Bedminster
 Bristol
 BS3 4AG

Compiled By

K. Flunocher

Date

28/08/20

Checked By

S. H. [Signature]

Date

07/09/20

Contract

Angmering

Contract Ref:

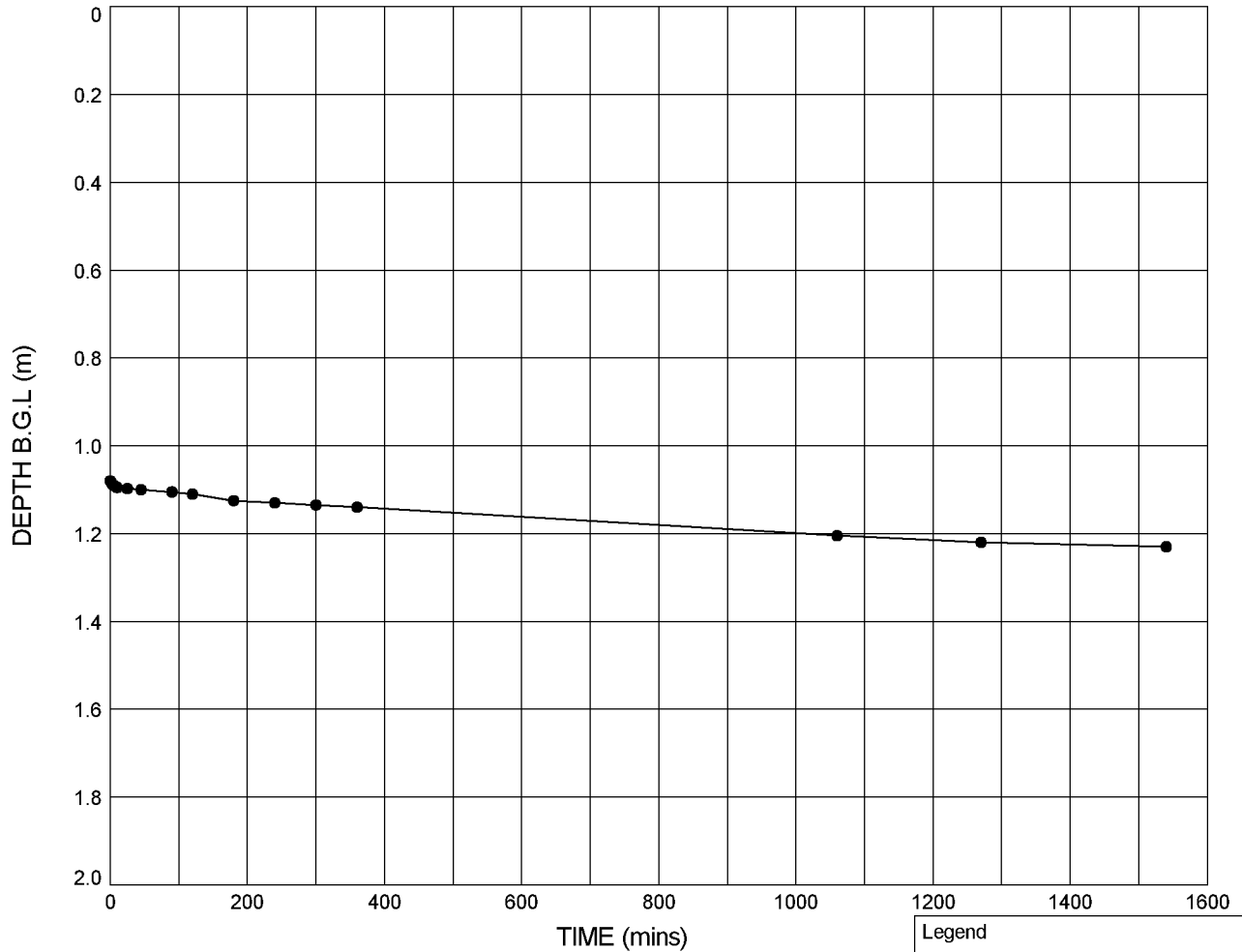
749615

FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : **TPSA2**

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



Test 1

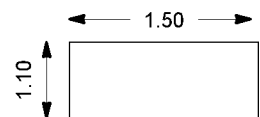
Pit start depth: = **2.00** m
 Pit final depth: = **1.85** m
 Effective depth, D_e = **0.77** m
 Effective storage volume, V_{p75-25} = **0.6353** m³
 Surface area, a_{p50} = **3.6520** m²
 Time, t_{p75-25} = **N/A** secs
 Infiltration rate, f = **N/A** m/s

Notes: Test 1 - Unable to calculate infiltration rate due to insufficient drop in water level.

Legend

● Test 1 (26.08.20)

Plan (Not to scale)



No Bearing Taken



STRUCTURAL SOILS
 1a Princess Street
 Bedminster
 Bristol
 BS3 4AG

Compiled By

Date

Checked By

Date

K. L. M. Ocher

28/08/20

S. H. M. Ocher

07/09/20

Contract

Contract Ref:

Angmering

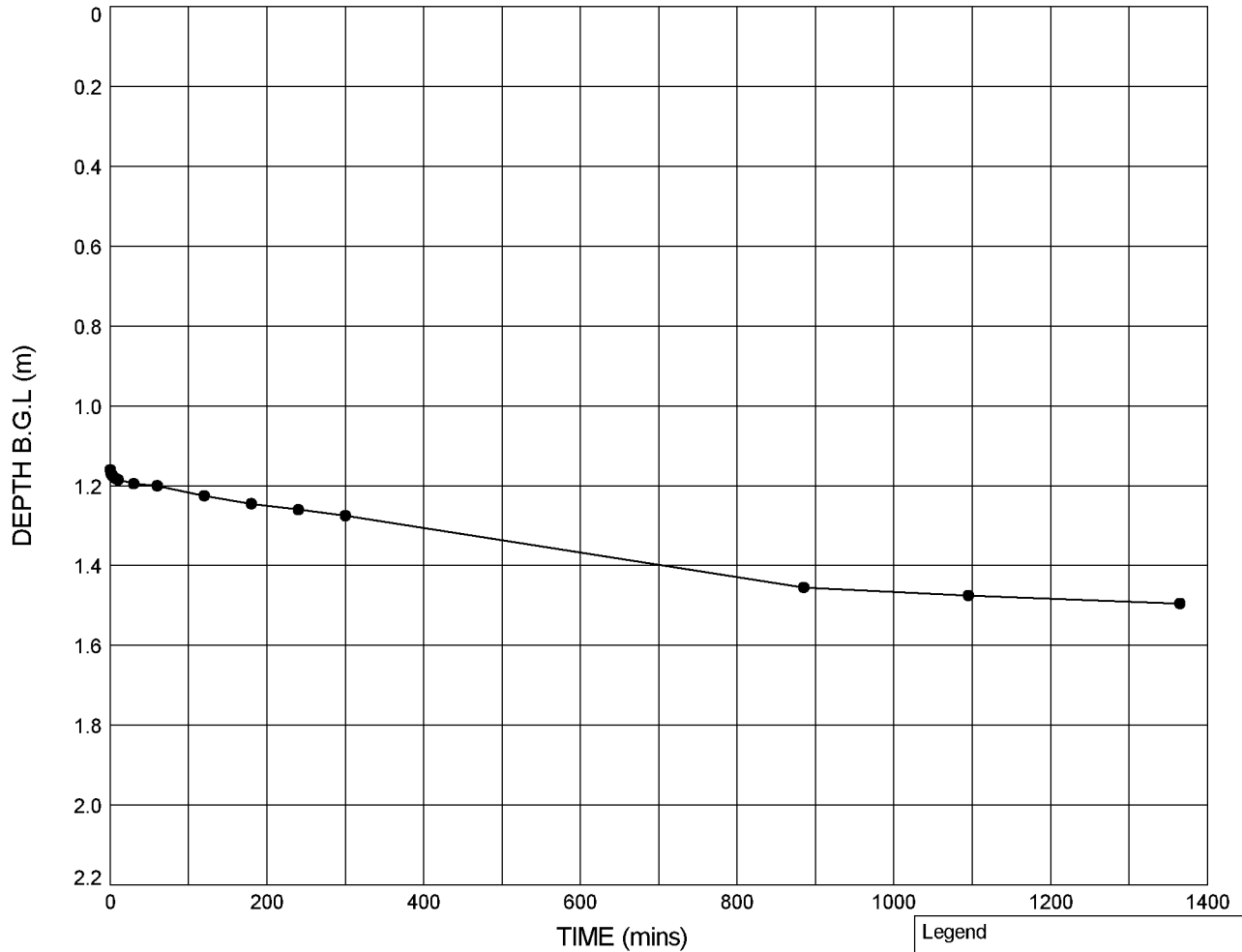
749615

FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : **TPSA3**

Plot of Depth of Water Below Ground Level Against Time



Test 1

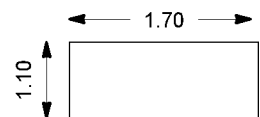
Pit start depth: = **2.10** m
 Pit final depth: = **2.00** m
 Effective depth, D_e = **0.84** m
 Effective storage volume, V_{p75-25} = **0.7854** m³
 Surface area, a_{p50} = **4.2220** m²
 Time, t_{p75-25} = **284325** secs
 Infiltration rate, f = **6.54×10^{-7}** m/s

Please note test data was extrapolated to obtain $t_{p75-tp25}$.

Legend

● Test 1 (26.08.20)

Plan (Not to scale)



No Bearing Taken



STRUCTURAL SOILS
 1a Princess Street
 Bedminster
 Bristol
 BS3 4AG

Compiled By

K. L. M. Ocher

Date

28/08/20

Checked By

S. J. M. Ocher

Date

01/09/20

Contract

Angmering

Contract Ref:

749615

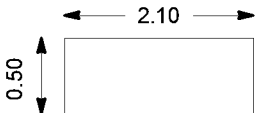


TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd			Trial Pit: TP1	
Contract Ref: 52207		Start: 26.08.20 End: 26.08.20	Ground Level: 13.44		National Grid Co-ordinate: E:506475.0 N:105411.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.10-0.20	1	ES	Tub + VL + J			Grass over dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL) Soft to firm brown gravelly CLAY. Gravel is angular to rounded fine to coarse flint.	13.14	0.30	
1.30-1.60	1	B				Firm brown mottled grey CLAY.	12.14	1.30	
2.30-2.60	2	B					10.84	2.60	

Plan (Not to Scale)



General Remarks

- 1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
- 2. Trial pit remained dry and stable during excavation.
- 3. No groundwater encountered.
- 4. Trial pit backfilled with arisings in reverse order upon completion.

All dimensions in metres

Scale: 1:25

Method Used: Machine dug	Plant Used: 8 Ton Tracked Excavator	Logged By: EChissell	Checked By:	
------------------------------------	---	--------------------------------	-------------	--



TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd			Trial Pit: TP2	
Contract Ref: 52207		Start: 26.08.20 End: 26.08.20	Ground Level: 16.37		National Grid Co-ordinate: E:506605.0 N:105465.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20-0.30	1	ES	Tub + VL + J			Grass over dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL) Firm to stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint.	16.17	0.20	
1.50-1.80	1	B						(2.60)	
2.40-2.70	2	B					13.57	2.80	

Plan (Not to Scale) 		General Remarks 1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained dry and stable during excavation. 3. No groundwater encountered. 4. Trial pit backfilled with arisings in reverse order upon completion.	
All dimensions in metres		Scale: 1:25	
Method Used: Machine dug	Plant Used: 8 Ton Tracked Excavator	Logged By: EChissell	Checked By:



TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Trial Pit: TP3
Contract Ref: 52207	Start: 26.08.20 End: 26.08.20	Ground Level: 20.81	National Grid Co-ordinate: E:506684.0 N:105444.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20-0.30	1	ES	Tub + VL + J			Grass over dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL) Firm to stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint.	20.61	0.20	
1.20-1.50	1	B						(2.30)	
2.50-2.80	2	B				Soft to firm brown mottled grey CLAY.	18.31	2.50	
							18.01	2.80	

Plan (Not to Scale) 	General Remarks 1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained dry and stable during excavation. 3. No groundwater encountered. 4. Trial pit backfilled with arisings in reverse order upon completion.			
All dimensions in metres		Scale: 1:25		
Method Used: Machine dug	Plant Used: 8 Ton Tracked Excavator	Logged By: EChissell	Checked By:	



TRIAL PIT LOG

Contract: Arundel Road, Angmering		Client: Gladman Developments Ltd		Trial Pit: TP4	
Contract Ref: 52207	Start: 26.08.20 End: 26.08.20	Ground Level: 16.45	National Grid Co-ordinate: E:506590.0 N:105427.0	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.30-0.40	1	ES	Tub + VL + J			Grass over dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL) Firm brown slightly sandy CLAY. Sand is fine to coarse.	16.25	0.20	
1.20-1.50	1	B						(1.80)	
2.00-2.30	2	B				Firm brown mottled grey and red CLAY.	14.45	2.00	
								(0.80)	
							13.65	2.80	

Plan (Not to Scale)		General Remarks	
		1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained dry and stable during excavation. 3. No groundwater encountered. 4. Trial pit backfilled with arisings in reverse order upon completion.	
All dimensions in metres		Scale: 1:25	
Method Used: Machine dug	Plant Used: 8 Ton Tracked Excavator	Logged By: EChissell	Checked By:



TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd			Trial Pit: TP5		
Contract Ref: 52207		Start: 25.08.20 End: 25.08.20	Ground Level: 17.36		National Grid Co-ordinate: E:506589.0 N:105381.0		Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.10-0.20	101	ES				Firm brown sandy gravelly CLAY with rare fragments of brick. Sand is fine to coarse. Gravel is angular fine to coarse flint. (TOPSOIL)	17.16	0.20	
0.60-0.70	102	ES				Firm to stiff orangish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse flint.			
1.00-1.10	1	D				... Becoming orangish brown mottled grey ... Land drain running east to west across south face of trial pit			
1.90		V	c _u >=140/>140/>140						
2.00-2.10	2	D							
2.90-3.00	3	D					14.36	3.00	
Trial pit terminated at 3.00m depth.									

Plan (Not to Scale)		General Remarks		
		1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained stable during excavation. 3. Trial pit backfilled with arisings in reverse order upon completion.		
		All dimensions in metres		Scale: 1:25
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: OGLuck	Checked By:	



TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Trial Pit: TP6
Contract Ref: 52207	Start: 26.08.20 End: 26.08.20	Ground Level: 14.49	National Grid Co-ordinate: E:506480.0 N:105359.0		Sheet: 1 of 1

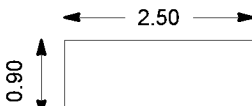
Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20-0.30	1	ES	Tub + VL + J			Grass over dark brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL) Soft to firm brown slightly sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is angular to subrounded fine to coarse flint.	14.29	0.20	
0.90-1.20	1	B						(1.80)	
2.10-2.40	2	B				Firm gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.	12.49	2.00	
							11.49	3.00	

Plan (Not to Scale)		General Remarks			
		1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained dry and stable during excavation. 3. No groundwater encountered. 4. Trial pit backfilled with arisings in reverse order upon completion.			
		All dimensions in metres		Scale:	1:25
Method Used: Machine dug	Plant Used: 8 Ton Tracked Excavator	Logged By: EChissell	Checked By:		

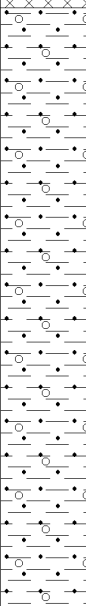
ARUN DISTRICT COUNCIL
LIBRARY_V10_01.GLB LibVersion: v8_07_001 PrjVersion: v8_07 | Log TRIAL PIT LOG - A4P | 52207 ANGMERING.GPJ - v10_01.
[23/09/20 - 19:44 | AA4]



Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend			
Depth	No	Type	Results									
0.20-0.30	101	ES	c _u =>140 / >140 / >140			Stiff friable light brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse flint and angular fine chalk. (TOPSOIL)	16.06	(0.30)				
0.70-0.80	102	ES				Stiff friable orangish brown mottled grey sandy CLAY. Sand is fine to coarse.	13.71	2.65				
1.30-1.40	1	D				. . . Becoming sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse flint. I9						
2.10-2.20	2	D										
2.40		V										
2.70-3.00	3	B				Orangish brown clayey sandy angular fine to coarse GRAVEL of flint. Sand is fine to coarse.				13.16	(0.55)	
3.40-3.50	4	D				Stiff orangish brown sandy CLAY. Sand is fine to coarse.				12.76	(0.40)	
						Trial pit terminated at 3.60m depth.						

Plan (Not to Scale) 		General Remarks 1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained stable during excavation. 3. Trial pit backfilled with arisings in reverse order upon completion.	
		All dimensions in metres Scale: 1:25	
Method Used Machine dug	Plant Used: Tracked excavator	Logged By: OGLuck	Checked By: AGS



Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20-0.30	101	ES	c _u =>140/>140/>140			Brown sandy CLAY with rare fragments of brick and metal. (MADE GROUND)	16.20	(0.30)	
0.80-0.90	102	ES				Stiff friable orangish brown mottled grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint and angular fine chalk.	14.20	2.30	
1.00-1.20	1	D							
2.00-2.20	2	D							
2.30-2.80	3	B				Orangish brown clay sandy angular fine to coarse GRAVEL of flint. Sand is fine to coarse.	13.60	(0.60)	
3.00-3.10	4	D				Stiff orangish brown sandy CLAY.	13.40	3.10	
3.00	V								
						Trial pit terminated at 3.10m depth.			

Plan (Not to Scale)		General Remarks 1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained stable during excavation. 3. Trial pit backfilled with arisings in reverse order upon completion.	
Method Used: Machine dug		All dimensions in metres Scale: 1:25	
Plant Used: Tracked excavator		Logged By: OGLuck	
Checked By: AGS		Checked By: AGS	



TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd			Trial Pit: TP9	
Contract Ref: 52207		Start: 25.08.20 End: 25.08.20	Ground Level: 13.23		National Grid Co-ordinate: E:506423.0 N:105270.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20-0.30	101	ES				Grass over stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse flint and angular fine chalk. (TOPSOIL)	12.93	(0.30) 0.30	
0.80-0.90	102	ES				Stiff to very stiff orangish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint.			
1.00-1.10	1	D							
							11.73	1.50	
1.60-1.90	2	B				Orangish brown clayey sandy angular fine to coarse GRAVEL of flint. Sand is fine to coarse.		(0.50)	
						Very stiff orangish brown sandy CLAY. Sand is fine to coarse.	11.23	2.00	
2.30-2.40	3	D						(0.90)	
2.80-2.90	4	D					10.33	2.90	
Trial pit terminated at 2.90m depth.									

Plan (Not to Scale)			General Remarks			
			1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained stable during excavation. 3. Trial pit backfilled with arisings in reverse order upon completion.			
			All dimensions in metres		Scale: 1:25	
Method Used: Machine dug		Plant Used: Tracked excavator	Logged By: OGLuck	Checked By:		

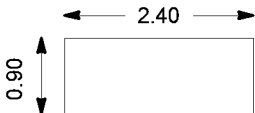


TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd			Trial Pit: TP10		
Contract Ref: 52207		Start: 25.08.20 End: 25.08.20	Ground Level: 12.61		National Grid Co-ordinate: E:506389.0 N:105234.0		Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.10-0.20	101	ES				Grass over brown stiff sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse flint and angular fine chalk. (TOPSOIL)	12.31	(0.30) 0.30	
0.60-0.70	102	ES				Stiff to very stiff orangish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint.		(1.20)	
1.00-1.10	1	D					11.11	1.50	
1.60-1.90	2	B				Orangish brown very clayey sandy angular medium to coarse GRAVEL of flint. Sand is fine to coarse.	10.71	(0.40) 1.90	
2.10-2.20	3	D				Very stiff orangish brown mottled grey sandy CLAY. Sand is fine to coarse.		(1.10)	
2.90-3.00	4	D					9.61	3.00	
						Trial pit terminated at 3.00m depth.			

Plan (Not to Scale)



General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Trial pit remained stable during excavation.
3. Trial pit backfilled with arisings in reverse order upon completion.

All dimensions in metres

Scale: **1:25**

Method

Used: **Machine dug**

Plant

Used: **Tracked excavator**

Logged

By: **OGLuck**

Checked

By:



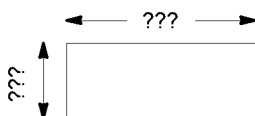


TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Trial Pit: TP11
Contract Ref: 52207	Start: 25.08.20 End: 25.08.20	Ground Level: 13.69	National Grid Co-ordinate: E:506478.0 N:105257.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20-0.30	101	ES				Grass over stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint and subrounded fine chalk. (TOPSOIL)	13.39	(0.30) 0.30	
0.70-0.80	102	ES				Stiff to very stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint.			
1.20-1.30	1	D				... From 1.40mbgl: becoming orangish brown mottled grey		(2.20)	
1.90-2.00	2	D							
2.60-3.20	3	B				Orangish brown clayey sandy angular fine to coarse GRAVEL of flint. Sand is fine to coarse.	11.19	2.50 (0.70)	
							10.49	3.20	
3.40-3.50	4	D				Very stiff orangish brown sandy CLAY.	10.19	(0.30)	
						Trial pit terminated at 3.50m depth.		3.50	

Plan (Not to Scale)



General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Trial pit remained stable during excavation.
3. Trial pit backfilled with arisings in reverse order upon completion.

All dimensions in metres

Scale: **1:25**

Method

Used: **Machine dug**

Plant

Used: **Tracked excavator**

Logged

By: **OGLuck**

Checked

By:



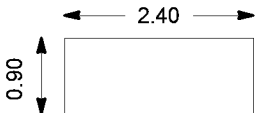


TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd			Trial Pit: TP12		
Contract Ref: 52207		Start: 25.08.20 End: 25.08.20	Ground Level: 15.09		National Grid Co-ordinate: E:506559.0 N:105271.0		Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20-0.30	1	ES	TXJXV			Stiff friable light brown sandy gravelly CLAY with rare fragments of brick, slate and oyster shell. Sand is fine. Gravel is angular fine to coarse flint. (MADE GROUND)	14.79	(0.30) 0.30	
0.50-0.60	2	ES	TXJXV			Orangish brown slightly sandy very clayey angular medium to coarse flint GRAVEL. Sand is fine to coarse.			
1.00-1.10	3	D						(2.20)	
1.90-2.40	4	B							
2.70-2.80	5	D				Very Stiff orangish brown mottled grey sandy CLAY. Sand is fine.	12.59	2.50 (0.50) 3.00	

Plan (Not to Scale)



General Remarks

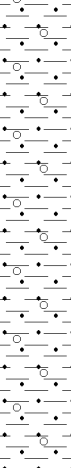
- 1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
- 2. Trial pit remained stable during excavation.
- 3. Trial pit backfilled with arisings in reverse order upon completion.

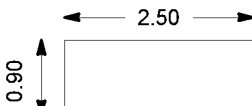
All dimensions in metres

Scale: 1:25

Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: OGLuck	Checked By:	
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Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20-0.30	101	ES				Grass over stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint and angular fine chalk. (TOPSOIL)	13.99	(0.30) 0.30	
0.60-0.80	102	ES				Stiff to very stiff orangish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint.	12.39	1.90	
0.90-1.00	1	D							
1.90-2.30	2	B				Orangish brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is angular fine to coarse flint.			
3.40-3.50 3.40	3	D V				c _u >>140/>140/>140			Very stiff orangish brown sandy CLAY. Sand is fine to coarse.
					(0.40)				
						Trial pit terminated at 3.50m depth.			

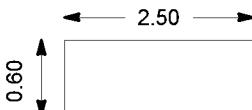
Plan (Not to Scale) 		General Remarks - Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. - Trial pit remained stable during excavation. - Trial pit backfilled with arisings in reverse order upon completion.	
		All dimensions in metres Scale: 1:25	
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: OGLuck	Checked By: AGS



TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Trial Pit: TP14
Contract Ref: 52207	Start: 26.08.20 End: 26.08.20	Ground Level: 12.27	National Grid Co-ordinate: E:506408.0 N:105175.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.10-0.20	1	ES	TUB + VL + J			Grass over dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL)	12.07	0.20	
0.50-0.60	2	ES	TUB + VL + J			Soft becoming firm with depth brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse flint.			
1.00-1.10	1	D							
1.50-1.80	1	B						(2.80)	
2.00-2.10	2	D							
2.50-2.80	2	B					9.27	3.00	

Plan (Not to Scale)		General Remarks	
		1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained dry and stable during excavation. 3. No groundwater encountered. 4. Trial pit backfilled with arisings in reverse order upon completion.	
		All dimensions in metres	Scale: 1:25
Method Used: Machine dug	Plant Used: 8 Ton Tracked Excavator	Logged By: EChissell	Checked By: 



Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Grass over dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL)	19.08	0.30	
						Soft brown slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.	19.03	0.35	

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Contract:		Client:		Trial Pit:	
Arundel Road, Angmering		Gladman Developments Ltd		TP16/CBR6	
Contract Ref:		Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
52207		27.08.20	15.53	E:506544.0 N:105414.0	1 of 1
End:					
27.08.20					

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Plan (Not to Scale)		General Remarks - Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. - Trial pit remained dry and stable during excavation. - No groundwater encountered. - Vehicle mounted CBR testing undertaken at base of trial pit at 0.35mbgl. - Trial pit backfilled with arisings in reverse order upon completion.	
		All dimensions in metres Scale: 1:25	
		Method Used Machine dug	Plant Used: 8 Ton Tracked Excavator

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Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Grass over dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL)	15.38	0.30	
						Soft brown slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.	15.33	0.35	

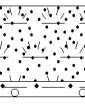
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ARUN DISTRICT COUNCIL	Used: Machine dug	Used: 8 Ton Tracked Excavator	By: EChissell	By: AGS
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Contract: Arundel Road, Angmering		Client: Gladman Developments Ltd		Trial Pit: TP21/CBR4
Contract Ref: 52207	Start: 27.08.20 End: 27.08.20	Ground Level: 13.35	National Grid Co-ordinate: E:506510.0 N:105204.0	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Grass over dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL)	13.10 13.05	0.25 0.30	
						Soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint.			

Plan (Not to Scale)		General Remarks 1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained dry and stable during excavation. 3. No groundwater encountered. 4. Vehicle mounted CBR testing undertaken at base of trial pit at 0.35mbgl. 5. Trial pit backfilled with arisings in reverse order upon completion.	
		All dimensions in metres Scale: 1:25	
Method Used: Machine dug	Plant Used: 8 Ton Tracked Excavator	Logged By: EChissell	Checked By:

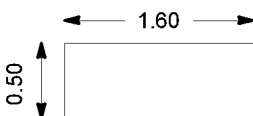


TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd			Trial Pit: TP22/SA3		
Contract Ref: 52207		Start: 26.08.20 End: 27.08.20	Ground Level: 14.72		National Grid Co-ordinate: E:506493.0 N:105319.0		Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.40-0.50	1	ES	TUB + VL + J			Grass over dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL) Brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint.	14.52	0.20	
0.70-1.00	1	B						(1.40)	
1.60-1.90	2	B				Firm to stiff brown gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.	13.12	1.60	
								(0.40)	
							12.72	2.00	

Plan (Not to Scale)



General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Trial pit remained dry and stable during excavation.
3. No groundwater encountered.
4. Soil infiltration testing undertaken at base of trial pit at 2.00mbgl.
5. Trial pit backfilled with arisings in reverse order upon completion.

All dimensions in metres

Scale: **1:25**

Method

Used: **Machine dug**

Plant

Used: **8 Ton Tracked Excavator**

Logged

By: **EChissell**

Checked

By:



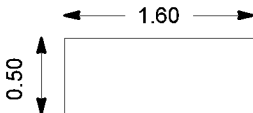


TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd			Trial Pit: TP23/SA2		
Contract Ref: 52207		Start: 26.08.20 End: 27.08.20	Ground Level: 12.74		National Grid Co-ordinate: E:506383.0 N:105287.0		Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.30-0.40	1	ES	TUB + VL + J			Grass over dark brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL)	12.54	0.20	
0.60-0.90	1	B				Stiff to very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint.		(1.40)	
1.60-1.90	2	B				Stiff to very stiff brown gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.	11.14	1.60	
								(0.40)	
							10.74	2.00	

Plan (Not to Scale)



General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.
2. Trial pit remained dry and stable during excavation.
3. No groundwater encountered.
4. Soil infiltration testing undertaken at base of trial pit at 2.00mbgl.
5. Trial pit backfilled with arisings in reverse order upon completion.

All dimensions in metres

Scale: **1:25**

Method

Used: **Machine dug**

Plant

Used: **8 Ton Tracked Excavator**

Logged

By: **EChissell**

Checked

By:





TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd			Trial Pit: TP24/SA1		
Contract Ref: 52207		Start: 26.08.20 End: 27.08.20	Ground Level: 11.48		National Grid Co-ordinate: E:506366.0 N:105363.0		Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.30-0.40	1	ES	TUB + VL + J			Grass over dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL) Brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint.	11.28	0.20	
0.80-1.10	1	B						(1.30)	
1.60-1.90	2	B				Firm brown mottled grey CLAY.	9.98	1.50	
							9.48	2.00	

Plan (Not to Scale) 	General Remarks 1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Trial pit remained dry and stable during excavation. 3. No groundwater encountered. 4. Soil infiltration testing undertaken at base of trial pit at 2.00mbgl. 5. Trial pit backfilled with arisings in reverse order upon completion.		
All dimensions in metres		Scale: 1:25	
Method Used: Machine dug	Plant Used: 8 Ton Tracked Excavator	Logged By: EChissell	Checked By:



TRIAL PIT LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Trial Pit: TP25
Contract Ref: 52207	Start: 26.08.20 End: 26.08.20	Ground Level: 18.64	National Grid Co-ordinate: E:506637.0 N:105374.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20-0.30	1	ES	TUB + VL + J			Grass over brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL)	18.44	0.20	
0.60-0.90	1	B				Soft becoming firm and stiff with depth brown silty slightly sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.			
1.50-1.80	2	B						(2.80)	
							15.64	3.00	

Plan (Not to Scale)		General Remarks			
		- Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. - Trial pit remained dry and stable during excavation. - No groundwater encountered. - Trial pit backfilled with arisings in reverse order upon completion.			
		All dimensions in metres		Scale:	1:25
Method Used: Machine dug	Plant Used: 8 Ton Tracked Excavator	Logged By: EChissell	Checked By:		



WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Window Sample: WS1
Contract Ref: 52207	Start: 28.08.20 End: 28.08.20	Ground Level: 20.80	National Grid Co-ordinate: E:506684.0 N:105446.0		Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.10-0.20	1	ES	TUB + VL + J			Dark brown slightly clayey slightly gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint and brick. (MADE GROUND) Soft to firm slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint.	20.50	0.30	
	0.40-0.50	2	ES	TUB + VL + J					(1.40)	
	1.10-1.20	3	ES	TUB + VL + J			Firm to stiff brown slightly sandy CLAY. Sand is fine to coarse.	19.10	1.70	
	1.20-1.65	1	SPT	N=17						
	1.20-1.30	1	D							
	1.80-1.90	2	D							
	2.00-2.45	2	SPT	N=18						
	2.30-2.40	3	D						(1.75)	
	2.80-2.90	4	D							
	3.00-3.45	3	SPT	N=17				17.35	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						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. 4. 19mm diameter gas/groundwater monitoring well complete with flush protective cover installed to 3.00m depth on completion. Response zone 1.00m to 3.00m depth.			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Dando Terrier		Drilled By:	P J Drilling		Logged By: EChissell Checked By:





WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Window Sample: WS2
Contract Ref: 52207	Start: 25.08.20 End: 25.08.20	Ground Level: 19.48	National Grid Co-ordinate: E:506667.0 N:105366.0		Sheet: 1 of 2

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend				
Window Run	Depth	No	Type	Results										
	0.00-0.20	1	ES	Tub + VL + J		Grass over dark brown slightly sandy slightly gravelly CLAY with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. (TOPSOIL) Soft becoming firm and stiff with depth brown slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.	19.23	0.25						
	0.50-1.00	2	ES	Tub + VL + J										
	1.00-2.00	1	D	Tub + VL + J										
	1.00-2.00	3	ES											
	1.20-1.65	1	SPT	N=8										
	2.00-2.45	2	SPT	N=12										
	2.00-3.00	2	D	Tub + VL + J										
	2.00-3.00	4	ES											
	3.00-3.45	3	SPT	N=17										
	3.00-4.00	3	D											
	4.00-4.45	4	SPT	N=20										
	4.00-5.00	4	D	Tub + VL + J										
	4.00-5.00	5	ES											

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	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. 4. 19mm diameter gas/groundwater monitoring well complete with flush protective cover installed to 4.00m depth on completion. Response zone 1.00m to 4.00m depth.			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Dando Terrier		Drilled By:	P J Drilling		Logged By: AAwoyomi Checked By:





WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Window Sample: WS2
Contract Ref: 52207	Start: 25.08.20 End: 25.08.20	Ground Level: 19.48	National Grid Co-ordinate: E:506667.0 N:105366.0		Sheet: 2 of 2

Progress		Samples / Tests			Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick-ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	5.00-5.45 5.00-6.00 5.00-6.00	5 5 6	SPT D ES	N=20 Tub + VL + J			Soft becoming firm and stiff with depth brown slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse flint. (stratum copied from 0.25m from previous sheet)			
	6.00-6.45	6	SPT	N=19				13.03	6.45	

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



WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Window Sample: WS3
Contract Ref: 52207	Start: 28.08.20 End: 28.08.20	Ground Level: 17.05	National Grid Co-ordinate: E:506597.0 N:105319.0		Sheet: 1 of 1

Progress	Samples / Tests				Water Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.20-0.30	1	ES	TUB + VL + J		Dark brown gravelly SAND. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, brick and concrete. (MADE GROUND)	16.55	0.50	
	0.60-0.70	2	ES	TUB + VL + J		Soft to firm greyish brown slightly sandy CLAY. Sand is fine to coarse.			
	0.90-1.00	1	D					(1.00)	
	1.20-1.65	1	SPT	N=8			15.55	1.50	
	1.50-1.60	3	ES	TUB + VL + J		Soft becoming firm with depth brown CLAY.			
	1.60-1.70	2	D						
	2.00-2.45	2	SPT	N=8				(1.95)	
	2.20-2.30	3	D						
	2.80-2.90	4	D						
	3.00-3.45	3	SPT	N=18			13.60	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						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. 4. 19mm diameter gas/groundwater monitoring well complete with flush protective cover installed to 3.00m depth on completion. Response zone 1.00m to 3.00m depth.			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Dando Terrier		Drilled By:	P J Drilling		Logged By: EChissell Checked By:





WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Window Sample: WS4
Contract Ref: 52207	Start: 28.08.20 End: 28.08.20	Ground Level: 18.02	National Grid Co-ordinate: E:506634.0 N:105329.0		Sheet: 1 of 2

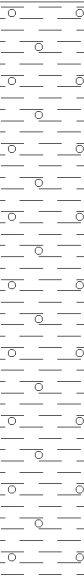
Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.20-0.30	1	ES	TUB + VL + J			Dark brown to black gravelly SAND. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse brick, flint and concrete. (MADE GROUND)	17.72	(0.30) 0.30	
	0.50-0.60	2	ES	TUB + VL + J			Soft becoming firm with depth brown slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.			
	0.90-1.00	1	D							
	1.10-1.20	3	ES	TUB + VL + J						
	1.20-1.65	1	SPT	N=9						
	1.30-1.40	2	D							
	1.90-2.00	3	D							
	2.00-2.45	2	SPT	N=13						
	2.90-3.00	4	D					15.32	2.70	
	3.00-3.45	3	SPT	N=13			Firm becoming stiff with depth brown gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.			

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	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. 4. 19mm diameter gas/groundwater monitoring well complete with flush protective cover installed to 3.00m depth on completion. Response zone 1.00m to 3.00m depth.			
Method Used: Tracked window sampling		Plant Used: Dando Terrier		Drilled By: P J Drilling		All dimensions in metres		Scale: 1:25	
Logged By: EChissell		Checked By:							



WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering		Client: Gladman Developments Ltd		Window Sample: WS4
Contract Ref: 52207	Start: 28.08.20 End: 28.08.20	Ground Level: 18.02	National Grid Co-ordinate: E:506634.0 N:105329.0	Sheet: 2 of 2

Progress	Samples / Tests				Water	Backfill & Instru- mentation	Description of Strata	Reduced Level	Depth (Thick- ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	5.00-5.45	4	SPT	N=21			Firm becoming stiff with depth brown gravelly CLAY. Gravel is angular to subrounded fine to coarse flint. <i>(stratum copied from 2.70m from previous sheet)</i>		(3.75)	
	6.00-6.45	5	SPT	N=20				11.57	6.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						All dimensions in metres		Scale:	1:25
Method Used: Tracked window sampling	Plant Used: Dando Terrier		Drilled By: P J Drilling		Logged By: EChissell		Checked By:		



WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Window Sample: WS7
Contract Ref: 52207	Start: 28.08.20 End: 28.08.20	Ground Level: 17.22	National Grid Co-ordinate: E:506631.0 N:105298.0		Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.10-0.20	1	ES	TUB + VL + J			Dark brown sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, brick, concrete and granite. (MADE GROUND) Soft brown slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.	17.02	0.20	
	0.50-0.60	2	ES	TUB + VL + J					(0.70)	
	0.80-0.90	1	D					16.32	0.90	
	1.20-1.65 1.20-1.30	1 3	SPT ES	N=5 TUB + VL + J						
	1.60-1.70	2	D						(1.90)	
	2.00-2.45 2.10-2.20	2 3	SPT D	N=11						
	2.80-2.90	4	D					14.42	2.80	
	3.00-3.45	3	SPT	N=16			Firm brown gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.		(0.65)	
								13.77	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	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. 4. 19mm diameter gas/groundwater monitoring well complete with flush protective cover installed to 3.00m depth on completion. Response zone 1.00m to 3.00m depth.			
Method Used: Tracked window sampling						All dimensions in metres		Scale: 1:25	
Plant Used: Dando Terrier			Drilled By: P J Drilling		Logged By: EChissell	Checked By:			



WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Window Sample: WS9
Contract Ref: 52207	Start: 25.08.20 End: 25.08.20	Ground Level: 15.40	National Grid Co-ordinate: E:506600.0 N:105229.0		Sheet: 1 of 2

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.00-0.10 0.10-0.50	1 2	ES ES				Brown gravelly CLAY. Gravel is angular to subrounded fine to coarse flint, brick and concrete. (MADE GROUND)	14.90	(0.50) 0.50	
	1.00-2.00 1.00-2.00 1.20-1.65	1 3 1	D ES SPT	N=11			Firm brown slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.	13.90	(1.00) 1.50	
	2.00-2.45 2.00-3.00 2.00-3.00	2 2 4	SPT D ES	N=13			Firm becoming stiff with depth brown CLAY.		(4.95)	
	3.00-3.45 3.00-4.00	3 5	SPT ES	N=21						
	4.00-5.00 4.00-4.45 4.00-5.00	3 4 6	D SPT ES	N=20						

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	- Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. - Inspection pit hand dug to 1.20m depth. - No groundwater encountered. 19mm diameter gas/groundwater monitoring well complete with flush protective cover installed to 4.00m depth on completion. Response zone 1.00m to 4.00m depth.			
Method Used: Tracked window sampling						All dimensions in metres		Scale: 1:25	
Plant Used: Dando Terrier			Drilled By: P J Drilling		Logged By: AAwoyomi	Checked By:			



Contract: Arundel Road, Angmering		Client: Gladman Developments Ltd		Window Sample: WS9
Contract Ref: 52207	Start: 25.08.20 End: 25.08.20	Ground Level: 15.40	National Grid Co-ordinate: E:506600.0 N:105229.0	Sheet: 2 of 2

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Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	
Method Used: Tracked window sampling Plant Used: Dando Terrier						All dimensions in metres Scale: 1:25
Drilled By: P J Drilling Logged By: AAwoyomi Checked By: 						



WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Window Sample: WS10
Contract Ref: 52207	Start: 28.08.20 End: 28.08.20	Ground Level: 16.30	National Grid Co-ordinate: E:506652.0 N:105243.0		Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.10-0.20	1	ES	TUB + VL + J			Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse brick, concrete and flint. (MADE GROUND) Soft to firm brown slightly sandy CLAY. Sand is fine to coarse.	16.00	(0.30) 0.30	
	0.40-0.50	2	ES	TUB + VL + J						
	1.10-1.20	3	ES	TUB + VL + J						
	1.20-1.65	1	SPT	N=8						
	1.30-1.40	1	D							
	1.80-1.90	2	D						(3.15)	
	2.00-2.45	2	SPT	N=9						
	2.40-2.50	3	D							
	2.90-3.00	4	D							
	3.00-3.45	3	SPT	N=12				12.85	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						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. 4. 19mm diameter gas/groundwater monitoring well complete with flush protective cover installed to 3.00m depth on completion. Response zone 1.00m to 3.00m depth.			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Dando Terrier		Drilled By:	P J Drilling		Logged By: EChissell Checked By:





WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering		Client: Gladman Developments Ltd		Window Sample: WS11
Contract Ref: 52207	Start: 25.08.20 End: 25.08.20	Ground Level: 17.67	National Grid Co-ordinate: E:506691.0 N:105262.0	Sheet: 1 of 2

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.00-0.50 0.00-0.50	1 1	ES D				Brown gravelly CLAY. Gravel is angular to subrounded fine to coarse flint, brick and concrete. (MADE GROUND)	17.17	0.50	
							Soft brown gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.			
	1.00-2.00 1.00-2.00	2 2	ES D							
	1.20-1.65	1	SPT	N=9					(1.50)	
	2.00-2.45 2.00-3.00 2.00-3.00	2 3 3	SPT ES D	N=11			Firm to stiff brown CLAY.	15.67	2.00	
	3.00-3.45 3.00-4.00 3.00-4.00	3 4 4	SPT ES D	N=22						
	4.00-4.45 4.00-5.00 4.00-5.00	4 5 5	SPT ES D	N=16					(4.45)	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	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. 4. 19mm diameter gas/groundwater monitoring well complete with flush protective cover installed to 4.00m depth on completion. Response zone 1.00m to 4.00m depth.			
Method Used: Tracked window sampling						All dimensions in metres		Scale: 1:25	
Plant Used: Dando Terrier			Drilled By: P J Drilling		Logged By: AAwoyomi	Checked By:			

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WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd		Window Sample: WS12
Contract Ref: 52207	Start: 25.08.20 End: 25.08.20	Ground Level: 16.93	National Grid Co-ordinate: E:506679.0 N:105232.0		Sheet: 1 of 2

Progress	Samples / Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.00-0.70 0.00-0.70	1 1	ES D				Brown gravelly CLAY. Gravel is angular to subrounded fine to coarse flint, brick and concrete. (MADE GROUND)		(0.50)	
								16.43	0.50	
							Soft brown gravelly CLAY. Gravel is angular to subrounded fine to coarse flint.			
	1.00-2.00 1.00-2.00	2 2	ES D							
	1.20-1.65	1	SPT	N=10						
									(2.50)	
	2.00-2.45 2.00-3.00 2.00-3.00	2 3 3	SPT ES D	N=10						
	3.00-3.45 3.00-4.00 3.00-4.00	3 4 4	SPT ES D	N=12			Firm brown CLAY.	13.93	3.00	
	4.00-4.45 4.00-5.00 4.00-5.00	4 5 5	SPT ES D	N=17						

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	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. 4. On completion, borehole backfilled with arisings.			
Method Used: Tracked window sampling						All dimensions in metres		Scale: 1:25	
Plant Used: Dando Terrier			Drilled By: P J Drilling		Logged By: AAwoyomi	Checked By:			



WINDOW SAMPLE LOG

Contract: Arundel Road, Angmering			Client: Gladman Developments Ltd			Window Sample: WS12			
Contract Ref: 52207		Start: 25.08.20 End: 25.08.20		Ground Level: 16.93		National Grid Co-ordinate: E:506679.0 N:105232.0		Sheet: 2 of 2	

Progress	Samples / Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							Firm brown CLAY. (stratum copied from 3.00m from previous sheet)		(3.45)	
	5.00-5.45 5.00-6.00 5.00-6.00	5 6 6	SPT ES D	N=21						
	6.00-6.45	6	SPT	N=22						
								10.48	6.45	

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

APPENDIX E

GROUNDWATER AND GROUND GAS MONITORING DATA

IN-SITU GAS MONITORING RESULTS

	<u>Start Date</u>	<u>End Date</u>	<u>[Pressures]</u>	<u>Previous</u>	<u>During</u>	<u>Start</u>	<u>End</u>	<u>Equipment Used & Remarks</u>
Round 1	-	-		-	-	-	-	
Round 2	-	-		-	-	-	-	
Round 3	-	-		-	-	-	-	

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)	
WS1	1	2.85	18/09/2020 09:00:00	1024	1024	0.0 _(SS)	DRY	2.0	0.0 _(SS)	21.1	
WS1	1	---	15 secs	1024	1024	-	-	2.0	0.0	21.1	
WS1	1	---	30 secs	1024	1024	-	-	2.0	0.0	21.1	
WS1	1	---	60 secs	1024	1024	-	-	2.0	0.0	21.1	
WS1	1	---	90 secs	1024	1024	-	-	2.0	0.0	21.1	
WS1	1	---	120 secs	1024	1024	-	-	2.0	0.0	21.1	
WS1	1	---	180 secs	1024	1024	-	-	2.0	0.0	21.1	
WS1	1	---	240 secs	1024	1024	-	-	2.0	0.0	21.1	
WS1	1	---	300 secs	1024	1024	-	-	2.0	0.0	21.1	
WS1	1	---	360 secs	1024	1024	-	-	2.0	0.0	21.1	
WS1	1	---	420 secs	1024	1024	-	-	2.0	0.0	21.1	
WS1	2	2.85	25/09/2020 09:00:00	995	995	0.0 _(SS)	DRY	2.0	0.0	20.1	
WS1	2	---	15 secs	995	995	-	-	2.0	0.0	20.1	
WS1	2	---	30 secs	995	995	-	-	2.0	0.0	20.1	
WS1	2	---	60 secs	995	995	-	-	2.0	0.0	20.1	
WS1	2	---	90 secs	995	995	-	-	2.0	0.0	20.1	
WS1	2	---	120 secs	995	995	-	-	2.0	0.0	20.1	
WS1	2	---	180 secs	995	995	-	-	2.0	0.0	20.1	

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

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	Contract: Arundel Road, Angmering				Page: 1 of 12



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)	
WS1	2	---	240 secs	995	995	-	-	2.0	0.0	20.1	
WS1	2	---	300 secs	995	995	-	-	2.0	0.0	20.1	
WS1	2	---	360 secs	995	995	-	-	2.0	0.0	20.1	
WS1	2	---	420 secs	995	995	-	-	2.0	0.0	20.1	
WS1	3	2.85	30/09/2020 09:00:00	1000	1000	0.0 _(SS)	DRY	2.0	0.0	20.1	
WS1	3	---	15 secs	1000	1000	-	-	2.0	0.0	20.1	
WS1	3	---	30 secs	1000	1000	-	-	2.0	0.0	20.1	
WS1	3	---	60 secs	1000	1000	-	-	2.0	0.0	20.1	
WS1	3	---	90 secs	1000	1000	-	-	2.0	0.0	20.1	
WS1	3	---	120 secs	1000	1000	-	-	2.0	0.0	20.1	
WS1	3	---	180 secs	1000	1000	-	-	2.0	0.0	20.1	
WS1	3	---	240 secs	1000	1000	-	-	2.0	0.0	20.1	
WS1	3	---	300 secs	1000	1000	-	-	2.0	0.0	20.1	
WS1	3	---	360 secs	1000	1000	-	-	2.0	0.0	20.1	
WS1	3	---	420 secs	1000	1000	-	-	2.0	0.0	20.1	
WS10	1	2.70	18/09/2020 09:00:00	1024	1024	0.0 _(SS)	DRY	1.8 _(SS)	0.0 _(SS)	20.4 _(SS)	
WS10	1	---	15 secs	1024	1024	-	-	1.8	0.0	20.4	
WS10	1	---	30 secs	1024	1024	-	-	1.8	0.0	20.4	
WS10	1	---	60 secs	1024	1024	-	-	1.8	0.0	20.4	
WS10	1	---	90 secs	1024	1024	-	-	1.8	0.0	20.4	
WS10	1	---	120 secs	1024	1024	-	-	1.8	0.0	20.4	
WS10	1	---	180 secs	1024	1024	-	-	1.8	0.0	20.4	
WS10	1	---	240 secs	1024	1024	-	-	1.8	0.0	20.4	
WS10	1	---	300 secs	1024	1024	-	-	1.8	0.0	20.4	

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

Anerley Court Half Moon Lane Hildenborough Tonbridge Kent, TN11 9HU	Compiled By	Date	Checked By	Date	Contract Ref:
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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)	
WS10	1	---	360 secs	1024	1024	-	-	1.8	0.0	20.4	
WS10	1	---	420 secs	1024	1024	-	-	1.8	0.0	20.4	
WS10	2	2.70	25/09/2020 09:00:00	995	995	0.0 _(SS)	DRY	2.0	0.0	20.1	
WS10	2	---	15 secs	995	995	-	-	2.0	0.0	20.1	
WS10	2	---	30 secs	995	995	-	-	2.0	0.0	20.1	
WS10	2	---	60 secs	995	995	-	-	2.0	0.0	20.1	
WS10	2	---	90 secs	995	995	-	-	2.0	0.0	20.2	
WS10	2	---	120 secs	995	995	-	-	2.0	0.0	20.1	
WS10	2	---	180 secs	995	995	-	-	2.0	0.0	20.1	
WS10	2	---	240 secs	995	995	-	-	2.0	0.0	20.1	
WS10	2	---	300 secs	995	995	-	-	2.0	0.0	20.1	
WS10	2	---	360 secs	995	995	-	-	2.0	0.0	20.1	
WS10	2	---	420 secs	995	995	-	-	2.0	0.0	20.1	
WS10	3	2.70	30/09/2020 09:00:00	1000	1000	-	DRY	1.9	0.0	20.1	
WS10	3	---	15 secs	1000	1000	-	-	1.9	0.0	20.1	
WS10	3	---	30 secs	1000	1000	-	-	1.9	0.0	20.1	
WS10	3	---	60 secs	1000	1000	-	-	1.9	0.0	20.1	
WS10	3	---	90 secs	1000	1000	-	-	1.9	0.0	20.1	
WS10	3	---	120 secs	1000	1000	-	-	1.9	0.0	20.1	
WS10	3	---	180 secs	1000	1000	-	-	1.9	0.0	20.1	
WS10	3	---	240 secs	1000	1000	-	-	1.9	0.0	20.1	
WS10	3	---	300 secs	1000	1000	-	-	1.9	0.0	20.1	
WS10	3	---	360 secs	1000	1000	-	-	1.9	0.0	20.1	
WS10	3	---	420 secs	1000	1000	-	-	1.9	0.0	20.1	

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

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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)	
WS11	1	4.05	18/09/2020 09:00:00	1024	1024	0.0 _(SS)	3.68	6.1 _(SS)	0.0 _(SS)	15.5 _(SS)	
WS11	1	---	15 secs	1024	1024	-	-	6.1	0.0	15.5	
WS11	1	---	30 secs	1024	1024	-	-	6.1	0.0	15.5	
WS11	1	---	60 secs	1024	1024	-	-	6.1	0.0	15.5	
WS11	1	---	90 secs	1024	1024	-	-	6.1	0.0	15.5	
WS11	1	---	120 secs	1024	1024	-	-	6.1	0.0	15.5	
WS11	1	---	180 secs	1024	1024	-	-	6.1	0.0	15.5	
WS11	1	---	240 secs	1024	1024	-	-	6.1	0.0	15.5	
WS11	1	---	300 secs	1024	1024	-	-	6.1	0.0	15.5	
WS11	1	---	360 secs	1024	1024	-	-	6.1	0.0	15.5	
WS11	1	---	420 secs	1024	1024	-	-	6.1	0.0	15.5	
WS11	2	4.05	25/09/2020 09:00:00	995	995	0.0 _(SS)	3.69	5.6	0.0	16.0	
WS11	2	---	15 secs	995	995	-	-	5.8	0.0	16.0	
WS11	2	---	30 secs	995	995	-	-	5.8	0.0	16.0	
WS11	2	---	60 secs	995	995	-	-	5.8	0.0	16.0	
WS11	2	---	90 secs	995	995	-	-	5.9	0.0	16.0	
WS11	2	---	120 secs	995	995	-	-	5.8	0.0	16.0	
WS11	2	---	180 secs	995	995	-	-	5.8	0.0	16.0	
WS11	2	---	240 secs	995	995	-	-	6.0	0.0	16.0	
WS11	2	---	300 secs	995	995	-	-	6.1	0.0	16.0	
WS11	2	---	360 secs	995	995	-	-	6.0	0.0	16.0	
WS11	2	---	420 secs	995	995	-	-	6.1	0.0	16.0	
WS11	3	4.05	30/09/2020 09:00:00	1000	1000	-	3.69	6.0	0.0	16.2	
WS11	3	---	15 secs	1000	1000	-	-	6.0	0.0	16.2	
WS11	3	---	30 secs	1000	1000	-	-	6.0	0.0	16.2	

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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)	
WS11	3	---	60 secs	1000	1000	-	-	6.0	0.0	16.2	
WS11	3	---	90 secs	1000	1000	-	-	6.0	0.0	16.2	
WS11	3	---	120 secs	1000	1000	-	-	6.0	0.0	16.2	
WS11	3	---	180 secs	1000	1000	-	-	6.0	0.0	16.2	
WS11	3	---	240 secs	1000	1000	-	-	6.0	0.0	16.2	
WS11	3	---	300 secs	1000	1000	-	-	6.0	0.0	16.2	
WS11	3	---	360 secs	1000	1000	-	-	6.0	0.0	16.2	
WS11	3	---	420 secs	1000	1000	-	-	6.0	0.0	16.2	
WS2	1	4.05	18/09/2020 09:00:00	1024	1024	0.0 _(SS)	2.20	1.4	0.0	21.8	
WS2	1	---	15 secs	1024	1024	-	-	1.4	0.0	21.8	
WS2	1	---	30 secs	1024	1024	-	-	1.4	0.0	21.8	
WS2	1	---	60 secs	1024	1024	-	-	1.4	0.0	21.8	
WS2	1	---	90 secs	1024	1024	-	-	1.4	0.0	21.8	
WS2	1	---	120 secs	1024	1024	-	-	1.4	0.0	21.8	
WS2	1	---	180 secs	1024	1024	-	-	1.4	0.0	21.8	
WS2	1	---	240 secs	1024	1024	-	-	1.4	0.0	21.8	
WS2	1	---	300 secs	1024	1024	-	-	1.4	0.0	21.8	
WS2	1	---	360 secs	1024	1024	-	-	1.4	0.0	21.8	
WS2	1	---	420 secs	1024	1024	-	-	1.4	0.0	21.8	
WS2	2	4.05	25/09/2020 09:00:00	995	995	0.0 _(SS)	2.19	2.0	0.0	20.1	
WS2	2	---	15 secs	995	995	-	-	2.0	0.0	20.1	
WS2	2	---	30 secs	995	995	-	-	2.0	0.0	20.1	
WS2	2	---	60 secs	995	995	-	-	2.0	0.0	20.1	
WS2	2	---	90 secs	995	995	-	-	2.0	0.0	20.1	

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

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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)	
WS2	2	---	120 secs	995	995	-	-	2.0	0.0	20.1	
WS2	2	---	180 secs	995	995	-	-	2.0	0.0	20.1	
WS2	2	---	240 secs	995	995	-	-	2.0	0.0	20.1	
WS2	2	---	300 secs	995	995	-	-	2.0	0.0	20.1	
WS2	2	---	360 secs	995	995	-	-	2.0	0.0	20.1	
WS2	2	---	420 secs	995	995	-	-	2.0	0.0	20.1	
WS2	3	4.05	30/09/2020 09:00:00	1000	1000	0.0 _(SS)	2.20	2.2	0.0	19.8	
WS2	3	---	15 secs	1000	1000	-	-	2.2	0.0	19.8	
WS2	3	---	30 secs	1000	1000	-	-	2.2	0.0	19.8	
WS2	3	---	60 secs	1000	1000	-	-	2.2	0.0	19.8	
WS2	3	---	90 secs	1000	1000	-	-	2.2	0.0	19.8	
WS2	3	---	120 secs	1000	1000	-	-	2.2	0.0	19.8	
WS2	3	---	180 secs	1000	1000	-	-	2.2	0.0	19.8	
WS2	3	---	240 secs	1000	1000	-	-	2.2	0.0	19.8	
WS2	3	---	300 secs	1000	1000	-	-	2.2	0.0	19.8	
WS2	3	---	360 secs	1000	1000	-	-	2.2	0.0	19.8	
WS2	3	---	420 secs	1000	1000	-	-	2.2	0.0	19.8	
WS3	1	3.06	18/09/2020 09:00:00	1024	1024	0.0 _(SS)	2.42	5.6 _(SS)	0.0 _(SS)	15.0	
WS3	1	---	15 secs	1024	1024	-	-	5.6	0.0	15.0	
WS3	1	---	30 secs	1024	1024	-	-	5.6	0.0	15.0	
WS3	1	---	60 secs	1024	1024	-	-	5.6	0.0	15.0	
WS3	1	---	90 secs	1024	1024	-	-	5.6	0.0	15.0	
WS3	1	---	120 secs	1024	1024	-	-	5.6	0.0	15.0	
WS3	1	---	180 secs	1024	1024	-	-	5.6	0.0	15.0	

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

Anerley Court Half Moon Lane Hildenborough Tonbridge Kent, TN11 9HU	Compiled By	Date	Checked By	Date	Contract Ref:
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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)	
WS3	1	---	240 secs	1024	1024	-	-	5.6	0.0	15.0	
WS3	1	---	300 secs	1024	1024	-	-	5.6	0.0	15.0	
WS3	1	---	360 secs	1024	1024	-	-	5.6	0.0	15.0	
WS3	1	---	420 secs	1024	1024	-	-	5.6	0.0	15.0	
WS3	2	3.05	25/09/2020 09:00:00	995	995	0.0	2.40	5.0	0.0	16.1	
WS3	2	---	15 secs	995	995	-	-	5.0	0.0	16.1	
WS3	2	---	30 secs	995	995	-	-	5.0	0.0	16.1	
WS3	2	---	60 secs	995	995	-	-	5.0	0.0	16.1	
WS3	2	---	90 secs	995	995	-	-	5.0	0.0	16.1	
WS3	2	---	120 secs	995	995	-	-	5.0	0.0	16.1	
WS3	2	---	180 secs	995	995	-	-	5.0	0.0	16.1	
WS3	2	---	240 secs	995	995	-	-	5.0	0.0	16.1	
WS3	2	---	300 secs	995	995	-	-	5.0	0.0	16.1	
WS3	2	---	360 secs	995	995	-	-	5.0	0.0	16.1	
WS3	2	---	420 secs	995	995	-	-	5.0	0.0	16.1	
WS3	3	3.05	30/09/2020 09:00:00	1000	1000	-	2.40	5.5	0.0	15.2	
WS3	3	---	15 secs	1000	1000	-	-	5.5	0.0	15.2	
WS3	3	---	30 secs	1000	1000	-	-	5.5	0.0	15.2	
WS3	3	---	60 secs	1000	1000	-	-	5.5	0.0	15.2	
WS3	3	---	90 secs	1000	1000	-	-	5.5	0.0	15.2	
WS3	3	---	120 secs	1000	1000	-	-	5.5	0.0	15.2	
WS3	3	---	180 secs	1000	1000	-	-	5.5	0.0	15.2	
WS3	3	---	240 secs	1000	1000	-	-	5.5	0.0	15.2	
WS3	3	---	300 secs	1000	1000	-	-	5.5	0.0	15.2	
WS3	3	---	360 secs	1000	1000	-	-	5.5	0.0	15.2	

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

Anerley Court Half Moon Lane Hildenborough Tonbridge Kent, TN11 9HU	Compiled By	Date	Checked By	Date	Contract Ref:
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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)	
WS3	3	---	420 secs	1000	1000	-	-	5.5	0.0	15.2	
WS4	1	1.79	18/09/2020 09:00:00	1024	1024	0.0 _(SS)	1.70	5.5 _(SS)	0.0 _(SS)	9.6	
WS4	1	---	15 secs	1024	1024	-	-	5.5	0.0	9.6	
WS4	1	---	30 secs	1024	1024	-	-	5.5	0.0	9.6	
WS4	1	---	60 secs	1024	1024	-	-	5.5	0.0	9.6	
WS4	1	---	90 secs	1024	1024	-	-	5.5	0.0	9.6	
WS4	1	---	120 secs	1024	1024	-	-	5.5	0.0	9.6	
WS4	1	---	180 secs	1024	1024	-	-	5.5	0.0	9.6	
WS4	1	---	240 secs	1024	1024	-	-	5.5	0.0	9.6	
WS4	1	---	300 secs	1024	1024	-	-	5.5	0.0	9.6	
WS4	1	---	360 secs	1024	1024	-	-	5.5	0.0	9.6	
WS4	1	---	420 secs	1024	1024	-	-	5.5	0.0	9.6	
WS4	2	1.80	25/09/2020 09:00:00	995	995	0.0 _(SS)	1.70	5.5	0.0	10.8	
WS4	2	---	15 secs	995	995	-	-	5.5	0.0	10.8	
WS4	2	---	30 secs	995	995	-	-	5.5	0.0	10.8	
WS4	2	---	60 secs	995	995	-	-	5.5	0.0	10.8	
WS4	2	---	90 secs	995	995	-	-	5.5	0.0	10.6	
WS4	2	---	120 secs	995	995	-	-	5.5	0.0	10.6	
WS4	2	---	180 secs	995	995	-	-	5.5	0.0	10.5	
WS4	2	---	240 secs	995	995	-	-	5.5	0.0	10.5	
WS4	2	---	300 secs	995	995	-	-	5.5	0.0	10.5	
WS4	2	---	360 secs	995	995	-	-	5.5	0.0	10.5	
WS4	2	---	420 secs	995	995	-	-	5.5	0.0	10.5	
WS4	3	1.80	30/09/2020 09:00:00	1000	1000	0.0 _(SS)	1.70	5.5	0.0	10.5	

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

Anerley Court Half Moon Lane Hildenborough Tonbridge Kent, TN11 9HU	Compiled By	Date	Checked By	Date	Contract Ref:
		02/10/20			52207
	Contract: Arundel Road, Angmering				Page: 8 of 12 

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)	
WS4	3	---	15 secs	1000	1000	-	-	5.5	0.0	10.5	
WS4	3	---	30 secs	1000	1000	-	-	5.5	0.0	10.5	
WS4	3	---	60 secs	1000	1000	-	-	5.5	0.0	10.5	
WS4	3	---	90 secs	1000	1000	-	-	5.5	0.0	10.5	
WS4	3	---	120 secs	1000	1000	-	-	5.5	0.0	10.5	
WS4	3	---	180 secs	1000	1000	-	-	5.5	0.0	10.5	
WS4	3	---	240 secs	1000	1000	-	-	5.5	0.0	10.5	
WS4	3	---	300 secs	1000	1000	-	-	5.5	0.0	10.5	
WS4	3	---	360 secs	1000	1000	-	-	5.5	0.0	10.5	
WS4	3	---	420 secs	1000	1000	-	-	5.5	0.0	10.5	
WS7	1	3.21	18/09/2020 09:00:00	1024	1024	0.0 _(SS)	2.01	3.6 _(SS)	0.0 _(SS)	19.8 _(SS)	
WS7	1	---	15 secs	1024	1024	-	-	3.6	0.0	19.8	
WS7	1	---	30 secs	1024	1024	-	-	3.6	0.0	19.8	
WS7	1	---	60 secs	1024	1024	-	-	3.6	0.0	19.8	
WS7	1	---	90 secs	1024	1024	-	-	3.6	0.0	19.8	
WS7	1	---	120 secs	1024	1024	-	-	3.6	0.0	19.8	
WS7	1	---	180 secs	1024	1024	-	-	3.6	0.0	19.8	
WS7	1	---	240 secs	1024	1024	-	-	3.6	0.0	19.8	
WS7	1	---	300 secs	1024	1024	-	-	3.6	0.0	19.8	
WS7	1	---	360 secs	1024	1024	-	-	3.6	0.0	19.8	
WS7	1	---	420 secs	1024	1024	-	-	3.6	0.0	19.8	
WS7	2	3.20	25/09/2020 09:00:00	995	995	0.0 _(SS)	2.00	4.0	0.0	20.1	
WS7	2	---	15 secs	995	995	-	-	3.9	0.0	20.1	
WS7	2	---	30 secs	995	995	-	-	3.9	0.0	20.1	

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

Anerley Court Half Moon Lane Hildenborough Tonbridge Kent, TN11 9HU	Compiled By	Date	Checked By	Date	Contract Ref:
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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)	
WS7	2	---	60 secs	995	995	-	-	3.6	0.0	20.1	
WS7	2	---	90 secs	995	995	-	-	3.5	0.0	20.1	
WS7	2	---	120 secs	995	995	-	-	3.6	0.0	20.1	
WS7	2	---	180 secs	995	995	-	-	3.5	0.0	20.1	
WS7	2	---	240 secs	995	995	-	-	3.6	0.0	20.1	
WS7	2	---	300 secs	995	995	-	-	3.6	0.0	20.1	
WS7	2	---	360 secs	995	995	-	-	3.6	0.0	20.1	
WS7	2	---	420 secs	995	995	-	-	3.6	0.0	20.1	
WS7	3	3.20	30/09/2020 09:00:00	1000	1000	0.0 _(SS)	2.00	3.6	0.0	20.1	
WS7	3	---	15 secs	1000	1000	-	-	3.6	0.0	20.1	
WS7	3	---	30 secs	1000	1000	-	-	3.6	0.0	20.1	
WS7	3	---	60 secs	1000	1000	-	-	3.6	0.0	20.1	
WS7	3	---	90 secs	1000	1000	-	-	3.6	0.0	20.1	
WS7	3	---	120 secs	1000	1000	-	-	3.6	0.0	20.1	
WS7	3	---	180 secs	1000	1000	-	-	3.6	0.0	20.1	
WS7	3	---	240 secs	1000	1000	-	-	3.6	0.0	20.1	
WS7	3	---	300 secs	1000	1000	-	-	3.6	0.0	20.1	
WS7	3	---	360 secs	1000	1000	-	-	3.6	0.0	20.1	
WS7	3	---	420 secs	1000	1000	-	-	3.6	0.0	20.1	
WS9	1	---	18/09/2020 09:00:00	1024	1024	0.0 _(SS)	DRY	5.3 _(SS)	0.0 _(SS)	10.2 _(SS)	
WS9	1	---	15 secs	1024	1024	-	-	5.3	0.0	10.2	
WS9	1	---	30 secs	1024	1024	-	-	5.3	0.0	10.2	
WS9	1	---	60 secs	1024	1024	-	-	5.3	0.0	10.2	
WS9	1	---	90 secs	1024	1024	-	-	5.3	0.0	10.2	

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

Anerley Court Half Moon Lane Hildenborough Tonbridge Kent, TN11 9HU	Compiled By	Date	Checked By	Date	Contract Ref:
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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)	
WS9	1	---	120 secs	1024	1024	-	-	5.3	0.0	10.2	
WS9	1	---	180 secs	1024	1024	-	-	5.3	0.0	10.2	
WS9	1	---	240 secs	1024	1024	-	-	5.3	0.0	10.2	
WS9	1	---	300 secs	1024	1024	-	-	5.3	0.0	10.2	
WS9	1	---	360 secs	1024	1024	-	-	5.3	0.0	10.2	
WS9	1	---	420 secs	1024	1024	-	-	5.3	0.0	10.2	
WS9	2	---	25/09/2020 09:00:00	995	995	0.0	DRY	5.0	0.0	10.2	
WS9	2	---	15 secs	995	995	-	-	4.9	0.0	10.3	
WS9	2	---	30 secs	995	995	-	-	4.8	0.0	10.3	
WS9	2	---	60 secs	995	995	-	-	4.8	0.0	10.2	
WS9	2	---	90 secs	995	995	-	-	4.8	0.0	10.5	
WS9	2	---	120 secs	995	995	-	-	5.0	0.0	10.3	
WS9	2	---	180 secs	995	995	-	-	5.0	0.0	10.3	
WS9	2	---	240 secs	995	995	-	-	5.1	0.0	10.3	
WS9	2	---	300 secs	995	995	-	-	5.0	0.0	10.3	
WS9	2	---	360 secs	995	995	-	-	5.0	0.0	10.3	
WS9	2	---	420 secs	995	995	-	-	5.1	0.0	10.2	
WS9	3	---	30/09/2020 09:00:00	1000	1000	-	DRY	5.0	0.0	10.1	
WS9	3	---	15 secs	1000	1000	-	-	5.0	0.0	10.1	
WS9	3	---	30 secs	1000	1000	-	-	5.0	0.0	10.1	
WS9	3	---	60 secs	1000	1000	-	-	5.0	0.0	10.1	
WS9	3	---	90 secs	1000	1000	-	-	5.0	0.0	10.1	
WS9	3	---	120 secs	1000	1000	-	-	5.0	0.0	10.1	
WS9	3	---	180 secs	1000	1000	-	-	5.0	0.0	10.1	
WS9	3	---	240 secs	1000	1000	-	-	5.0	0.0	10.1	

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

Anerley Court Half Moon Lane Hildenborough Tonbridge Kent, TN11 9HU	Compiled By	Date	Checked By	Date	Contract Ref:
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IN-SITU GAS MONITORING RESULTS

[illegible]

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

Anerley Court Half Moon Lane Hildenborough Tonbridge Kent, TN11 9HU	Compiled By	Date	Checked By	Date	Contract Ref:
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APPENDIX F LABORATORY CERTIFICATES FOR SOIL CHEMICAL ANALYSIS

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 20/07501
Issue Number: 1

Date: 21 September, 2020

Client: RSK Environment Ltd Tonbridge
Anerley Court, Half Moon Lane, Hildenborough
Tonbridge
Kent
TN11 9HU

Project Manager: Augustus Awoyomi/Svetislav Trajkovski
Project Name: Arundel Road, Angmering
Project Ref: 52207
Order No: N/A
Date Samples Received: 27/08/20
Date Instructions Received: 08/09/20
Date Analysis Completed: 21/09/20

Prepared by:

Approved by:

Sophie France
Client Service Manager

Richard Wong
Client Manager



Envirolab Job Number: 20/07501

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07501/8	20/07501/9	20/07501/15	20/07501/21				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS9	WS9	WS11	WS12						
Depth to Top	0.00	0.10	0.00	0.00						
Depth To Bottom	0.10	0.50	0.50	0.70						
Date Sampled	24-Aug-20	24-Aug-20	24-Aug-20	24-Aug-20						
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	6ABE	5AE	6ABE	5ABE						
% Stones >10mm _A	22.6	<0.1	32.9	10.0				% w/w	0.1	A-T-044
pH _D ^{M#}	8.20	8.00	8.39	8.22				pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.12	0.03	0.03	0.09				g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	500	270	550	1100				mg/kg	200	A-T-028s
Total Organic Carbon _D ^{M#}	0.85	0.58	1.60	2.61				% w/w	0.03	A-T-032s
Arsenic _D ^{M#}	2	3	3	5				mg/kg	1	A-T-024s
Cadmium _D ^{M#}	1.7	1.2	<0.5	0.8				mg/kg	0.5	A-T-024s
Copper _D ^{M#}	15	14	15	25				mg/kg	1	A-T-024s
Chromium _D ^{M#}	24	32	13	27				mg/kg	1	A-T-024s
Lead _D ^{M#}	80	23	44	86				mg/kg	1	A-T-024s
Mercury _D	1.80	<0.17	1.52	1.19				mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	26	19	9	22				mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	2				mg/kg	1	A-T-024s
Zinc _D ^{M#}	64	47	52	109				mg/kg	5	A-T-024s

Envirolab Job Number: 20/07501

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07501/8	20/07501/9	20/07501/15	20/07501/21				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS9	WS9	WS11	WS12						
Depth to Top	0.00	0.10	0.00	0.00						
Depth To Bottom	0.10	0.50	0.50	0.70						
Date Sampled	24-Aug-20	24-Aug-20	24-Aug-20	24-Aug-20						
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	6ABE	5AE	6ABE	5ABE						
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	NAD	NAD						A-T-045
Asbestos ACM - Suitable for Water Absorption Test? ^o	N/A	N/A	N/A	N/A						A-T-045

Envirolab Job Number: 20/07501

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07501/8	20/07501/9	20/07501/15	20/07501/21				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS9	WS9	WS11	WS12						
Depth to Top	0.00	0.10	0.00	0.00						
Depth To Bottom	0.10	0.50	0.50	0.70						
Date Sampled	24-Aug-20	24-Aug-20	24-Aug-20	24-Aug-20						
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	6ABE	5AE	6ABE	5ABE						
PAH-16MS										
Acenaphthene _A ^{M#}	0.04	<0.01	0.55	0.02				mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.07	<0.01	0.69	<0.01				mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.19	<0.02	1.04	<0.02				mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	1.30	0.06	5.95	0.06				mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	1.57	0.10	7.03	0.08				mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	1.58	0.10	7.53	0.11				mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.76	0.08	4.51	0.08				mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.58	<0.07	2.87	<0.07				mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	1.25	<0.06	5.66	0.08				mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.19	<0.04	1.23	<0.04				mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	2.16	<0.08	9.74	0.14				mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.04	<0.01	0.56	<0.01				mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	1.01	0.10	5.70	0.09				mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	0.08	<0.03				mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.60	<0.03	3.69	0.04				mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	2.09	<0.07	9.44	0.09				mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	13.4	0.44	66.3	0.79				mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/07501

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07501/8	20/07501/9	20/07501/15	20/07501/21				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS9	WS9	WS11	WS12						
Depth to Top	0.00	0.10	0.00	0.00						
Depth To Bottom	0.10	0.50	0.50	0.70						
Date Sampled	24-Aug-20	24-Aug-20	24-Aug-20	24-Aug-20						
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	6ABE	5AE	6ABE	5ABE						
TPH CWG										
Ali >C5-C6 _A [#]	<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				mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<5	<1				mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<5	<1				mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	<1	6	<1				mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	2	<1	14	<1				mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	16	1	38	8				mg/kg	1	A-T-055s
Total Aliphatics _A	18	1	58	8				mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<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				mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1	<1	<5	<1				mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1	<1	<5	<1				mg/kg	1	A-T-055s
Aro >C12-C16 _A	5	<1	48	1				mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	41	<1	322	2				mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	173	6	873	20				mg/kg	1	A-T-055s
Total Aromatics _A	221	6	1250	23				mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	239	7	1310	32				mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<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				mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<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				mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<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				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

Client: RSK Environment Ltd Tonbridge, Anerley Court, Half Moon Lane,
Hildenborough, Tonbridge, Kent, TN11 9HU

Project: Arundel Road, Angmering

Clients Project No: 52207

Project No: 20/07501

Date Received: 08/09/2020 (am)

Cool Box Temperatures (°C): 16.4, 16.0, 17.1, 17.0

Lab Sample ID	20/07501/8	20/07501/9	20/07501/15	20/07501/21
Client Sample No				
Client Sample ID/Depth	WS9 0.00-0.10m	WS9 0.10-0.50m	WS11 0.00-0.50m	WS12 0.00-0.70m
Date Sampled	24/08/20	24/08/20	24/08/20	24/08/20
Deviation Code				
F	✓	✓	✓	✓

Key

F Maximum holding time exceeded between sampling date and analysis for analytes listed below

HOLDING TIME EXCEEDANCES

Lab Sample ID	20/07501/8	20/07501/9	20/07501/15	20/07501/21
Client Sample No				
Client Sample ID/Depth	WS9 0.00-0.10m	WS9 0.10-0.50m	WS11 0.00-0.50m	WS12 0.00-0.70m
Date Sampled	24/08/20	24/08/20	24/08/20	24/08/20
PAH-16MS	✓	✓	✓	✓
VPHCWG	✓	✓	✓	✓

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.

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 20/07502
Issue Number: 1

Date: 21 September, 2020

Client: RSK Environment Ltd Tonbridge
Anerley Court, Half Moon Lane, Hildenborough
Tonbridge
Kent
TN11 9HU

Project Manager: Augustus Awoyomi/Svetislav Trajkovski
Project Name: Arundel Road, Angmering
Project Ref: 52207
Order No: N/A
Date Samples Received: 03/09/20
Date Instructions Received: 08/09/20
Date Analysis Completed: 21/09/20

Prepared by:

Approved by:

Sophie France
Client Service Manager

Richard Wong
Client Manager



Envirolab Job Number: 20/07502

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07502/1	20/07502/4	20/07502/7	20/07502/10	20/07502/14			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS1	WS3	WS4	WS7	WS10					
Depth to Top	0.10	0.20	0.20	0.10	0.40					
Depth To Bottom	0.20	0.30	0.30	0.20	0.50					
Date Sampled	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20					
Sample Type	Soil	Solid	Soil	Solid	Soil					
Sample Matrix Code	6AE	7	5AE	7	5AE					
% Moisture at <40C _A	-	-	-	9.3	-			% w/w	0.1	A-T-044
% Stones >10mm _A	19.7	<0.1	3.6	<0.1	<0.1			% w/w	0.1	A-T-044
pH _D ^{M#}	8.01	8.82	7.94	9.04	8.27			pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.03	0.01	0.18	-	<0.01			g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	960	<200	1100	-	<200			mg/kg	200	A-T-028s
Total Organic Carbon _D ^{M#}	8.32	0.05	3.17	-	0.23			% w/w	0.03	A-T-032s
Arsenic _D ^{M#}	59	<1	3	<1	<1			mg/kg	1	A-T-024s
Cadmium _D ^{M#}	2.6	<0.5	1.2	1.1	0.9			mg/kg	0.5	A-T-024s
Copper _D ^{M#}	166	5	38	16	9			mg/kg	1	A-T-024s
Chromium _D ^{M#}	67	6	32	24	24			mg/kg	1	A-T-024s
Chromium (hexavalent) _D	-	-	-	<1	-			mg/kg	1	A-T-040s
Lead _D ^{M#}	1520	27	59	86	10			mg/kg	1	A-T-024s
Mercury _D	0.45	<0.17	0.52	0.61	<0.17			mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	44	4	16	14	14			mg/kg	1	A-T-024s
Selenium _D ^{M#}	2	<1	3	2	2			mg/kg	1	A-T-024s
Zinc _D ^{M#}	1010	25	128	102	45			mg/kg	5	A-T-024s

Envirolab Job Number: 20/07502

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07502/1	20/07502/4	20/07502/7	20/07502/10	20/07502/14			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS1	WS3	WS4	WS7	WS10					
Depth to Top	0.10	0.20	0.20	0.10	0.40					
Depth To Bottom	0.20	0.30	0.30	0.20	0.50					
Date Sampled	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20					
Sample Type	Soil	Solid	Soil	Solid	Soil					
Sample Matrix Code	6AE	7	5AE	7	5AE					
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	NAD	NAD	NAD					A-T-045
Asbestos ACM - Suitable for Water Absorption Test? ^o	N/A	N/A	N/A	N/A	N/A					A-T-045

Envirolab Job Number: 20/07502

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07502/1	20/07502/4	20/07502/7	20/07502/10	20/07502/14			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS1	WS3	WS4	WS7	WS10					
Depth to Top	0.10	0.20	0.20	0.10	0.40					
Depth To Bottom	0.20	0.30	0.30	0.20	0.50					
Date Sampled	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20					
Sample Type	Soil	Solid	Soil	Solid	Soil					
Sample Matrix Code	6AE	7	5AE	7	5AE					
PAH-16MS										
Acenaphthene _A ^{M#}	0.05	0.08	<0.01	0.34	<0.01			mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.06	0.15	<0.01	0.74	<0.01			mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.24	0.54	<0.02	2.07	<0.02			mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	1.42	4.03	<0.04	12.6	<0.04			mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	2.37	5.07	0.07	13.6	<0.04			mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	2.35	5.10	0.07	13.4	<0.05			mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	2.78	4.00	0.07	11	<0.05			mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.75	1.96	<0.07	5.15	<0.07			mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	1.54	3.66	<0.06	10.4	<0.06			mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.57	1.01	<0.04	3.13	<0.04			mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	1.99	5.80	<0.08	13.9	<0.08			mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.05	0.08	<0.01	0.23	<0.01			mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	3.20	5.13	0.08	13.5	0.05			mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03	0.23	<0.03			mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.60	1.03	0.05	2.55	<0.03			mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	1.85	5.71	<0.07	16.7	<0.07			mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	19.8	43.4	0.34	-	<0.08			mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/07502

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07502/1	20/07502/4	20/07502/7	20/07502/10	20/07502/14			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS1	WS3	WS4	WS7	WS10					
Depth to Top	0.10	0.20	0.20	0.10	0.40					
Depth To Bottom	0.20	0.30	0.30	0.20	0.50					
Date Sampled	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20					
Sample Type	Soil	Solid	Soil	Solid	Soil					
Sample Matrix Code	6AE	7	5AE	7	5AE					
PAH-16MS plus Coronene										
Coronene _A	-	-	-	1.85	-			mg/kg	0.01	A-T-019s
Total PAH-16MS plus Coronene _A	-	-	-	121	-			mg/kg	0.01	A-T-019s
TPH Total with ID + GC Trace										
TPH total (>C6-C40) _A ^{M#}	-	-	-	3980	-			mg/kg	10	A-T-007s
TPH FID Chromatogram _A	-	-	-	Appended	-					A-T-007s
TPH ID (for FID characterisations) _A	-	-	-	C12-44 with PAHs and humic substances	-					A-T-007s

Envirolab Job Number: 20/07502

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07502/1	20/07502/4	20/07502/7	20/07502/10	20/07502/14			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS1	WS3	WS4	WS7	WS10					
Depth to Top	0.10	0.20	0.20	0.10	0.40					
Depth To Bottom	0.20	0.30	0.30	0.20	0.50					
Date Sampled	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20					
Sample Type	Soil	Solid	Soil	Solid	Soil					
Sample Matrix Code	6AE	7	5AE	7	5AE					
TPH CWG										
Ali >C5-C6 _A [#]	<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			mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<1	-	<1			mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<1	-	<1			mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	7	<1	<1	-	<1			mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	12	4	<1	-	<1			mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	340	112	11	-	1			mg/kg	1	A-T-055s
Total Aliphatics _A	359	117	11	-	1			mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<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			mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	2	1	<1	-	<1			mg/kg	1	A-T-055s
Aro >C10-C12 _A	2	<1	<1	-	<1			mg/kg	1	A-T-055s
Aro >C12-C16 _A	136	5	<1	-	<1			mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	68	30	1	-	<1			mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	377	280	16	-	2			mg/kg	1	A-T-055s
Total Aromatics _A	585	316	17	-	2			mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	944	433	28	-	3			mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<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			mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<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			mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<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			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



Client: RSK Environment Ltd Tonbridge, Anerley Court, Half Moon Lane,
Hildenborough, Tonbridge, Kent, TN11 9HU

Project: Arundel Road, Angmering

Clients Project No: 52207

Project No: 20/07502

Date Received: 08/09/2020 (am)

Cool Box Temperatures (°C): 16.1, 16.3

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.

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 20/07503
Issue Number: 1

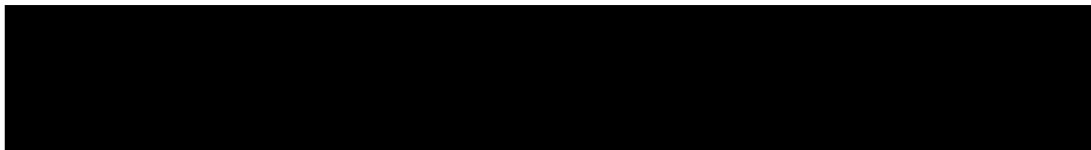
Date: 21 September, 2020

Client: RSK Environment Ltd Tonbridge
Anerley Court, Half Moon Lane, Hildenborough
Tonbridge
Kent
TN11 9HU

Project Manager: Augustus Awoyomi/Svetislav Trajkovski
Project Name: Arundel Road, Angmering
Project Ref: 52207
Order No: N/A
Date Samples Received: 02/09/20
Date Instructions Received: 08/09/20
Date Analysis Completed: 21/09/20

Prepared by:

Approved by:



Sophie France
Client Service Manager

Richard Wong
Client Manager



Envirolab Job Number: 20/07503

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07503/2	20/07503/5	20/07503/6	20/07503/10	20/07503/12	20/07503/14	20/07503/16	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP2	TP6	TP14	TP24	TP05	TP07	TP08			
Depth to Top	0.20	0.20	0.10	0.30	0.10	0.20	0.20			
Depth To Bottom	0.30	0.30	0.20	0.40	0.20	0.30	0.30			
Date Sampled	26-Aug-20	26-Aug-20	26-Aug-20	26-Aug-20	25-Aug-20	25-Aug-20	25-Aug-20			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	5AE	5A	6AE	6AE	6AE	6AE	6AE			
% Stones >10mm _A	<0.1	10.3	10.7	14.0	23.0	<0.1	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	8.46	7.45	6.99	7.85	7.79	7.74	7.83	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#}	-	-	-	-	420	-	510	mg/kg	200	A-T-028s
Total Organic Carbon _D ^{M#}	0.04	0.11	1.54	0.47	1.85	1.41	1.65	% w/w	0.03	A-T-032s
Arsenic _D ^{M#}	25	8	4	3	2	1	3	mg/kg	1	A-T-024s
Cadmium _D ^{M#}	2.8	1.3	0.9	1.0	0.8	0.8	1.0	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	34	20	19	10	17	19	21	mg/kg	1	A-T-024s
Chromium _D ^{M#}	21	33	22	26	22	24	23	mg/kg	1	A-T-024s
Lead _D ^{M#}	11	12	19	12	72	21	26	mg/kg	1	A-T-024s
Mercury _D	0.21	<0.17	<0.17	<0.17	<0.17	0.22	<0.17	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	51	24	13	15	11	13	13	mg/kg	1	A-T-024s
Selenium _D ^{M#}	6	2	2	<1	<1	1	<1	mg/kg	1	A-T-024s
Zinc _D ^{M#}	77	48	55	35	82	50	56	mg/kg	5	A-T-024s
TPH total (>C6-C40) _A ^{M#}	<10	<10	17	<10	-	20	-	mg/kg	10	A-T-007s

Envirolab Job Number: 20/07503

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07503/2	20/07503/5	20/07503/6	20/07503/10	20/07503/12	20/07503/14	20/07503/16	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP2	TP6	TP14	TP24	TP05	TP07	TP08			
Depth to Top	0.20	0.20	0.10	0.30	0.10	0.20	0.20			
Depth To Bottom	0.30	0.30	0.20	0.40	0.20	0.30	0.30			
Date Sampled	26-Aug-20	26-Aug-20	26-Aug-20	26-Aug-20	25-Aug-20	25-Aug-20	25-Aug-20			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	5AE	5A	6AE	6AE	6AE	6AE	6AE			
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: 20/07503

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07503/2	20/07503/5	20/07503/6	20/07503/10	20/07503/12	20/07503/14	20/07503/16	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP2	TP6	TP14	TP24	TP05	TP07	TP08			
Depth to Top	0.20	0.20	0.10	0.30	0.10	0.20	0.20			
Depth To Bottom	0.30	0.30	0.20	0.40	0.20	0.30	0.30			
Date Sampled	26-Aug-20	26-Aug-20	26-Aug-20	26-Aug-20	25-Aug-20	25-Aug-20	25-Aug-20			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	5AE	5A	6AE	6AE	6AE	6AE	6AE			
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	0.06	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.12	mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/07503

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07503/2	20/07503/5	20/07503/6	20/07503/10	20/07503/12	20/07503/14	20/07503/16	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP2	TP6	TP14	TP24	TP05	TP07	TP08			
Depth to Top	0.20	0.20	0.10	0.30	0.10	0.20	0.20			
Depth To Bottom	0.30	0.30	0.20	0.40	0.20	0.30	0.30			
Date Sampled	26-Aug-20	26-Aug-20	26-Aug-20	26-Aug-20	25-Aug-20	25-Aug-20	25-Aug-20			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	5AE	5A	6AE	6AE	6AE	6AE	6AE			
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	-	<1	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	-	-	-	-	<1	-	<1	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	-	-	-	-	<1	-	<1	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	-	-	-	-	<1	-	<1	mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	-	-	-	-	3	-	7	mg/kg	1	A-T-055s
Total Aliphatics _A	-	-	-	-	3	-	7	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	-	2	mg/kg	1	A-T-055s
Aro >C10-C12 _A	-	-	-	-	<1	-	1	mg/kg	1	A-T-055s
Aro >C12-C16 _A	-	-	-	-	<1	-	1	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	-	-	-	-	<1	-	1	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	-	-	-	-	4	-	12	mg/kg	1	A-T-055s
Total Aromatics _A	-	-	-	-	4	-	18	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	-	-	-	-	7	-	25	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

Envirolab Job Number: 20/07503

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07503/18	20/07503/22	20/07503/24					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP09	TP11	TP12							
Depth to Top	0.20	0.20	0.20							
Depth To Bottom	0.30	0.30	0.30							
Date Sampled	25-Aug-20	25-Aug-20	25-Aug-20							
Sample Type	Soil	Soil	Soil							
Sample Matrix Code	6AE	6AE	6AE							
% Moisture at <40C _A	-	11.1	-					% w/w	0.1	A-T-044
% Stones >10mm _A	<0.1	<0.1	<0.1					% w/w	0.1	A-T-044
pH _D ^{M#}	7.89	7.83	7.20					pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	-	-	<0.01					g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	-	-	520					mg/kg	200	A-T-028s
Total Organic Carbon _D ^{M#}	1.37	-	2.00					% w/w	0.03	A-T-032s
Arsenic _D ^{M#}	3	5	2					mg/kg	1	A-T-024s
Cadmium _D ^{M#}	0.7	0.8	1.0					mg/kg	0.5	A-T-024s
Copper _D ^{M#}	13	14	26					mg/kg	1	A-T-024s
Chromium _D ^{M#}	20	20	23					mg/kg	1	A-T-024s
Chromium (hexavalent) _D	-	<1	-					mg/kg	1	A-T-040s
Lead _D ^{M#}	17	18	82					mg/kg	1	A-T-024s
Mercury _D	0.38	<0.17	0.22					mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	12	12	15					mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	1	2					mg/kg	1	A-T-024s
Zinc _D ^{M#}	48	55	97					mg/kg	5	A-T-024s
TPH total (>C6-C40) _A ^{M#}	24	20	-					mg/kg	10	A-T-007s

Envirolab Job Number: 20/07503

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07503/18	20/07503/22	20/07503/24					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP09	TP11	TP12							
Depth to Top	0.20	0.20	0.20							
Depth To Bottom	0.30	0.30	0.30							
Date Sampled	25-Aug-20	25-Aug-20	25-Aug-20							
Sample Type	Soil	Soil	Soil							
Sample Matrix Code	6AE	6AE	6AE							
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	-	NAD	NAD							A-T-045
Asbestos ACM - Suitable for Water Absorption Test? ^o	-	N/A	N/A							A-T-045

Envirolab Job Number: 20/07503

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07503/18	20/07503/22	20/07503/24					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP09	TP11	TP12							
Depth to Top	0.20	0.20	0.20							
Depth To Bottom	0.30	0.30	0.30							
Date Sampled	25-Aug-20	25-Aug-20	25-Aug-20							
Sample Type	Soil	Soil	Soil							
Sample Matrix Code	6AE	6AE	6AE							
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02	<0.02	<0.02					mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	<0.04	<0.04					mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.06	<0.04	<0.04					mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.06	<0.05	<0.05					mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	<0.05	<0.05					mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	<0.07	<0.07					mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.06	<0.06	<0.06					mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	<0.04					mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.08	<0.08	<0.08					mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.06	<0.03	0.05					mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03					mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	<0.03	<0.03	<0.03					mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.07	<0.07	<0.07					mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	0.18	-	<0.08					mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/07503

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07503/18	20/07503/22	20/07503/24					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP09	TP11	TP12							
Depth to Top	0.20	0.20	0.20							
Depth To Bottom	0.30	0.30	0.30							
Date Sampled	25-Aug-20	25-Aug-20	25-Aug-20							
Sample Type	Soil	Soil	Soil							
Sample Matrix Code	6AE	6AE	6AE							
PAH-16MS plus Coronene										
Coronene _A	-	<0.01	-					mg/kg	0.01	A-T-019s
Total PAH-16MS plus Coronene _A	-	<0.08	-					mg/kg	0.01	A-T-019s
TPH Total with ID + GC Trace										
TPH FID Chromatogram _A	-	Appended	-							A-T-007s
TPH ID (for FID characterisations) _A	-	Concentration too low to identify	-							A-T-007s

Envirolab Job Number: 20/07503

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07503/18	20/07503/22	20/07503/24					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP09	TP11	TP12							
Depth to Top	0.20	0.20	0.20							
Depth To Bottom	0.30	0.30	0.30							
Date Sampled	25-Aug-20	25-Aug-20	25-Aug-20							
Sample Type	Soil	Soil	Soil							
Sample Matrix Code	6AE	6AE	6AE							
TPH CWG										
Ali >C5-C6 _A [#]	-	-	<0.01					mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	-	-	<0.01					mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	-	-	<1					mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	-	-	<1					mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	-	-	<1					mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	-	-	<1					mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	-	-	2					mg/kg	1	A-T-055s
Total Aliphatics _A	-	-	2					mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	-	-	<0.01					mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	-	-	<0.01					mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	-	-	<1					mg/kg	1	A-T-055s
Aro >C10-C12 _A	-	-	<1					mg/kg	1	A-T-055s
Aro >C12-C16 _A	-	-	<1					mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	-	-	<1					mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	-	-	6					mg/kg	1	A-T-055s
Total Aromatics _A	-	-	6					mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	-	-	8					mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	-	-	<0.01					mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	-	-	<0.01					mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	-	-	<0.01					mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	-	-	<0.01					mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	-	-	<0.01					mg/kg	0.01	A-T-022s
MTBE _A [#]	-	-	<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

Client: RSK Environment Ltd Tonbridge, Anerley Court, Half Moon Lane,
Hildenborough, Tonbridge, Kent, TN11 9HU

Project: Arundel Road, Angmering

Clients Project No: 52207

Project No: 20/07503

Date Received: 08/09/2020 (am)

Cool Box Temperatures (°C): 16.1, 15.7, 15.6

Lab Sample ID	20/07503/12	20/07503/14	20/07503/16	20/07503/18	20/07503/22	20/07503/24
Client Sample No						
Client Sample ID/Depth	TP05 0.10-0.20m	TP07 0.20-0.30m	TP08 0.20-0.30m	TP09 0.20-0.30m	TP11 0.20-0.30m	TP12 0.20-0.30m
Date Sampled	25/08/20	25/08/20	25/08/20	25/08/20	25/08/20	25/08/20
Deviation Code						
F	✓	✓	✓	✓	✓	✓

Key

F Maximum holding time exceeded between sampling date and analysis for analytes listed below

HOLDING TIME EXCEEDANCES

Lab Sample ID	20/07503/12	20/07503/14	20/07503/16	20/07503/18	20/07503/22	20/07503/24
Client Sample No						
Client Sample ID/Depth	TP05 0.10-0.20m	TP07 0.20-0.30m	TP08 0.20-0.30m	TP09 0.20-0.30m	TP11 0.20-0.30m	TP12 0.20-0.30m
Date Sampled	25/08/20	25/08/20	25/08/20	25/08/20	25/08/20	25/08/20
PAH-16MS	✓	✓	✓	✓		✓
VPHCWG	✓		✓			✓
TPH total (>C6-C40)		✓		✓	✓	
PAH-16MS plus Coronene					✓	

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 G

LABORATORY CERTIFICATES FOR GEOTECHNICAL ANALYSIS



STRUCTURAL SOILS LTD

TEST REPORT



Report No. 584340-01 (00)

1774

Date 23-September-2020 Contract Arundel Road, Angmering

Client RSK
Address Anerley Court
Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU

For the Attention of Svetislav Trajkovski

Samples submitted by client	07-September-2020	Client Reference	52207
Testing Started	14-September-2020	Client Order No.	n/a
Testing Completed	23-September-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)* |

Undertaken by a sub-contractor

- | | |
|------|---|
| 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

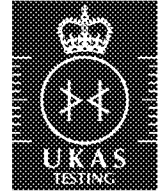
Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of .

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 9

TESTING VERIFICATION CERTIFICATE



1774

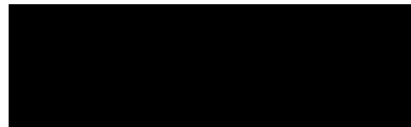
The test results included in this report are certified as:-

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: **23/09/2020 14:42:41**.

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:

Arundel Road, Angmering

Job No:

584340



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	% <425µm	Description of Sample
TP1		B	1.30	25	54	22	32	100	Light brown mottled red, orange and grey sandy CLAY
TP2		B	1.50	21	48	24	24	95	Brown mottled grey, orange and red slightly gravelly sandy CLAY
TP3		B	1.20	21	68	22	46	100	Grey mottled brown and orange sandy CLAY
TP4		B	1.20	16	51	21	30	99	Brown mottled orange and grey slightly gravelly sandy CLAY
TP5		B	1.00	16	56	22	34	89	Brown mottled orange and grey slightly gravelly sandy CLAY
TP8		B	1.00	14	42	20	22	97	Orangish brown slightly gravelly sandy CLAY
TP9		B	1.00	15	44	20	24	95	Brown mottled orange and grey slightly gravelly sandy CLAY
TP10		B	1.00	14	45	21	24	97	Brown mottled orange slightly gravelly sandy CLAY



**STRUCTURAL
SOILS LTD**

Contract:

Arundel Road, Angmering

Contract Ref:

584340



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	% <425µm	Description of Sample
TP11		B	1.20	19	44	20	24	98	Brown mottled orange and grey slightly gravelly sandy CLAY
TP14		B	1.00	11	43	19	24	21	Orangish brown sandy clayey GRAVEL
TP22		B	1.60	15	55	22	33	72	Brown mottled orange slightly gravelly sandy CLAY
TP23		B	0.60	16	46	20	26	92	Brown mottled orange slightly gravelly sandy CLAY
TP25		B	1.50	25	71	21	50	95	Brown mottled grey and orange slightly gravelly sandy CLAY
WS2		D	1.00	25	74	26	48	87	Brown mottled grey and orange slightly gravelly sandy CLAY
WS4		D	0.90	25	44	22	22	97	Brown mottled orange and grey slightly gravelly sandy CLAY
WS7		D	0.80	23	41	20	21	97	Brown mottled orange and grey slightly gravelly sandy CLAY



**STRUCTURAL
SOILS LTD**

Contract:

Arundel Road, Angmering

Contract Ref:

584340



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	% <425µm	Description of Sample
WS7		D	1.60	21	36	19	17	94	Brown mottled orange and grey slightly gravelly sandy CLAY
WS9		D	1.00	22	34	20	14	92	Brown mottled orange and grey slightly gravelly sandy CLAY
WS10		D	1.30	22	38	20	18	98	Brown mottled orange sandy CLAY



**STRUCTURAL
SOILS LTD**

Contract:

Arundel Road, Angmering

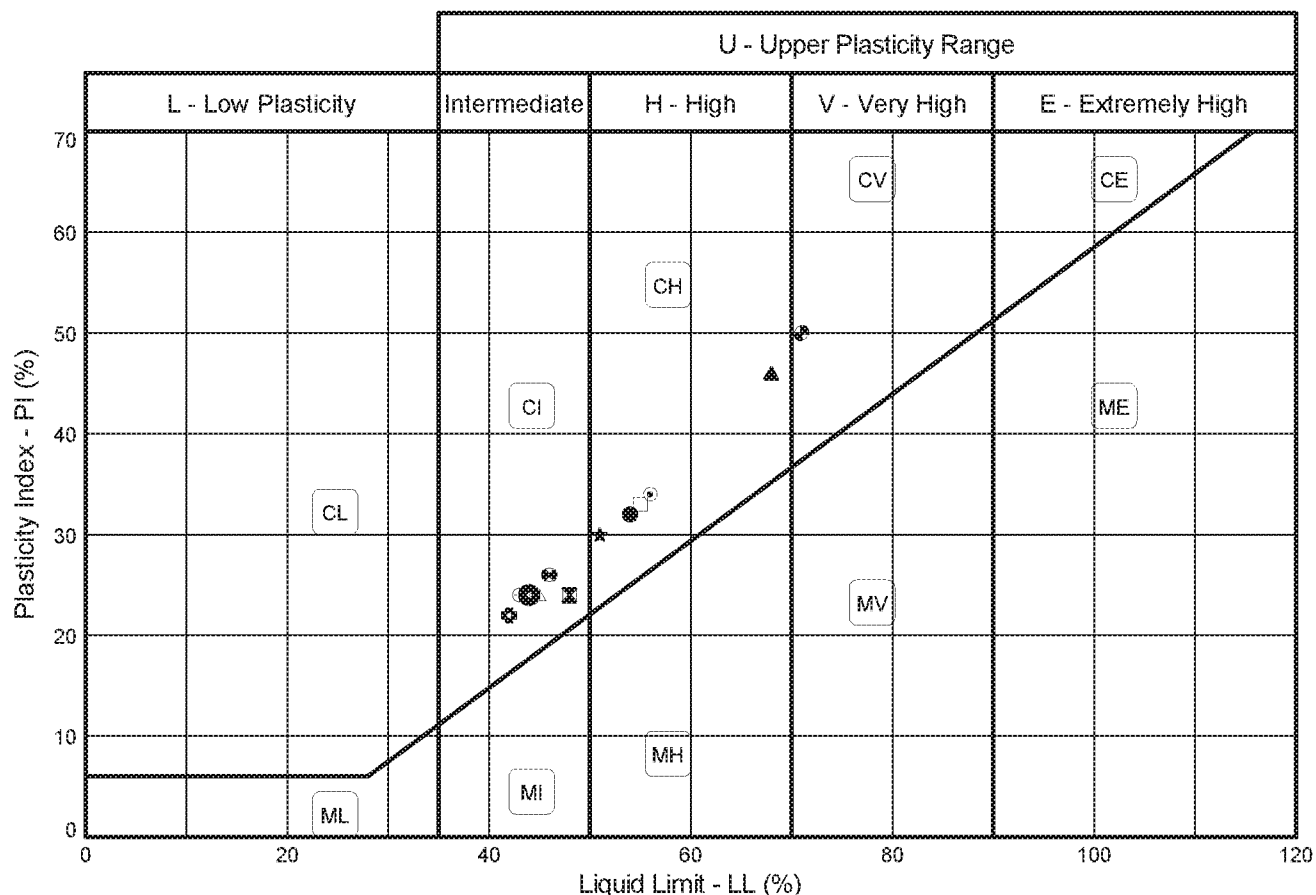
Contract Ref:

584340



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 %	<425µm %	Lab location	Notes
Exploratory Position ID	Sample	Depth (m)										
●	TP1	B	1.30	3.2/4.4/5.3/5.4	4.2.4	25	54	22	32	100	T	
⊗	TP2	B	1.50	3.2/4.4/5.3/5.4	4.2.4	21	48	24	24	95	T	
▲	TP3	B	1.20	3.2/4.4/5.3/5.4	4.2.4	21	68	22	46	100	T	
★	TP4	B	1.20	3.2/4.4/5.3/5.4	4.2.4	16	51	21	30	99	T	
⊙	TP5	B	1.00	3.2/4.4/5.3/5.4	4.2.4	16	56	22	34	89	T	
⊗	TP8	B	1.00	3.2/4.4/5.3/5.4	4.2.4	14	42	20	22	97	T	
⊗	TP9	B	1.00	3.2/4.4/5.3/5.4	4.2.4	15	44	20	24	95	T	
△	TP10	B	1.00	3.2/4.4/5.3/5.4	4.2.4	14	45	21	24	97	T	
⊗	TP11	B	1.20	3.2/4.4/5.3/5.4	4.2.4	19	44	20	24	98	T	
⊕	TP14	B	1.00	3.2/4.4/5.3/5.4	4.2.4	11	43	19	24	21	T	
□	TP22	B	1.60	3.2/4.4/5.3/5.4	4.2.4	15	55	22	33	72	T	
⊗	TP23	B	0.60	3.2/4.4/5.3/5.4	4.2.4	16	46	20	26	92	T	
⊗	TP25	B	1.50	3.2/4.4/5.3/5.4	4.2.4	25	71	21	50	95	T	

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 1NU), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)



STRUCTURAL SOILS
Anerley Court
Half Moon Lane
Hildenborough
Tonbridge TN11 9HU

Compiled By

Date

SHARON CAIRNS

23/09/20

Contract

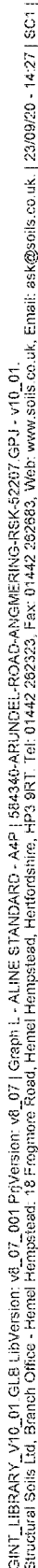
Contract Ref:

Arundel Road, Angmering

584340



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

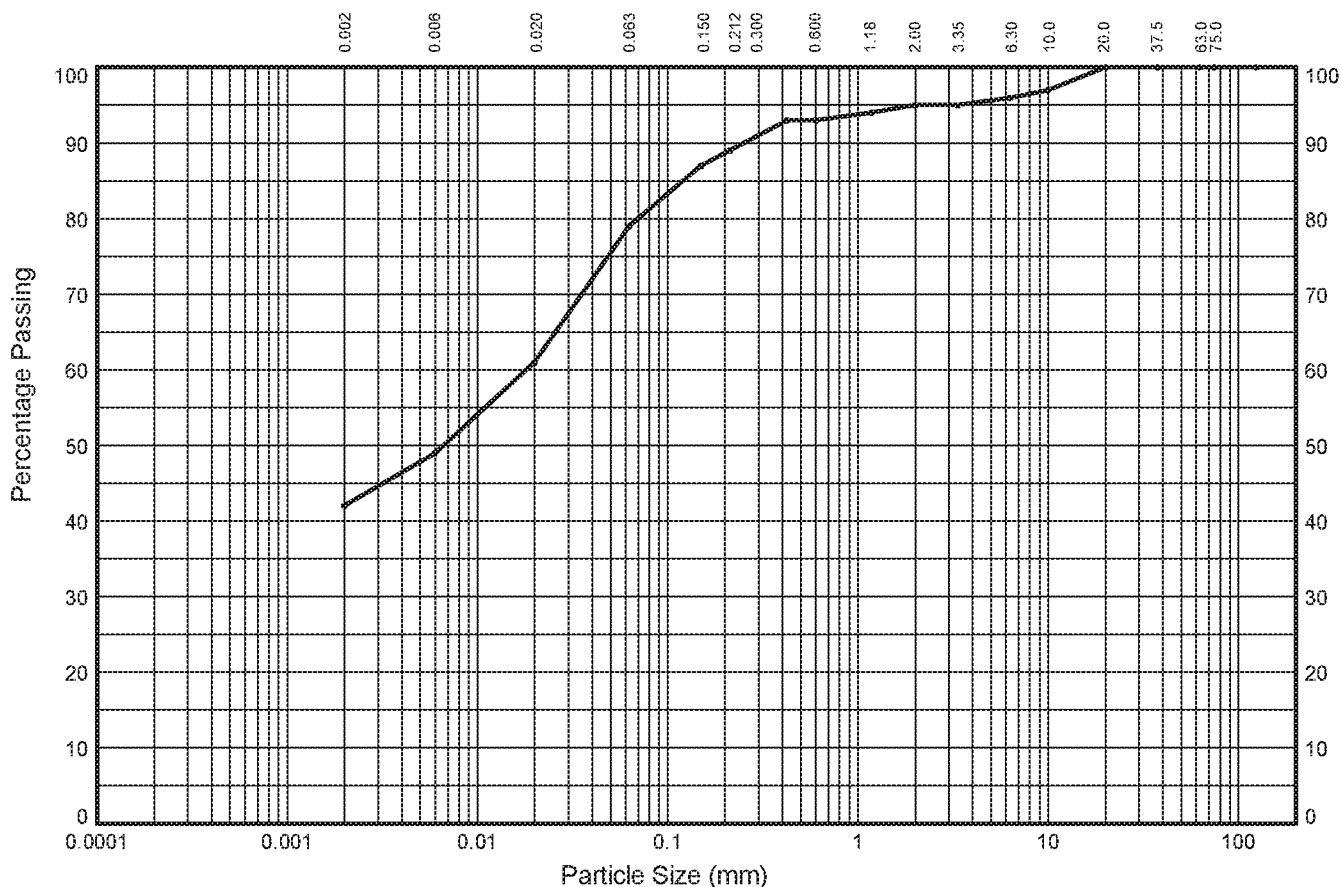


Compiled By		Date
[REDACTED]		23/09/20
SHARON CAIRNS		
Contract	Contract Ref:	
Arundel Road, Angmering	584340	

PARTICLE SIZE DISTRIBUTION TEST

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

Trial Pit: **TP6** Sample Ref: Sample Type: **B** Depth (m): **0.90**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	7%	12%	18%	10%	4%	2%	1%	4%	0%	
	SILT			SAND			GRAVEL			
42%	37%			16%			5%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	97
6.30	96
3.35	95
2.00	95
1.18	94
0.600	93
0.425	93
0.212	89
0.150	87
0.063	79

Particle Diameter (mm)	Percent Passing (%)
0.02	61
0.006	49
0.002	42
Sedimentation sample was not pre-treated	

Coefficients	
D ₁₀ (mm)	NA
D ₁₅ (mm)	NA
D ₃₀ (mm)	NA
D ₅₀ (mm)	0.007
D ₆₀ (mm)	0.018
D ₈₅ (mm)	0.121
D ₉₀ (mm)	0.252
C _u	NA
C _c	NA

Soil Description:

Brown mottled orange and grey slightly gravelly slightly sandy silty CLAY

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



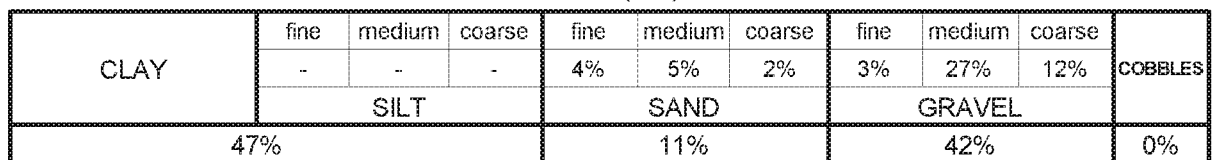
STRUCTURAL SOILS
Anerley Court
Half Moon Lane
Hildenborough
Tonbridge TN11 9HU

Compiled By		Date
[Redacted]		23/09/20
Contract		Contract Ref:
Arundel Road, Angmering		584340



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

Depth (m): 1.60



Coefficients	
D ₁₀ (mm)	NA
D ₁₅ (mm)	NA
D ₃₀ (mm)	NA
D ₅₀ (mm)	0.150
D ₆₀ (mm)	4.594
D ₈₅ (mm)	18.025
D ₉₀ (mm)	22.209
C _U	NA
C _C	NA

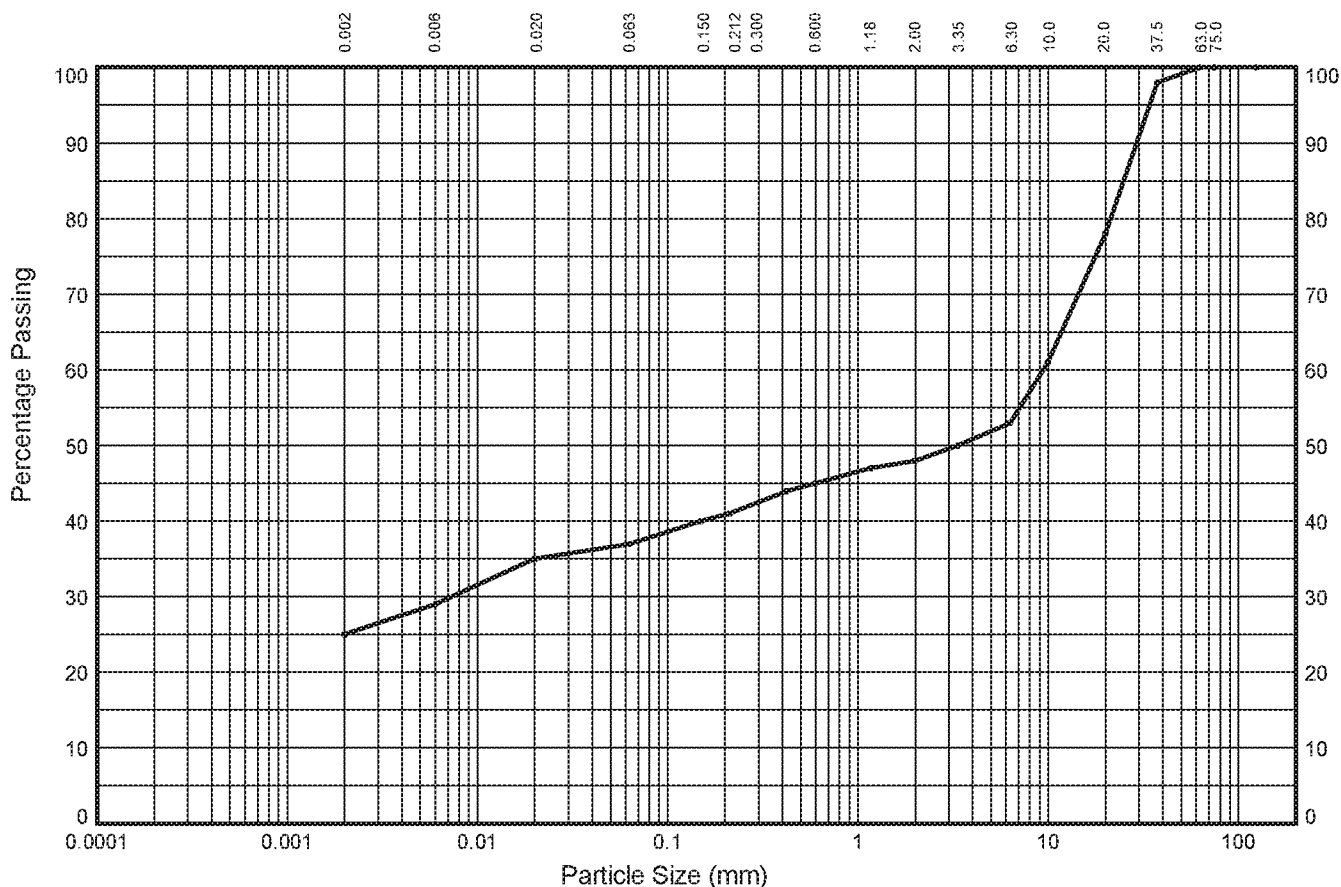
Orangish brown slightly sandy gravelly CLAY



PARTICLE SIZE DISTRIBUTION TEST

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

Trial Pit: **TP12** Sample Ref: Sample Type: **B** Depth (m): **1.90**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	4%	6%	2%	4%	4%	3%	5%	25%	22%	
	SILT			SAND			GRAVEL			
25%	12%			11%			52%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	98
20.0	78
10.0	61
6.30	53
3.35	50
2.00	48
1.18	47
0.600	45
0.425	44
0.212	41
0.150	40
0.063	37

Particle Diameter (mm)	Percent Passing (%)
0.02	35
0.006	29
0.002	25
Sedimentation sample was not pre-treated	

Coefficients	
D ₁₀ (mm)	NA
D ₁₅ (mm)	NA
D ₃₀ (mm)	0.007
D ₅₀ (mm)	3.350
D ₆₀ (mm)	9.439
D ₈₅ (mm)	24.922
D ₉₀ (mm)	29.163
C _U	NA
C _C	NA

Soil Description:

Brown mottled orange and grey slightly sandy very clayey GRAVEL

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



STRUCTURAL SOILS
Anerley Court
Half Moon Lane
Hildenborough
Tonbridge TN11 9HU

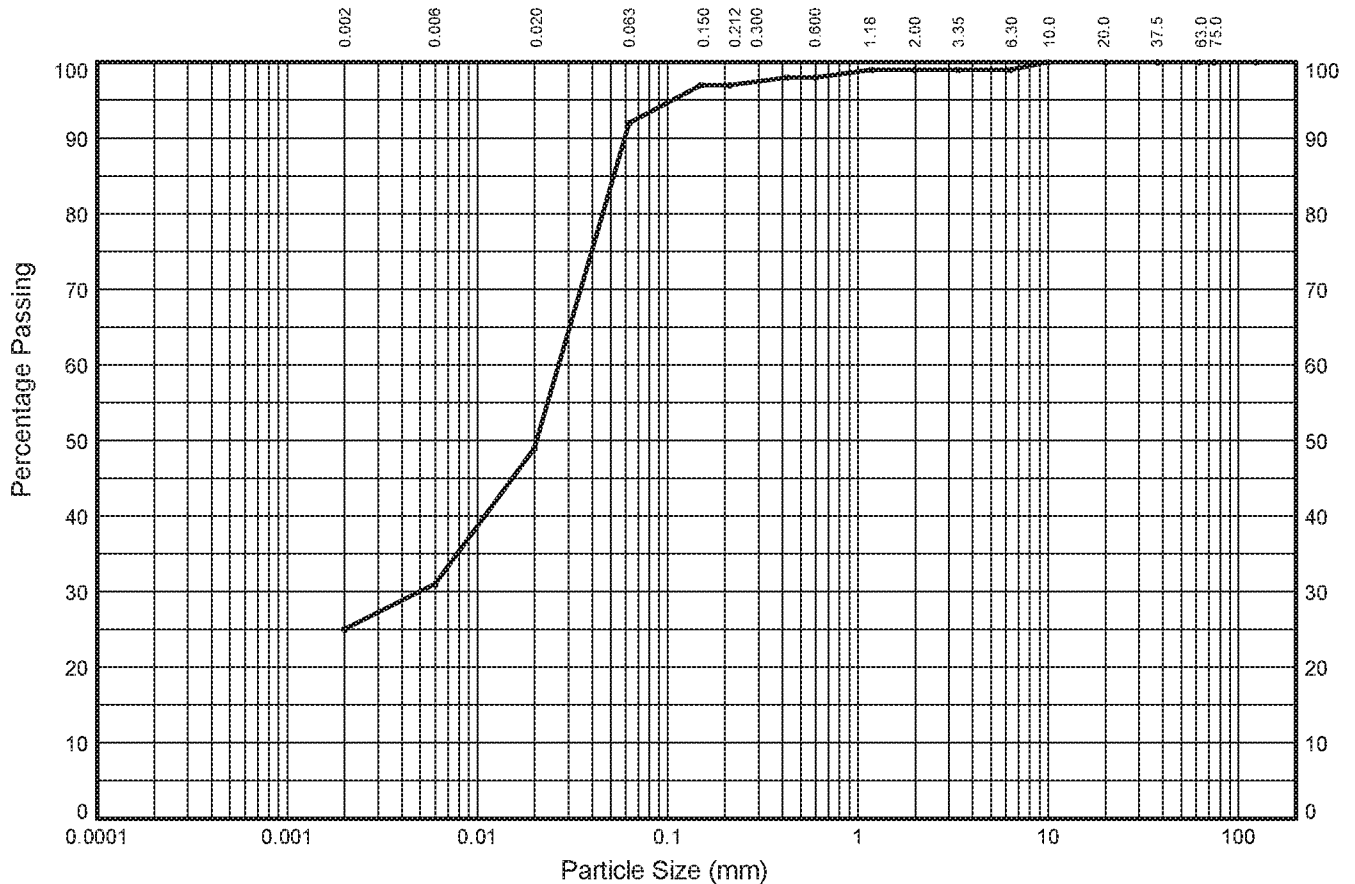
Compiled By		Date
[Redacted]		23/09/20
Contract		Contract Ref:
Arundel Road, Angmering		584340



PARTICLE SIZE DISTRIBUTION TEST

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

Trial Pit: **TP22** Sample Ref: Sample Type: **B** Depth (m): **0.70**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	6%	18%	43%	5%	1%	1%	0%	1%	0%	
	SILT			SAND			GRAVEL			
25%	67%			7%			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	99
3.35	99
2.00	99
1.18	99
0.600	98
0.425	98
0.212	97
0.150	97
0.063	92

Particle Diameter (mm)	Percent Passing (%)
0.02	49
0.006	31
0.002	25
Sedimentation sample was not pre-treated	

Coefficients	
D ₁₀ (mm)	NA
D ₁₅ (mm)	NA
D ₃₀ (mm)	0.005
D ₅₀ (mm)	0.021
D ₆₀ (mm)	0.027
D ₈₅ (mm)	0.052
D ₉₀ (mm)	0.060
C _u	NA
C _c	NA

Soil Description:

Orangish brown mottled grey slightly gravelly slightly sandy clayey SILT

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



STRUCTURAL SOILS
Anerley Court
Half Moon Lane
Hildenborough
Tonbridge TN11 9HU

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Date

SHARON CAIRNS

23/09/20

Contract

Contract Ref:

Arundel Road, Angmering

584340



PARTICLE SIZE DISTRIBUTION TEST

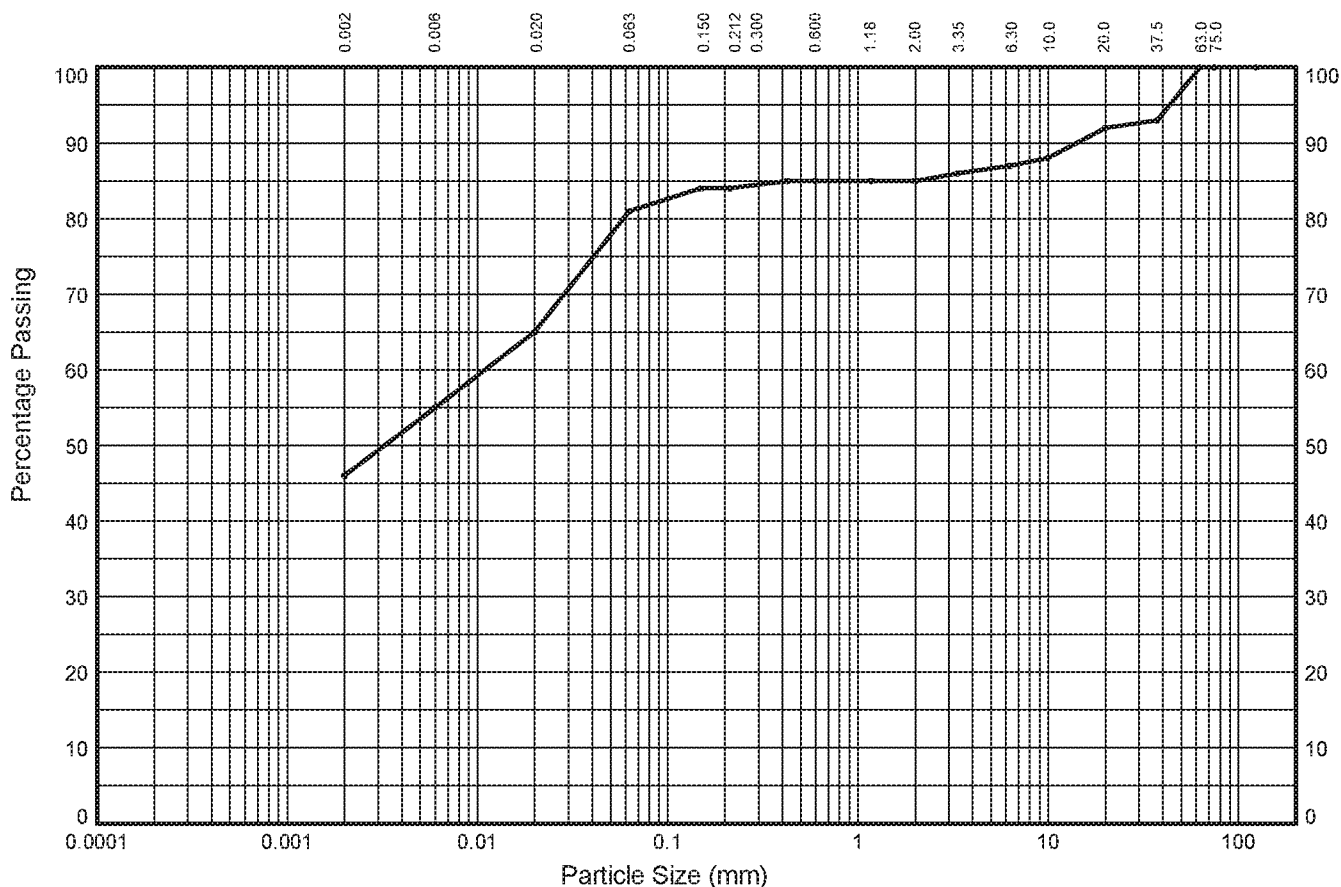
In accordance with clauses 9.2, 9.4 of BS1377:Part 2:1990

Trial Pit: **TP25**

Sample Ref:

Sample Type: **B**

Depth (m): **0.60**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	9%	10%	16%	3%	1%	0%	2%	5%	8%	
	SILT			SAND			GRAVEL			
46%	35%			4%			15%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	93
20.0	92
10.0	88
6.30	87
3.35	86
2.00	85
1.18	85
0.600	85
0.425	85
0.212	84
0.150	84
0.063	81

Particle Diameter (mm)	Percent Passing (%)
0.02	65
0.006	55
0.002	46
Sedimentation sample was not pre-treated	

Coefficients	
D ₁₀ (mm)	NA
D ₁₅ (mm)	NA
D ₃₀ (mm)	NA
D ₅₀ (mm)	0.003
D ₆₀ (mm)	0.011
D ₈₅ (mm)	0.425
D ₉₀ (mm)	14.142
C _u	NA
C _c	NA

Soil Description:

Brown mottled orange and grey slightly sandy slightly gravelly silty CLAY

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



STRUCTURAL SOILS
Anerley Court
Half Moon Lane
Hildenborough
Tonbridge TN11 9HU

Compiled By

Date

SHARON CAIRNS

23/09/20

Contract

Contract Ref:

Arundel Road, Angmering

584340



FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 20/07726/1

Amendments: Request for project/sample information change

Envirolab Job Number: 20/07726
Issue Number: 2

Date: 21 September, 2020

Client: Structural Soils Limited (Tonbridge Lab)
Anerley Court
Half Moon Lane
Hildenborough
Kent
UK
TN11 9HU

Project Manager: Richard Ashby
Project Name: Arundel Road, Angmering
Project Ref: 52207
Order No: N/A
Date Samples Received: 14/09/20
Date Instructions Received: 14/09/20
Date Analysis Completed: 18/09/20

Prepared by:

Approved by:

Sophie France
Client Service Manager

Holly Neary-King
Client Services Supervisor



Envirolab Job Number: 20/07726

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07726/1	20/07726/2	20/07726/3	20/07726/4	20/07726/5	20/07726/6	20/07726/7	Units	Limit of Detection	Method ref
Client Sample No		4	3	4	3	3				
Client Sample ID	TP4	TP5	TP8	TP10	TP11	TP12	TP14			
Depth to Top	1.20	2.00	1.00	1.60	1.20	1.00	1.50			
Depth To Bottom	1.50	2.10	1.20	1.90	1.30	1.10	1.80			
Date Sampled										
Sample Type	Soil - B	Soil - D	Soil - D	Soil - B	Soil - D	Soil - D	Soil - B			
Sample Matrix Code	5A	5A	5A	5A	5A	5A	5A			
% Stones >10mm _A	<0.1	<0.1	<0.1	<0.1	7.6	<0.1	<0.1	% w/w	0.1	A-T-044
pH BRE _D ^{MF}	8.33	6.60	8.03	8.06	7.76	5.20	7.98	pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1) _D ^{MF}	35	101	<10	<10	<10	<10	<10	mg/l	10	A-T-026s
Sulphate BRE (acid sol) _D ^{MF}	-	0.03	-	-	-	-	-	% w/w	0.02	A-T-028s
Sulphur BRE (total) _D	-	0.01	-	-	-	-	-	% w/w	0.01	A-T-024s

Envirolab Job Number: 20/07726

Client Project Name: Arundel Road, Angmering

Client Project Ref: 52207

Lab Sample ID	20/07726/8	20/07726/9	20/07726/10	20/07726/11	20/07726/12			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP23	TP25	WS4	WS7	WS10					
Depth to Top	1.60	1.50	0.90	1.60	1.30					
Depth To Bottom	1.90	1.80	1.00	1.70	1.40					
Date Sampled										
Sample Type	Soil - B	Soil - B	Soil - D	Soil - D	Soil - D					
Sample Matrix Code	5A	5A	5A	5A	5A					
% Stones >10mm _A	<0.1	3.4	<0.1	1.3	<0.1			% w/w	0.1	A-T-044
pH BRE _D ^{NE}	8.00	8.07	8.06	7.74	7.95			pH	0.01	A-T-031a
Sulphate BRE (water sol 2:1) _D ^{NE}	<10	65	16	11	13			mg/l	10	A-T-026a

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 268 4004 Email: info@envirolab.co.uk

Client: Structural Soils Limited (Tonbridge Lab), Anerley Court, Half Moon Lane,
Hildenborough, Kent, UK, TN11 9HU

Project No: 20/07726

Date Received: 14/09/2020 (am)

Project: Arundel Road, Angmering

Cool Box Temperatures (°C): 16.6

Clients Project No: 52207

Lab Sample ID	20/07726/1	20/07726/2	20/07726/3	20/07726/4	20/07726/5	20/07726/6	20/07726/7	20/07726/8	20/07726/9	20/07726/10	20/07726/11	20/07726/12
Client Sample No		4	3	4	3	3						
Client Sample ID/Depth	TP4 1.20-1.50m	TP5 2.00-2.10m	TP8 1.00-1.20m	TP10 1.60-1.90m	TP11 1.20-1.30m	TP12 1.00-1.10m	TP14 1.50-1.80m	TP23 1.60-1.90m	TP25 1.50-1.80m	WS4 0.90-1.00m	WS7 1.60-1.70m	WS10 1.30-1.40m
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 H

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 overleaf.

		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 (CO₂), methane (CH₄) and oxygen (O₂) in percentage by volume, while hydrogen sulphide (H₂S) 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 consultation 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 I GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH

Generic assessment criteria for human health: commercial scenario

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 only C4SL exposure modification relevant to a commercial end use are daily inhalation rates.

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.

Pathway selection

In accordance with SR3⁽⁵⁾ the commercial scenario considers risks to a female worker who works from the age of 16 to 65 years. It should be noted that this end use is not suitable for a workplace nursery but may be appropriate for a sports centre or shopping centre where children are present. In accordance with Box 3.5, SR3⁽⁵⁾ the pathways considered for production of the SAC in the commercial scenario are

- direct soil and dust ingestion
- dermal contact with soil both indoors and outdoors
- indoor air inhalation from soil and vapour and outdoor inhalation of soil and vapour.

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 C₅–C₈ were not modelled, as this range comprises benzene (>EC5-EC7) and toluene (>EC7-EC8), which are modelled separately.

Physical parameters

For the commercial end use, the CLEA default pre-1970s three-storey office building was used. SR3⁽⁵⁾ notes this commercial building type to be the most conservative in terms of protection from vapour intrusion. The default input building parameters presented in Table 3.10 of SR3⁽⁵⁾ have been used.

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 a commercial land use

In summary, the RSK commercial 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 sole modification to the default commercial input parameters is the updated inhalation rate.

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

Figure 1: Conceptual model for CLEA commercial scenario

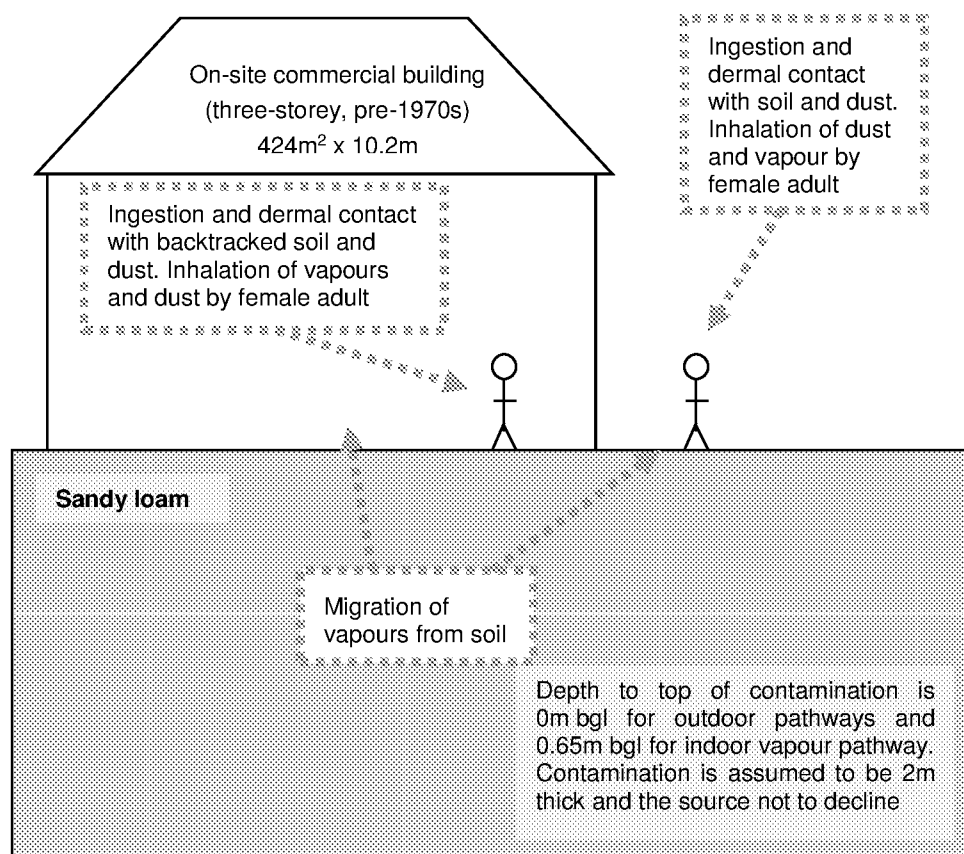


Table 1: Exposure assessment parameters for commercial scenario – inputs for CLEA model

Parameter	Value	Justification
Land use	Commercial	Chosen land use
Receptor	Female worker	Taken as female adult exposed over 49 years from age 16 to 65 years, Box 3.5, SR3 ⁽⁵⁾
Building	Office (pre-1970)	Key generic assumption given in Box 3.5, SR3 ⁽⁵⁾ . Pre-1970s three-storey office building chosen as it is the most conservative in terms of protection from vapour intrusion (Section 3.4.6, SR3 ⁽⁵⁾)
Soil type	Sandy loam	Most common UK soil type (Section 4.3.1, Table 4.4, SR3 ⁽⁵⁾)
Start age class (AC)	17	AC corresponding to key generic assumption that the critical receptor is a working female adult exposed over a 49-year period from age 16 to 65 years. Assumption given in Box 3.5, SR3 ⁽⁵⁾
End AC	17	
SOM (%)	6	Representative of sandy loam 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: Commercial – modified receptor inputs

Parameter	Unit	Value	Justification
Inhalation rate (AC17)	m ³ day ⁻¹	15.7	Mean value USEPA, 2011 ⁽¹²⁾ ; Table 3.2, SP1010 ⁽³⁾

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GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL



Table 3

Human health generic assessment criteria by pathway for commercial scenario

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)	6.36E-02	1.25E-03	NR	NR	6.36E-02	1.25E-03	NR	NR	6.36E-02	1.25E-03	NR	NR
Barium	(b)	3.31E+04	NR	NR	NR	3.31E+04	NR	NR	NR	2.21E+04	NR	NR	NR
Beryllium		3.97E-03	1.13E-01	NR	NR	3.97E-03	1.13E-01	NR	NR	2.65E-03	1.17E-01	NR	NR
Boron		2.36E-05	2.69E-07	NR	NR	2.36E-05	2.69E-07	NR	NR	2.28E-05	2.82E-07	NR	NR
Cadmium	(a)	7.73E-02	6.57E-02	4.19E-02	NR	7.73E-02	6.57E-02	4.19E-02	NR	7.73E-02	6.57E-02	4.19E-02	NR
Chromium (III) - trivalent	(c)	3.31E+05	6.57E-03	NR	NR	3.31E+05	6.57E-03	NR	NR	2.21E+06	6.57E-03	NR	NR
Chromium (VI) - hexavalent	(a,d)	6.62E-02	4.91E-01	NR	NR	6.62E-02	4.91E-01	NR	NR	6.62E-02	4.91E-01	NR	NR
Copper		1.89E-05	6.86E-04	6.83E-04	NR	1.89E-05	6.86E-04	6.83E-04	NR	1.89E-05	6.86E-04	6.83E-04	NR
Cobalt	(a)	3.32E-02	NR	NR	NR	3.32E-02	NR	NR	NR	2.28E-03	NR	NR	NR
Elemental Mercury (Hg^0)	(d)	NR	1.54E+01	NR	4.31E+00	NR	3.26E+01	NR	1.07E+01	NR	5.80E+01	NR	2.58E+01
Inorganic Mercury (Hg^{2+})		1.19E-03	1.87E-04	1.12E-02	NR	1.19E-03	1.87E-04	1.12E-02	NR	1.19E-03	1.87E-04	1.12E-02	NR
Methyl Mercury (Hg^{CH3})		3.38E+02	2.13E+03	2.92E+02	7.33E+01	3.38E+02	3.87E+03	3.11E+02	1.42E+02	3.38E+02	7.32E+03	3.23E+02	3.04E+02
Nickel	(d)	3.36E-03	9.63E-02	NR	NR	3.36E-03	9.63E-02	NR	NR	2.06E-03	9.63E-02	NR	NR
Selenium	(b)	1.33E-04	NR	NR	NR	1.33E-04	NR	NR	NR	1.23E-04	NR	NR	NR
Vanadium		2.15E-04	9.93E-03	NR	NR	2.15E-04	9.93E-03	NR	NR	2.15E-04	9.93E-03	NR	NR
Zinc	(b)	7.36E+03	1.97E+06	NR	NR	7.36E+03	1.97E+06	NR	NR	7.36E+03	1.97E+06	NR	NR
Cyanide (free)		6.56E-02	7.51E-04	6.53E-02	NR	6.56E-02	7.51E-04	6.53E-02	NR	6.56E-02	7.51E-04	6.53E-02	NR
Volatile Organic Compounds													
Benzene	(a)	1.09E-03	2.79E-01	2.72E-01	1.22E+03	1.09E-03	5.19E-01	4.96E-01	2.26E+03	1.09E-03	1.09E-02	9.80E-01	4.71E+03
Toluene		4.24E+05	6.49E+04	5.63E+04	8.69E+02	4.24E+05	1.43E+05	1.07E+05	1.92E+03	4.24E+05	3.24E+05	1.84E+05	4.36E+03
Ethylbenzene		1.91E+05	5.89E+03	5.71E+03	5.18E+02	1.91E+05	1.38E+04	1.28E+04	1.22E+03	1.91E+05	3.21E+04	2.75E+04	2.84E+03
Xylene - m		3.43E+05	6.26E+03	6.15E+03	6.25E+02	3.43E+05	1.47E+04	1.41E+04	1.47E+03	3.43E+05	3.44E+04	3.12E+04	3.46E+03
Xylene - o		3.43E+05	6.73E+03	6.60E+03	4.78E+02	3.43E+05	1.57E+04	1.50E+04	1.12E+03	3.43E+05	3.65E+04	3.30E+04	2.62E+03
Xylene - p		3.43E+05	6.03E+03	5.92E+03	5.76E+02	3.43E+05	1.41E+04	1.36E+04	1.35E+03	3.43E+05	3.28E+04	3.00E+04	3.17E+03
Total xylene		3.43E+05	6.03E+03	5.92E+03	6.25E+02	3.43E+05	1.41E+04	1.36E+04	1.47E+03	3.43E+05	3.28E+04	3.00E+04	3.46E+03
Methyl tertiary-Butyl ether (MTBE)		5.72E+05	7.58E-03	7.48E-03	2.04E+04	5.72E+05	1.23E-04	1.21E-04	3.31E+04	5.72E+05	3.34E-04	3.24E-04	6.27E+04
1,1,1,2-Tetrachloroethane		1.10E+04	1.09E-02	1.09E-02	2.60E+03	1.10E+04	2.53E-02	2.47E-02	6.02E+03	1.10E+04	5.88E-02	5.79E-02	1.40E+04
1,1,2,2-Tetrachloroethane		1.10E+04	2.81E-02	2.74E-02	2.67E+03	1.10E+04	5.75E-02	5.49E-02	5.46E+03	1.10E+04	1.86E-02	1.73E-02	1.20E+04
1,1,1-Trichloroethane		1.14E+06	6.60E-02	6.60E-02	1.43E+03	1.14E+06	1.38E-03	1.39E-03	2.92E+03	1.14E+06	2.96E-03	2.95E-03	6.39E+03
1,1,2-Trichloroethane		7.62E+03	9.63E-01	9.61E-01	4.03E+03	7.62E+03	1.04E-02	1.00E-02	8.21E+03	7.62E+03	4.02E-02	3.92E-02	1.80E+04
1,1-Dichloroethane		8.76E+04	2.43E-01	2.43E-01	2.23E+03	8.76E+04	4.39E-01	4.30E-01	3.94E+03	8.76E+04	8.88E-01	8.87E-01	7.94E+03
1,2-Dichloroethane		2.29E+02	6.73E-01	6.71E-01	3.41E+03	2.29E+02	9.71E-01	9.87E-01	4.91E+03	2.29E+02	1.67E-01	1.65E-01	8.43E+03
1,2,4-Trimethylbenzene		NR	3.29E-02	NR	4.74E+02	NR	6.41E-02	NR	1.16E+03	NR	1.04E-02	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
1,2-Dichloropropane		2.57E+04	3.14E-01	3.13E-01	1.19E+03	2.57E+04	5.54E-01	5.54E-01	2.11E+03	2.57E+04	1.11E-01	1.11E-01	4.24E+03
Carbon Tetrachloride (tetrachloromethane)		7.62E+03	2.87E+00	2.87E+00	1.52E+03	7.62E+03	6.29E+00	6.28E+00	3.32E+03	7.62E+03	1.43E+01	1.42E+01	7.54E+03
Chloroethane		NR	9.91E-04	NR	2.61E+03	NR	1.22E-03	NR	3.54E+03	NR	1.97E-03	NR	5.71E+03
Chloromethane		NR	9.94E-01	NR	1.91E+03	NR	1.11E+00	NR	2.24E+03	NR	1.49E+00	NR	2.99E+03
Cis 1,2-Dichloroethene		1.36E+01	NR	NR	3.94E+03	1.36E+01	NR	NR	6.61E+03	4.44E+01	NR	NR	1.29E+04
Dichloromethane		9.04E+03	2.63E-02	2.67E-02	7.27E+03	9.04E+03	3.59E-02	1.79E-02	9.68E+03	9.04E+03	5.53E-02	5.26E-02	1.53E+04
Tetrachloroethene		1.12E+04	1.06E-01	1.06E-01	4.24E+02	1.12E+04	4.17E-01	4.16E-01	9.51E+02	1.12E+04	5.57E-01	5.49E-01	2.18E+03
Trans 1,2-Dichloroethene		3.23E+04	2.87E-01	NR	3.42E+03	3.23E+04	2.74E-01	NR	6.17E+03	3.23E+04	7.63E-01	NR	1.26E+04
Trichloroethene		9.93E-02	1.23E+00	1.23E+00	1.54E+03	9.93E-02	2.58E+00	2.57E+00	3.22E+03	9.93E-02	5.72E+00	5.69E+00	7.14E+03
Vinyl Chloride (chloroethene)		2.87E-01	9.94E-02	9.94E-02	1.36E+03	2.87E-01	7.70E-02	7.87E-02	1.76E+03	2.87E-01	1.10E-01	1.17E-01	2.69E+03
Semi-Volatile Organic Compounds													
2-Chloronaphthalene		1.53E+05	3.71E+02	3.70E+02	1.14E+02	1.53E+05	9.07E+02	9.02E+02	2.80E+02	1.53E+05	2.13E+03	2.10E+03	6.69E+02
Acenaphthene		1.10E+05	2.75E+06	1.06E+06	5.70E+01	1.10E+05	5.26E+06	1.08E+06	1.41E+02	1.10E+05	8.82E+06	1.08E+06	3.36E+02
Acenaphthylene		1.10E+05	2.68E+06	1.05E+06	8.61E+01	1.10E+05	5.23E+06	1.07E+06	2.12E+02	1.10E+05	8.65E+06	1.08E+06	5.06E+02
Anthracene		5.49E+05	1.13E+07	5.23E+06	1.17E+00	5.49E+05	2.25E+07	5.36E+06	2.91E+00	5.49E+05	4.12E+07	5.42E+06	6.96E+00
Benzo(a)anthracene		2.84E+02	4.08E+02	1.67E+02	1.71E+00	2.84E+02	4.47E+02	1.74E+02	4.28E+00	2.84E+02	4.67E+02	1.76E+02	1.03E+01
Benzo(a)pyrene	(a)	7.66E+01	2.94E+02	5.59E+01	9.11E-01	7.66E+01	2.09E+02	5.61E+01	2.28E+00	7.66E+01	2.11E+02	5.62E+01	5.46E+00

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL



Table 3

Human health generic assessment criteria by pathway for commercial scenario

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	
Benzo(b)fluoranthene		7.13E+01	1.17E+02	4.43E+01	1.22E+00	7.13E+01	1.20E+02	4.47E+01	3.04E+00	7.13E+01	1.21E+02	4.49E+01	7.29E+00
Benzo(g,h,i)perylene		6.29E+03	1.05E+04	3.99E+03	1.54E-02	6.29E+03	1.06E+04	3.95E+03	3.85E-02	6.29E+03	1.07E+04	3.96E+03	9.23E-02
Benzo(k)fluoranthene		1.89E+03	3.11E+03	1.17E+03	6.87E-01	1.89E+03	3.17E+03	1.18E+03	1.72E+00	1.89E+03	3.21E+03	1.19E+03	4.12E+00
Chrysene		5.67E+02	8.89E+02	3.46E+02	4.40E-01	5.67E+02	9.25E+02	3.52E+02	1.10E+00	5.67E+02	9.47E+02	3.59E+02	2.64E+00
Dibenz(a,h)anthracene		5.67E+00	9.32E+00	3.93E+00	3.93E-03	5.67E+00	9.59E+00	3.95E+00	9.82E-03	5.67E+00	9.64E+00	3.97E+00	2.36E-02
Fluoranthene		2.29E+04	1.89E+06	2.28E+04	1.89E+01	2.29E+04	2.72E+06	2.27E+04	4.73E+01	2.29E+04	1.92E+06	2.27E+04	1.13E+02
Fluorene		7.31E+04	4.55E+05	6.30E+04	3.09E+01	7.31E+04	1.06E+06	6.84E+04	7.65E+01	7.31E+04	2.24E+06	7.08E+04	1.83E+02
Hexachloroethane		2.09E+01	NR	NR	8.17E+00	4.96E+01	NR	NR	2.01E+01	1.11E+02	NR	NR	4.81E+01
Indeno(1,2,3-cd)pyrene		8.10E+02	1.31E+03	5.01E+02	6.13E-02	8.10E+02	1.35E+03	5.06E+02	1.53E-01	8.10E+02	1.37E+03	5.09E+02	3.68E-01
Naphthalene		3.64E+04	1.87E+03	1.78E+03	7.64E+01	3.64E+04	4.39E+03	3.92E+03	1.83E+02	3.64E+04	9.94E+03	7.81E+03	4.32E+02
Phenanthrene		2.29E+04	9.35E+05	2.19E+04	3.60E-01	2.29E+04	1.09E+06	2.24E+04	8.96E-01	2.29E+04	1.89E+06	2.29E+04	2.14E+02
Pyrene		5.49E+04	4.47E+06	5.48E+04	2.20E+00	5.49E+04	6.46E+06	5.44E+04	5.49E+00	5.49E+04	7.81E+06	5.49E+04	1.32E+01
Phenol		1.10E+06	2.65E+04	2.59E+04	2.42E+04	1.10E+06	3.04E+04	2.86E+04	3.81E+04	1.10E+06	3.46E+04	3.34E+04	7.03E+04
Total petroleum hydrocarbons													
Aliphatic hydrocarbons >EC5-EC6		4.77E+06	3.19E+03	3.19E+03	3.04E+02	4.77E+06	5.86E+03	5.86E+03	5.58E+02	4.77E+06	1.21E+04	1.21E+04	1.15E+03
Aliphatic hydrocarbons >EC6-EC8		4.77E+06	7.79E+03	7.78E+03	1.44E+02	4.77E+06	1.74E+04	1.74E+04	3.22E+02	4.77E+06	3.97E+04	3.96E+04	7.36E+02
Aliphatic hydrocarbons >EC8-EC10		9.53E+04	2.02E+03	2.00E+03	7.77E+01	9.53E+04	4.91E+03	4.85E+03	1.90E+02	9.53E+04	1.17E+04	1.13E+04	4.51E+02
Aliphatic hydrocarbons >EC10-EC12		9.53E+04	9.97E+03	9.69E+03	4.75E+01	9.53E+04	2.47E+04	2.29E+04	1.18E+02	9.53E+04	5.89E+04	4.73E+04	2.83E+02
Aliphatic hydrocarbons >EC12-EC16		9.53E+04	8.26E+04	5.88E+04	2.37E+01	9.53E+04	2.04E+05	8.17E+04	5.91E+01	9.53E+04	4.81E+05	9.02E+04	1.42E+02
Aliphatic hydrocarbons >EC16-EC35	(b)	1.59E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.59E+06	NR	NR	5.09E+01
Aliphatic hydrocarbons >EC35-EC44	(b)	1.59E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.59E+06	NR	NR	5.09E+01
Aromatic hydrocarbons >EC8-EC10		3.81E+04	3.55E+03	3.46E+03	6.13E+02	3.81E+04	8.66E+03	8.11E+03	1.50E+03	3.81E+04	2.05E+04	1.70E+04	3.58E+03
Aromatic hydrocarbons >EC10-EC12		3.81E+04	1.92E+04	1.62E+04	3.64E+02	3.81E+04	4.69E+04	2.79E+04	8.99E+02	3.81E+04	1.10E+05	3.42E+04	2.15E+03
Aromatic hydrocarbons >EC12-EC16		3.81E+04	2.02E+05	3.62E+04	1.69E+02	3.81E+04	4.76E+05	3.73E+04	4.19E+02	3.81E+04	1.03E+06	3.70E+04	1.00E+03
Aromatic hydrocarbons >EC16-EC21	(b)	2.82E+04	NR	NR	5.37E+01	2.82E+04	NR	NR	1.34E+02	2.84E+04	NR	NR	3.21E+02
Aromatic hydrocarbons >EC21-EC35	(b)	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01
Aromatic hydrocarbons >EC35-EC44	(b)	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01

Notes:

EC - equivalent carbon, GRAC - groundwater screening value, SAC - soil screening value.

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 dependent 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 naphthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor or 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 barium 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 - COMMERCIAL



Table 4
Human Health Generic Assessment Criteria for Commercial Scenario

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	640	640	640
Barium	22,000	22,000	22,000
Beryllium	12	12	12
Boron	240,000	240,000	240,000
Cadmium	410	410	410
Chromium (III) - trivalent	8,600	8,600	8,600
Chromium (VI) - hexavalent	49	49	49
Copper	68,000	68,000	68,000
Lead	2,300	2,300	2,300
Elemental Mercury (Hg ⁰)	15 (4)	33 (11)	58 (26)
Inorganic Mercury (Hg ²⁺)	1,120	1,120	1,120
Methyl Mercury (Hg ⁺)	290 (73)	310 (142)	320
Nickel	980	980	980
Selenium	12,000	12,000	12,000
Vanadium	9,000	9,000	9,000
Zinc	740,000	740,000	740,000
Cyanide (free)	650	650	650
Volatile Organic Compounds			
Benzene	27	50	98
Toluene	56,000 (869)	107,000 (1,916)	184,000 (4,357)
Ethylbenzene	6,000 (518)	13,000 (1,216)	27,000 (2,844)
Xylene - m	6,200 (625)	14,100 (1,474)	31,200 (3,457)
Xylene - o	6,600 (478)	15,000 (1,120)	33,000 (2,618)
Xylene - p	5,900 (576)	13,600 (1,353)	30,000 (3,167)
Total xylene	5,900 (625)	13,600 (1,474)	30,000 (3,457)
Methyl tertiary-Butyl ether (MTBE)	7,500	12,100	22,400
1,1,1,2-Tetrachloroethane	110	250	560
1,1,2,2-Tetrachloroethane	270	550	1,130
1,1,1-Trichloroethane	700	1,300	3,000
1,1,2-Trichloroethane	89	180	382
1,1-Dichloroethane	24	43	87
1,2-Dichloroethane	0.67	0.97	1.65
1,2,4-Trimethylbenzene	330	640	1,040
1,3,5-Trimethylbenzene	NR	NR	NR
1,2-Dichloropropane	3	6	11
Carbon Tetrachloride (tetrachloromethane)	2.9	6.3	14.2
Chloroethane	901	1,223	1,972
Chloromethane	1.0	1.1	1.5
Cis-1,2-Dichloroethene	14	23	44
Dichloromethane	257	339	526
Tetrachloroethene	20	40	90
Trichloroethene	1	3	6
Trans-1,2-Dichloroethene	21	37	76
Trichloroethene	1	3	6
Vinyl Chloride (chloroethene)	0.06	0.08	0.12
Semi-Volatile Organic Compounds			
2-Chloronaphthalene	370 (114)	902 (280)	2,098 (669)
Acenaphthene	110,000	110,000	110,000
Acenaphthylene	110,000	110,000	110,000
Anthracene	520,000	540,000	540,000
Benzo(a)anthracene	170	170	180
Benzo(a)pyrene	77	77	77
Benzo(b)fluoranthene	44	45	45
Benzo(g,h,i)perylene	3,900	3,900	4,000
Benzo(k)fluoranthene	1,200	1,200	1,200
Chrysene	350	350	350
Dibenzo(a,h)anthracene	3.5	3.6	3.6
Fluoranthene	23,000	23,000	23,000
Fluorene	63,000 (31)	68,000	71,000
Hexachlorocyclopentadiene	21 (8)	50 (20)	111 (48)
Indeno(1,2,3-cd)pyrene	500	510	510
Naphthalene	1,800 (76)	3,900 (183)	7,800 (432)
Phenanthrene	22,000	22,000	23,000
Pyrene	54,000	54,000	54,000
Phenol	440*	690*	1,300*
Total Petroleum Hydrocarbons			
Aliphatic hydrocarbons EC ₅ -EC ₈	3,200 (304)	5,900 (558)	12,100 (1,150)
Aliphatic hydrocarbons >EC ₈ -EC ₉	7,800 (144)	17,400 (322)	39,600 (736)
Aliphatic hydrocarbons >EC ₉ -EC ₁₀	2,000 (78)	4,800 (190)	11,300 (451)
Aliphatic hydrocarbons >EC ₁₀ -EC ₁₂	9,700 (48)	22,900 (118)	47,300 (283)
Aliphatic hydrocarbons >EC ₁₂ -EC ₁₆	59,000 (24)	82,000 (59)	90,000 (142)
Aliphatic hydrocarbons >EC ₁₆ -EC ₃₅	1,000,000**	1,000,000**	1,000,000**
Aliphatic hydrocarbons >EC ₃₅ -EC ₄₄	1,000,000**	1,000,000**	1,000,000**
Aromatic hydrocarbons >EC ₈ -EC ₁₀	3,500 (613)	8,100 (1,503)	17,000 (3,580)
Aromatic hydrocarbons >EC ₁₀ -EC ₁₂	16,000 (364)	28,000 (899)	34,000 (2,150)
Aromatic hydrocarbons >EC ₁₂ -EC ₁₅	36,000 (169)	37,000	38,000
Aromatic hydrocarbons >EC ₁₆ -EC ₂₁	28,000	28,000	28,000
Aromatic hydrocarbons >EC ₂₁ -EC ₃₅	28,000	28,000	28,000
Aromatic hydrocarbons >EC ₃₅ -EC ₄₄	28,000	28,000	28,000
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: ¹ 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. GAC - groundwater assessment criteria. SAC - soil assessment criteria. * The GAC for Phenol is based on a threshold which is protective of direct contact (SC050021/Phenol SGV report) ** Denoted SAC calculated exceeds 100% contaminant, hence 100% (1,000,000mg/kg) has been taken as SAC 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 naphthalene, 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/CI/1H 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.			

Generic assessment criteria for human health: Public open space (near residential housing) scenario

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. The publication of C4SL introduced two new land-use scenarios relating to public open spaces.

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 have been applied to the RSK GAC. The current RSK GAC also use 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 v1.06, supporting EA guidance^(5,8,9) and revised exposure scenarios published for the C4SL⁽³⁾.

Conceptual model

This GAC derivation considers POS_{Resi} to relate to public open space in close proximity to residential housing. This includes predominantly grassed areas adjacent to high-density housing such as a green surrounded by houses, in accordance with the C4SL POS_{Resi} land-use scenario⁽³⁾. This would also include smaller areas incorporated in newer developments.

The POS_{Resi} scenario considers risk to a child receptor (female) between the ages of >3 and <9 years old. In accordance with Section 3.6.3.3 of the SP1010 project report⁽³⁾, exposure assumptions are based on the adaptation of the CLEA residential land-use scenario without consumption of home-grown produce and vapour ingress to the building. The pathways considered for production of the SAC in the POS_{Resi} scenario are

- ingestion of soil and dust (outdoors and indoors respectively)

- dermal contact with soil (outdoors; and soil-derived dust indoors)
- inhalation of dust (outdoors and indoors)
- inhalation of vapours outdoors.

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 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 correction factor of 10 into the CLEA chemical database for all petroleum hydrocarbons (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⁽¹¹⁾ 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 C₅–C₈ were not modelled, as this range comprises benzene (>EC5-EC7) and toluene (>EC7-EC8), which are modelled separately.

Physical parameters

For the POS_{Resi} scenario, project report SP1010⁽³⁾ considers the potential for soil to be tracked into nearby houses with the potential for ingestion and inhalation of dust within the house. The CLEA default building is a small, two-storey terrace house.

POS_{resi} is considered to be a predominantly grassed area of up to 500m² (0.05 ha) with up to 50% potentially being bare soil. The input parameters were based on the air dispersion model and the vapour model detailed in SR3⁽⁵⁾. Full details of the land use scenario are presented in Table 3.6 of project report SP1010⁽³⁾.

The parameters for a sandy loam soil type were used in line with 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 parameter, RSK has produced an additional set of SAC for an SOM of 1% and 2.5%.

The SAC were produced using the input parameters in Table 1 below and Table 3.6 of project report SP1010⁽³⁾. The GAC by pathway are presented in Table 2 and the combined GAC presented in Table 3.

Figure 1: Conceptual model for CLEA public open space (residential) scenario

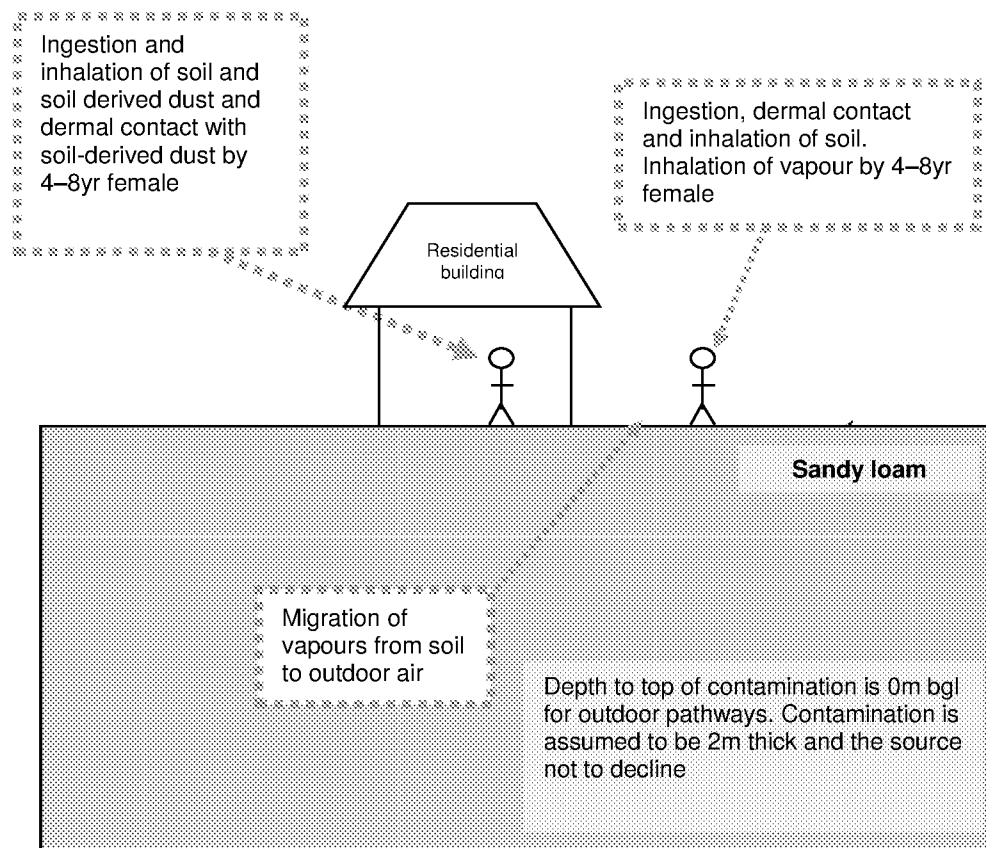


Table 1: Exposure assessment parameters for public open space (residential) scenario – inputs for CLEA model

Parameter	Value	Justification
Land use	Public open space (residential)	Chosen land use. Table 3.6 of SP1010 ⁽³⁾
Receptor	Female child	Taken as female child exposed over 6 years from 4 to 8 years, Table 3.6, SP1010 ⁽⁵⁾
Soil type	Sandy loam	Most common UK soil type (Section 4.3.1, Table 4.4, SR3 ⁽⁵⁾).
Start age class (AC)	4	Range of AC corresponding to key generic assumption that the critical receptor is a young female child aged 4–8 years (>3-<9). From Table 3.6, SP1010 ⁽⁵⁾
End AC	9	
SOM (%)	6	Representative of sandy loam 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

References

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GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - PUBLIC OPEN SPACE (IN CLOSE PROXIMITY TO RESIDENTIAL HOUSING)

Table 2
Human Health Generic Assessment Criteria for Public Open Space (in close proximity to residential housing)

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)	7.92E-01	5.31E-02	NR	NR	7.92E-01	5.31E-02	NR	NR	7.92E-01	5.31E-02	NR	NR
Barium	(b)	2.06E+03		NR	NR	2.06E+03		NR	NR	2.06E+03		NR	NR
Beryllium		3.91E-02	2.19E+00	NR	NR	3.91E-02	2.19E+00	NR	NR	3.91E-02	2.19E+00	NR	NR
Boron		2.15E+04	6.62E+06	NR	NR	2.15E+04	6.62E+06	NR	NR	2.15E+04	6.62E+06	NR	NR
Cadmium	(a)	3.64E+02	4.94E+02	2.20E+02	NR	3.64E+02	4.94E+02	2.20E+02	NR	3.64E+02	4.94E+02	2.20E+02	NR
Chromium (III) - trivalent	(c)	3.99E-04	1.54E+03	NR	NR	3.99E-04	1.54E+03	NR	NR	3.99E-04	1.54E+03	NR	NR
Chromium (VI) - hexavalent	(a,d)	1.18E+02	2.08E+01	NR	NR	1.18E+02	2.08E+01	NR	NR	1.18E+02	2.08E+01	NR	NR
Copper		2.19E+04	1.95E+04	1.20E+04	NR	2.19E+04	1.89E+04	1.20E+04	NR	2.19E+04	1.95E+04	1.20E+04	NR
Lead	(a)	6.26E+02	NR	NR	NR	6.26E+02	NR	NR	NR	6.26E+02	NR	NR	NR
Elemental Mercury (Hg ⁰)	(d)	NR	1.57E+01	NR	4.31E+00	NR	1.56E+01	NR	1.07E+01	NR	1.56E+01	NR	2.58E+01
Inorganic Mercury (Hg ²⁺)		1.28E-02	4.62E+03	1.24E-02	NR	1.28E-02	4.62E+03	1.24E-02	NR	1.28E-02	4.62E+03	1.24E-02	NR
Methyl Mercury (Hg ^M)		3.97E+01	5.86E+03	3.94E+01	7.33E+01	3.97E+01	7.06E+03	3.95E+01	1.42E+02	3.97E+01	6.43E+03	3.95E+01	3.04E+02
Nickel	(d)	3.74E-02	2.31E+02	NR	NR	3.74E-02	2.31E+02	NR	NR	3.74E-02	2.31E+02	NR	NR
Selenium	(b)	1.14E+03	NR	NR	NR	1.14E+03	NR	NR	NR	1.14E+03	NR	NR	NR
Vanadium		2.47E+03	1.99E+03	NR	NR	2.47E+03	1.99E+03	NR	NR	2.47E+03	1.99E+03	NR	NR
Zinc	(b)	6.08E+04	4.62E+07	NR	NR	6.08E+04	4.62E+07	NR	NR	6.08E+04	4.62E+07	NR	NR
Cyanide (free)		6.02E+01	1.75E+04	6.01E+01	NR	6.02E+01	1.75E+04	6.01E+01	NR	6.02E+01	1.75E+04	6.01E+01	NR
Volatile Organic Compounds													
Benzene	(a)	1.44E-02	8.39E-03	1.41E-02	1.22E-03	1.44E-02	1.12E-04	1.42E-02	2.26E-03	1.44E-02	1.58E-04	1.43E+02	4.71E-03
Toluene		5.61E+04	6.86E+06	5.57E+04	8.69E+02	5.61E+04	9.88E+06	5.58E+04	1.92E+03	5.61E+04	1.42E+07	5.59E+04	4.36E+03
Ethylbenzene		2.52E-04	4.74E-05	2.29E-04	5.18E-02	2.52E-04	6.95E-05	2.43E-04	1.22E+03	2.52E-04	9.98E+05	2.46E+04	2.84E+03
Xylene - m		4.53E+04	4.14E+05	4.06E-04	6.25E-02	4.53E-04	6.05E-05	4.22E+04	1.47E+03	4.53E-04	8.62E+05	4.31E+04	3.46E+03
Xylene - o		4.53E+04	4.26E+05	4.10E+04	4.78E-02	4.53E-04	6.22E+05	4.23E+04	1.12E+03	4.53E+04	8.64E+05	4.32E+04	2.62E+03
Xylene - p		4.53E+04	4.07E+05	4.08E-04	5.76E+02	4.53E-04	5.93E+05	4.22E+04	1.35E+03	4.53E-04	8.46E+05	4.31E+04	3.17E+03
Total xylene		4.53E-04	4.07E+05	4.06E-04	6.25E+02	4.53E-04	5.93E+05	4.22E+04	1.47E+03	4.53E-04	8.46E+05	4.31E+04	3.46E+03
Methyl tertiary-Butyl ether (MTBE)		7.57E-04	5.10E-06	7.46E-04	2.04E-04	7.57E-04	6.33E+06	7.46E-04	3.31E+04	7.57E-04	6.36E+06	7.51E-04	6.27E+04
Trichloroethene		1.26E+02	1.94E+03	1.19E-02	1.54E+03	1.26E-02	2.78E+03	1.21E+02	3.22E+03	1.26E-02	3.98E+03	1.22E+02	7.14E+03
Tetrachloroethene		1.44E+03	1.97E+04	1.39E+03	4.24E+02	1.44E+03	2.88E+04	1.40E+03	9.51E+02	1.44E+03	4.21E+04	1.41E+03	2.18E+03
1,1,1-Trichloroethane		1.51E-05	1.46E-06	1.37E-05	1.43E+03	1.51E-05	2.06E+06	1.41E-05	2.92E+03	1.51E-05	2.98E+06	1.44E-05	6.39E+03
1,1,1,2-Tetrachloroethane		1.45E-03	5.44E+04	1.41E+03	2.60E+03	1.45E-03	7.78E+04	1.42E+03	6.02E+03	1.45E+03	1.09E+05	1.43E+03	1.40E+04
1,1,2,2-Tetrachloroethane		1.45E+03	6.07E+04	1.42E+03	2.67E+03	1.45E-03	1.07E+05	1.43E+03	5.46E+03	1.45E+03	1.42E+05	1.43E+03	1.20E+04
Carbon Tetrachloride		1.01E+03	4.06E+03	8.96E-02	1.52E+03	1.01E+03	5.95E+03	8.23E+02	3.32E+03	1.01E+03	6.76E+03	9.50E+02	7.54E+03
1,2-Dichloroethane		3.02E-01	6.29E-02	2.89E+01	3.41E+03	3.02E-01	7.49E-02	2.81E+01	4.91E+03	3.02E-01	9.52E-02	2.94E+01	8.43E+03
Vinyl Chloride		3.53E+00	2.95E+02	3.49E+00	1.36E+03	3.53E+00	3.35E+02	3.30E+00	1.76E+03	3.53E+00	4.13E+02	3.50E+00	2.69E+03
1,2,4-Trimethylbenzene		NR	2.48E+02	NR	4.74E+02	NR	2.48E+02	NR	1.16E+03	NR	2.50E+02	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		1.49E-04	3.29E+06	1.48E-04	5.70E+01	1.49E-04	3.64E+06	1.48E-04	1.41E+02	1.49E-04	3.94E+06	1.48E-04	3.36E+02
Acenaphthylene		1.49E-04	3.21E+06	1.48E-04	8.61E+01	1.49E-04	3.61E+06	1.48E-04	2.12E+02	1.49E-04	3.91E+06	1.48E-04	5.06E+02
Anthracene		7.44E-04	1.94E+07	7.41E-04	1.17E+00	7.44E-04	2.06E+07	7.41E-04	2.91E+00	7.44E-04	2.14E+07	7.41E-04	6.96E+00
Benzo(a)anthracene		3.84E-01	1.11E+02	2.85E-01	1.71E+00	3.84E-01	1.13E+02	2.86E-01	4.28E+00	3.84E-01	1.14E+02	2.87E-01	1.03E+01
Benzo(a)pyrene	(a)	1.04E+01	3.88E+01	NR	9.11E-01	1.04E+01	3.93E+01	NR	2.28E+00	1.04E+01	3.95E+01	NR	5.46E+00
Benzo(b)fluoranthene		9.67E+00	2.83E+01	7.21E+00	1.22E+00	9.67E+00	2.86E+01	7.23E+00	3.04E+00	9.67E+00	2.89E+01	7.24E+00	7.29E+00
Benzo(g,h,i)perylene		6.53E+02	2.50E+03	6.36E-02	1.54E-02	6.53E-02	2.51E+03	6.37E+02	3.85E-02	6.53E-02	2.52E+03	6.37E+02	9.23E-02
Benzo(k)fluoranthene		2.55E-02	7.49E-02	1.90E-02	6.87E-01	2.55E-02	7.56E-02	1.91E-02	1.72E+00	2.55E-02	7.61E-02	1.91E-02	4.12E+00
Chrysene		7.68E-01	2.21E+02	5.70E-01	4.40E-01	7.68E-01	2.24E+02	5.72E-01	1.10E+00	7.68E-01	2.27E+02	5.74E-01	2.64E+00
Dibenz(a,h)anthracene		7.68E-01	2.25E+00	5.73E-01	3.93E-03	7.68E-01	2.27E+00	5.74E-01	9.82E-03	7.68E-01	2.29E+00	5.75E-01	2.36E-02
Fluoranthene		3.10E-03	8.82E-05	3.08E-03	1.89E-01	3.10E-03	9.10E-05	3.09E+03	4.73E+01	3.10E+03	9.27E-05	3.09E-03	1.13E+02
Fluorene		9.91E+03	2.34E+06	9.87E-03	3.09E+01	9.91E+03	2.57E+06	9.87E+03	7.65E+01	9.91E+03	2.73E+06	9.87E+03	1.83E+02
Indeno(1,2,3-cd)pyrene		1.10E+02	3.18E+02	8.17E+01	6.13E-02	1.10E+02	3.24E+02	8.20E+01	1.53E-01	1.10E+02	3.26E+02	8.22E+01	3.68E-01
Naphthalene		4.89E+03	1.93E+04	3.90E+03	7.64E-01	4.89E+03	2.93E+04	4.10E+03	1.83E+02	4.89E+03	3.16E+04	4.24E+03	4.32E+02
Phenanthrene		3.08E+03	8.12E+05	3.07E-03	3.60E+01	3.08E+03	8.61E+05	3.07E-03	8.96E+01	3.08E+03	8.94E+05	3.07E+03	2.14E+02

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - PUBLIC OPEN SPACE (IN CLOSE PROXIMITY TO RESIDENTIAL HOUSING)



Table 2

Human Health Generic Assessment Criteria for Public Open Space (in close proximity to residential housing)

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	
Pyrene		7.43E+03	2.11E+06	7.41E+03	2.20E+00	7.43E+03	2.18E+06	7.41E+03	5.49E+00	7.43E+03	2.22E+06	7.41E+03	1.32E+01
Phenol		1.31E+05	1.11E+04	1.03E+04	2.42E+04	1.31E+05	1.12E+04	1.03E+04	3.81E+04	1.31E+05	1.12E+04	1.03E+04	7.03E+04
Total Petroleum Hydrocarbons													
Aliphatic hydrocarbons <EC ₁₇ -EC ₆		6.31E+05	2.03E+06	5.75E+05	3.04E+02	6.31E+05	2.74E+06	5.91E+05	5.58E+02	6.31E+05	3.92E+06	6.04E+05	1.15E+03
Aliphatic hydrocarbons >EC ₆ -EC ₅		6.31E+05	3.16E+06	5.97E+05	1.44E+02	6.31E+05	4.68E+06	6.09E+05	3.22E+02	6.31E+05	6.99E+06	6.16E+05	7.36E+02
Aliphatic hydrocarbons >EC ₆ -EC ₁₀		1.26E+04	3.89E+05	1.25E+04	7.77E+01	1.26E+04	5.88E+05	1.26E+04	1.90E+02	1.26E+04	8.71E+05	1.26E+04	4.51E+02
Aliphatic hydrocarbons >EC ₁₀ -EC ₁₃		1.26E+04	8.12E+05	1.26E+04	4.75E+01	1.26E+04	1.23E+06	1.26E+04	1.18E+02	1.26E+04	1.80E+06	1.26E+04	2.83E+02
Aliphatic hydrocarbons >EC ₁₃ -EC ₁₆		1.26E+04	2.07E+06	1.26E+04	2.37E+01	1.26E+04	2.95E+06	1.26E+04	5.91E+01	1.26E+04	3.99E+06	1.26E+04	1.42E+02
Aliphatic hydrocarbons >EC ₁₆ -EC ₂₀	(b)	2.51E+05	NR	NR	8.48E+00	2.51E+05	NR	NR	2.12E+01	2.51E+05	NR	NR	5.09E+01
Aliphatic hydrocarbons >EC ₂₀ -EC ₄₄	(b)	2.51E+05	NR	NR	8.48E+00	2.51E+05	NR	NR	2.12E+01	2.51E+05	NR	NR	5.09E+01
Aromatic hydrocarbons >EC ₉ -EC ₁₀		5.05E+03	2.16E+05	5.02E+03	6.13E+02	5.05E+03	3.21E+05	5.03E+03	1.50E+03	5.05E+03	4.60E+05	5.04E+03	3.58E+03
Aromatic hydrocarbons >EC ₁₀ -EC ₁₂		5.05E+03	4.48E+05	5.04E+03	3.64E+02	5.05E+03	6.34E+05	5.04E+03	8.99E+02	5.05E+03	8.52E+05	5.04E+03	2.15E+03
Aromatic hydrocarbons >EC ₁₂ -EC ₁₆		5.05E+03	1.02E+06	5.05E+03	1.69E+02	5.05E+03	1.29E+06	5.05E+03	4.19E+02	5.05E+03	1.52E+06	5.05E+03	1.00E+03
Aromatic hydrocarbons >EC ₁₆ -EC ₂₁	(b)	3.77E+03	NR	NR	5.37E+01	3.77E+03	NR	NR	1.34E+02	3.77E+03	NR	NR	3.21E+02
Aromatic hydrocarbons >EC ₂₁ -EC ₃₅	(b)	3.77E+03	NR	NR	4.83E+00	3.77E+03	NR	NR	1.21E+01	3.77E+03	NR	NR	2.90E+01
Aromatic hydrocarbons >EC ₃₅ -EC ₆₄	(b)	3.77E+03	NR	NR	4.83E+00	3.77E+03	NR	NR	1.21E+01	3.77E+03	NR	NR	2.90E+01

Notes:

Public open space (resi) and (park) GAC are based on the exposure parameters detailed within SP1010 "Development of Category 4 Screening Levels for Assessment of Land affected by Contamination", Final, 20th December 2013

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 naphthalene, 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, 5R3)

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

(b) SAC for barium 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.

(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

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	79	79	79
Barium	2,680	2,680	2,680
Beryllium	2.2	2.2	2.2
Boron	21,500	21,500	21,500
Cadmium	220	220	220
Chromium (III) - trivalent	1,540	1,540	1,540
Chromium (VI) - hexavalent	21	21	21
Copper	12,000	12,000	12,000
Lead	630	630	630
Elemental Mercury (Hg ⁰)	16	16	16
Inorganic Mercury (Hg ²⁺)	120	120	120
Methyl Mercury (Hg ⁺)	39	39	40
Nickel	230	230	230
Selenium	1,100	1,100	1,100
Vanadium	1,990	1,990	1,990
Zinc	81,000	81,000	81,000
Cyanide (free)	80	80	80
Volatile Organic Compounds			
Benzene	140	140	140
Toluene	55,700	55,800	55,900
Ethylbenzene	23,900	24,300	24,600
Xylene - m	40,800	42,200	43,100
Xylene - o	41,000	42,300	43,200
Xylene - p	40,800	42,200	43,100
Total xylene	40,800	42,200	43,100
Methyl tertiary-Butyl ether (MTBE)	74,600	74,800	75,100
Trichloroethene	120	120	120
Tetrachloroethene	1,400	1,400	1,400
1,1,1-Trichloroethane	140,000	140,000	140,000
1,1,1,2-Tetrachloroethane	1,400	1,400	1,400
1,1,2,2-Tetrachloroethane	1,400	1,400	1,400
Carbon Tetrachloride	886	923	950
1,2-Dichloroethane	29	29	29
Vinyl Chloride	3.5	3.5	3.5
1,2,4-Trimethylbenzene	250	250	250
1,3,5-Trimethylbenzene	NR	NR	NR
Semi-Volatile Organic Compounds			
Acenaphthene	14,800	14,800	14,800
Acenaphthylene	14,800	14,800	14,800
Anthracene	74,100	74,100	74,100
Benzo(a)anthracene	29	29	29
Benzo(a)pyrene	10	10	10
Benzo(b)fluoranthene	7	7	7
Benzo(g,h,i)perylene	640	640	640
Benzo(k)fluoranthene	190	191	191
Chrysene	57	57	57
Dibenzo(a,h)anthracene	0.57	0.57	0.58
Fluoranthene	3,100	3,100	3,100
Fluorene	9,900	9,900	9,900
Indeno(1,2,3-cd)pyrene	82	82	82
Naphthalene	4,900	4,900	4,900
Phenanthrene	3,100	3,100	3,100
Pyrene	7,400	7,400	7,400
Phenol	440*	690*	1,300*
Total Petroleum Hydrocarbons			
Aliphatic hydrocarbons EC ₅ -EC ₈	570,000 (304)	590,000	600,000
Aliphatic hydrocarbons >EC ₉ -EC ₉	600,000	610,000	620,000
Aliphatic hydrocarbons >EC ₉ -EC ₁₀	13,000	13,000	13,000
Aliphatic hydrocarbons >EC ₁₀ -EC ₁₂	13,000	13,000	13,000
Aliphatic hydrocarbons >EC ₁₂ -EC ₁₈	13,000	13,000	13,000
Aliphatic hydrocarbons >EC ₁₈ -EC ₃₅	250,000	250,000	250,000
Aliphatic hydrocarbons >EC ₃₅ -EC ₄₄	250,000	250,000	250,000
Aromatic hydrocarbons >EC ₈ -EC ₁₀	5,000	5,000	5,000
Aromatic hydrocarbons >EC ₁₀ -EC ₁₂	5,000	5,000	5,000
Aromatic hydrocarbons >EC ₁₂ -EC ₁₆	5,000	5,000	5,000
Aromatic hydrocarbons >EC ₁₈ -EC ₂₁	3,800	3,800	3,800
Aromatic hydrocarbons >EC ₂₁ -EC ₃₅	3,800	3,800	3,800
Aromatic hydrocarbons >EC ₃₅ -EC ₄₄	3,800	3,800	3,800
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. GRAC - groundwater assessment criteria. SAC - soil assessment criteria.			
* The GAC for Phenol is based on a threshold which is protective of direct contact (SC050021/Phenol SGV report)			
Public open space (res) and (park) GAC are based on the exposure parameters detailed within SP1010 "Development of Category 4 Screening Levels for Assessment of Land affected by Contamination", Final, 20th December 2013			
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 naphthalene, 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)	The SAC has been set as the model calculated SAC with the saturation limit shown in brackets.		

Generic assessment criteria for human health: residential scenario with 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, with the exception of the "top two" produce type approach taken in the C4SL, 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) for residential land use, reducing exposure frequency for dermal contact outdoors for residential land use, and updated produce type consumption rates (90th percentile) based on recent data from the National Diet and Nutrition Survey.

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 with 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 with home-grown produce scenario are

- direct soil and dust ingestion

- consumption of home-grown produce
- consumption of soil attached to home-grown produce
- 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⁽¹¹⁾ 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, methyl tertiary-butyl ether (MTBE), 1,1,2-trichloroethane, 1,1-dichloroethene, 1,2-dichloropropane, 2-chloronaphthalene, chloroethane, chloromethane, cis 1,2-dichloroethene, dichloromethane, hexachloroethane and trans 1,2-dichloroethene were obtained from the CL:AIRE Soil Generic Assessment Criteria report⁽¹¹⁾.

For TPH, aromatic hydrocarbons C₅–C₈ were not modelled, as this range comprises benzene (>EC5-EC7) and toluene (>EC7-EC8), which are modelled separately.

Physical parameters

For the residential with home-grown produce scenario, the CLEA default building is a small, two-storey terrace house with a concrete ground-bearing slab. The house is assumed to have a 100m² private garden consisting of lawn and flowerbeds, incorporating a 20m² plot for growing fruit and vegetables consumed by the residents. 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 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 with home-grown produce land-use scenario

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 Tables 2 and 3 below.

The final selected GAC are presented by pathway in Table 4 and the combined GAC in Table 5.