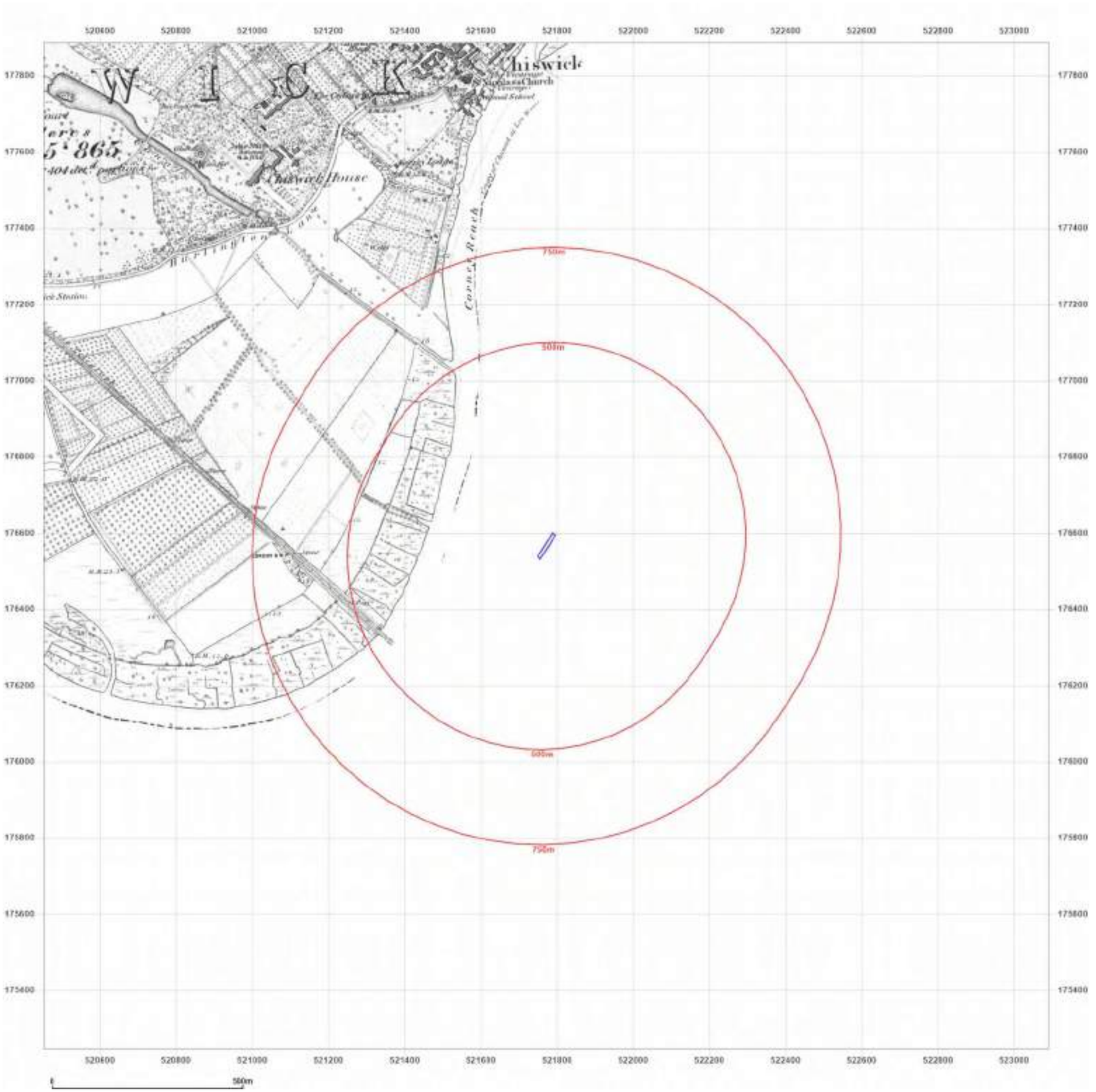

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: County Series
Map date: **1873**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
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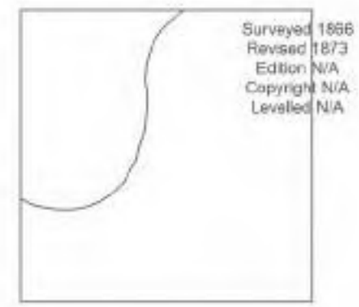

Powered by OS

Produced by
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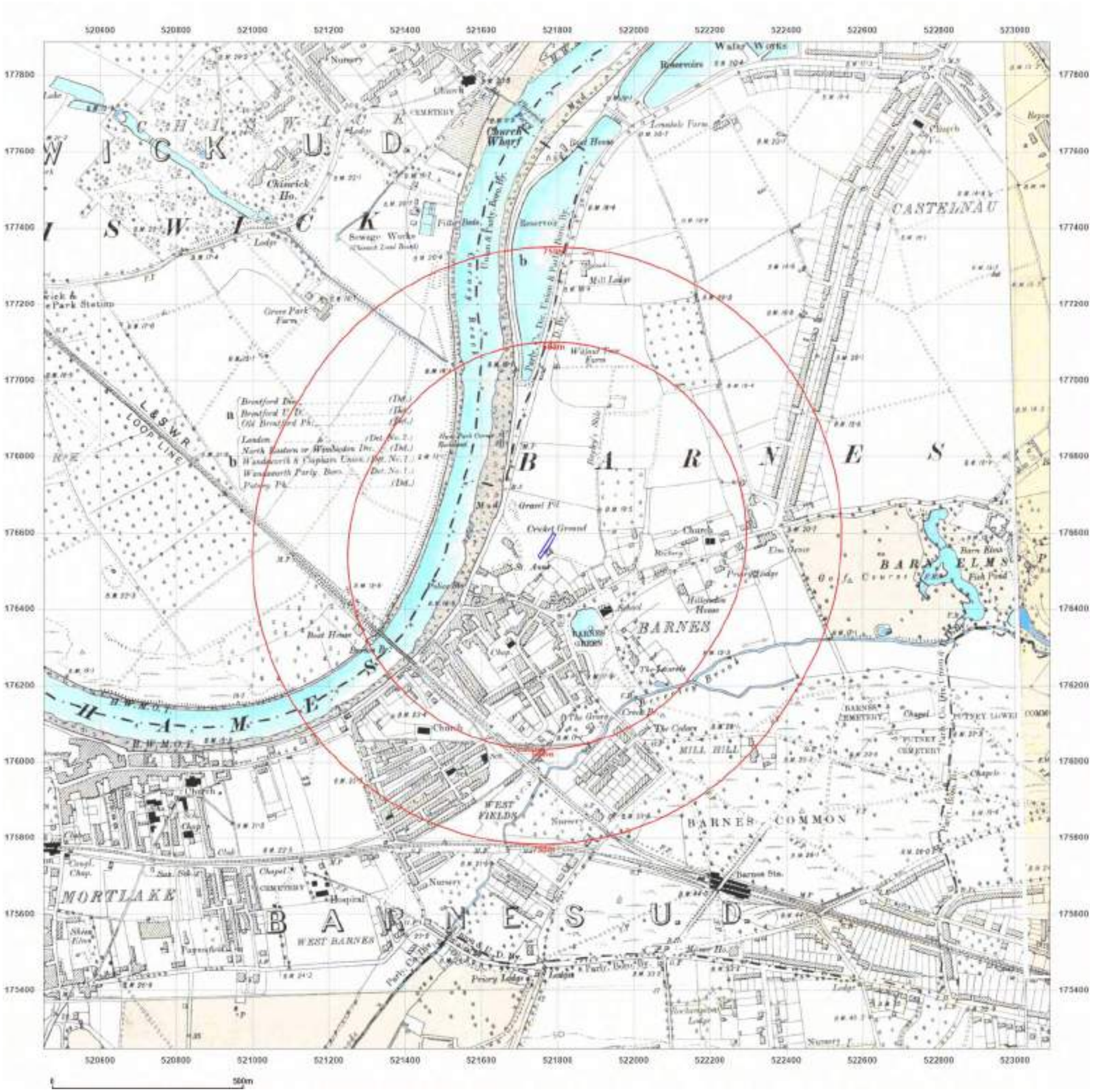
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 03 April 2024

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: County Series

Map date: **1893-1895**

Scale: 1:10,560

Printed at: 1:10,560

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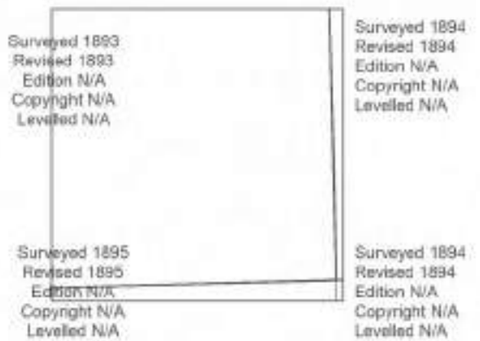

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Production date: 03 April 2024

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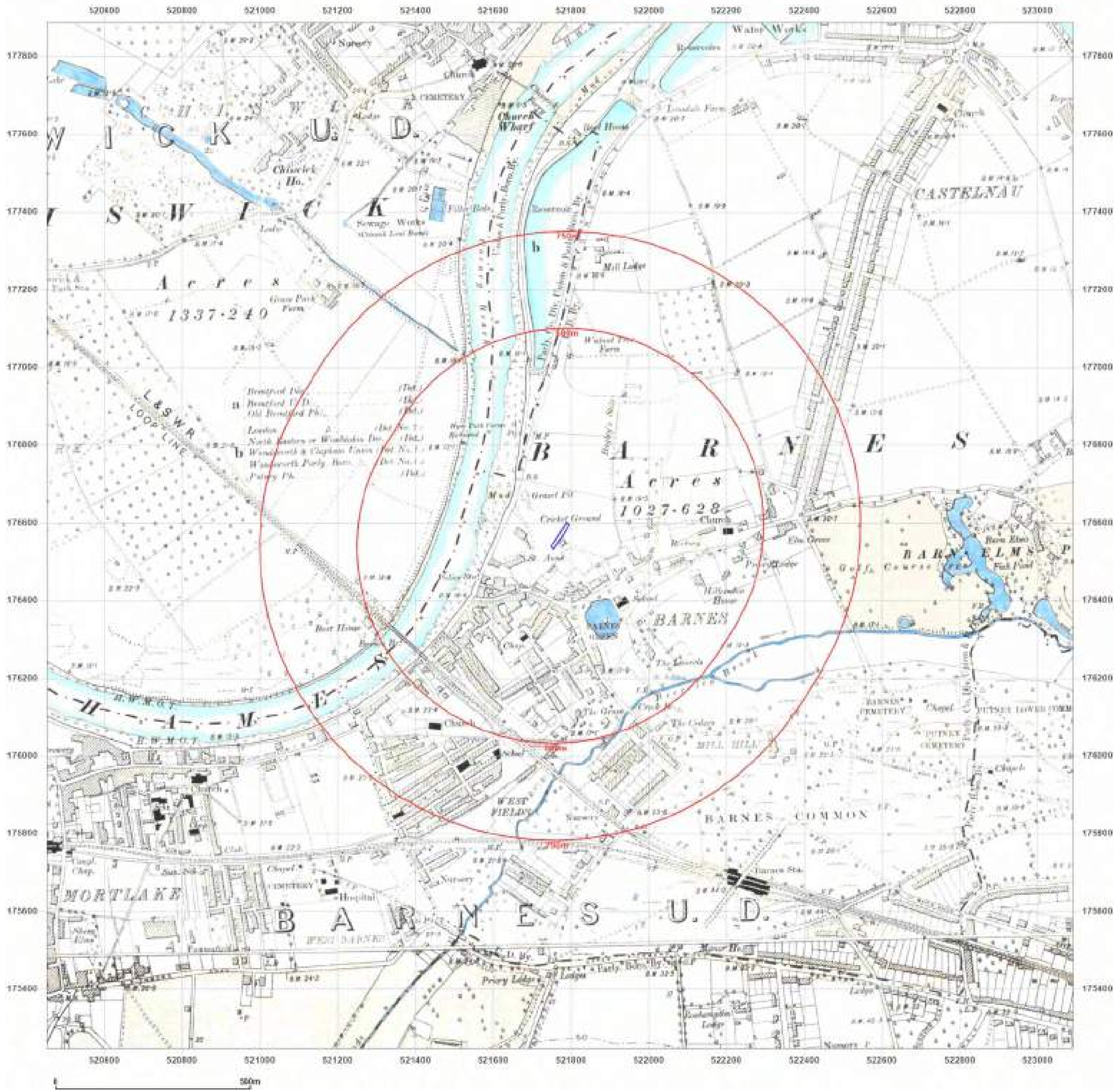

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: County Series

Map date: **1894-1895**

Scale: 1:10,560

Printed at: 1:10,560

N
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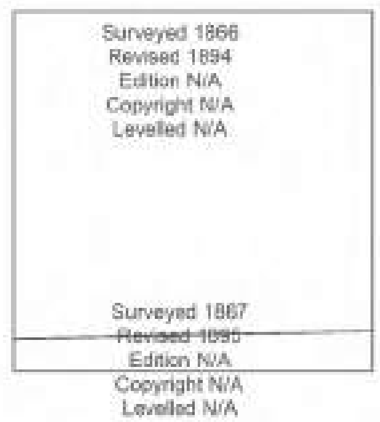

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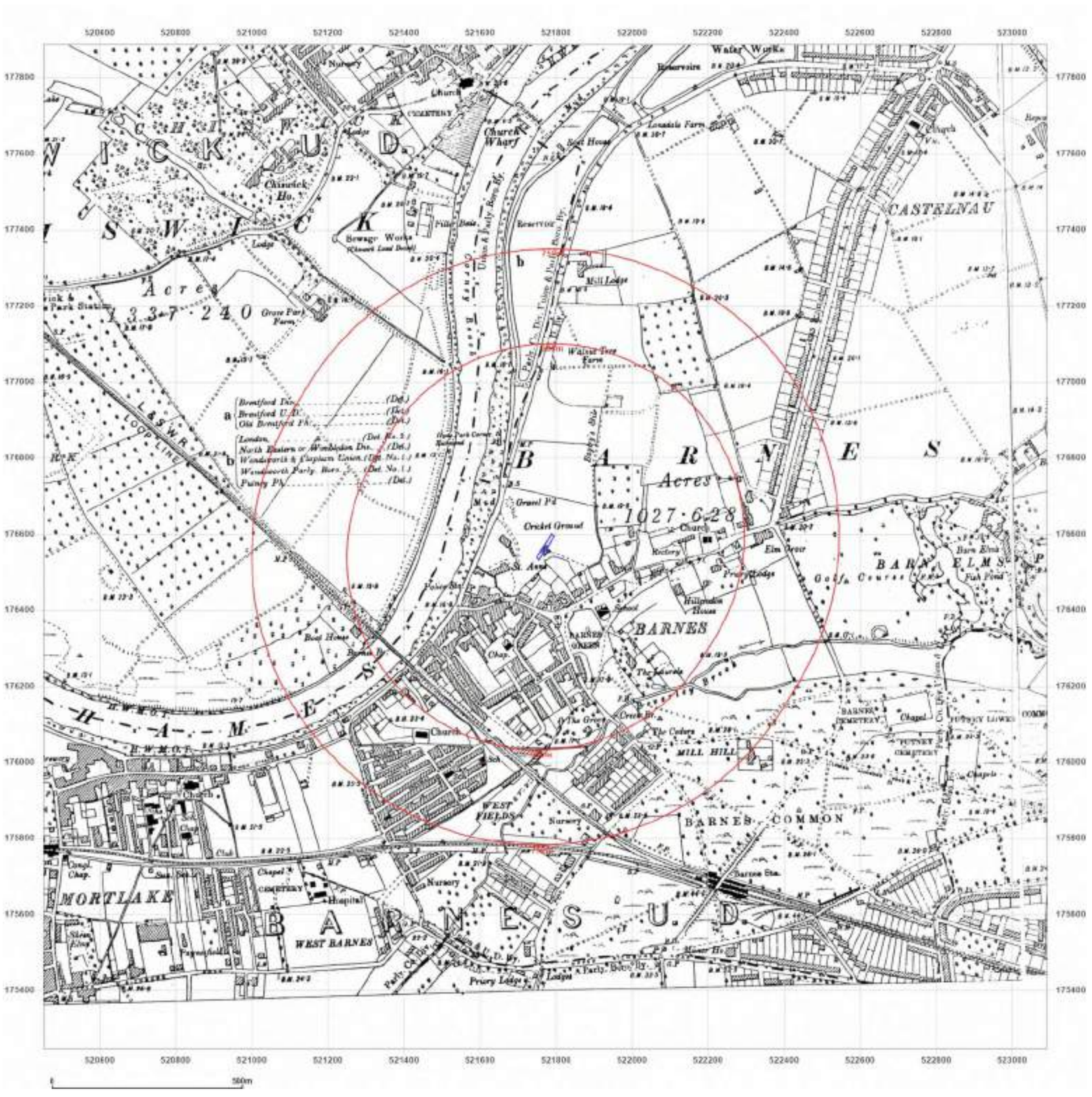
Production date: 03 April 2024

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: County Series

Map date: **1896**

Scale: 1:10,560

Printed at: 1:10,560

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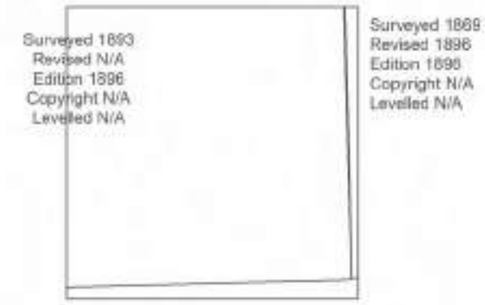

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Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: County Series

Map date: **1894-1899**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1866
Revised 1894
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1867
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

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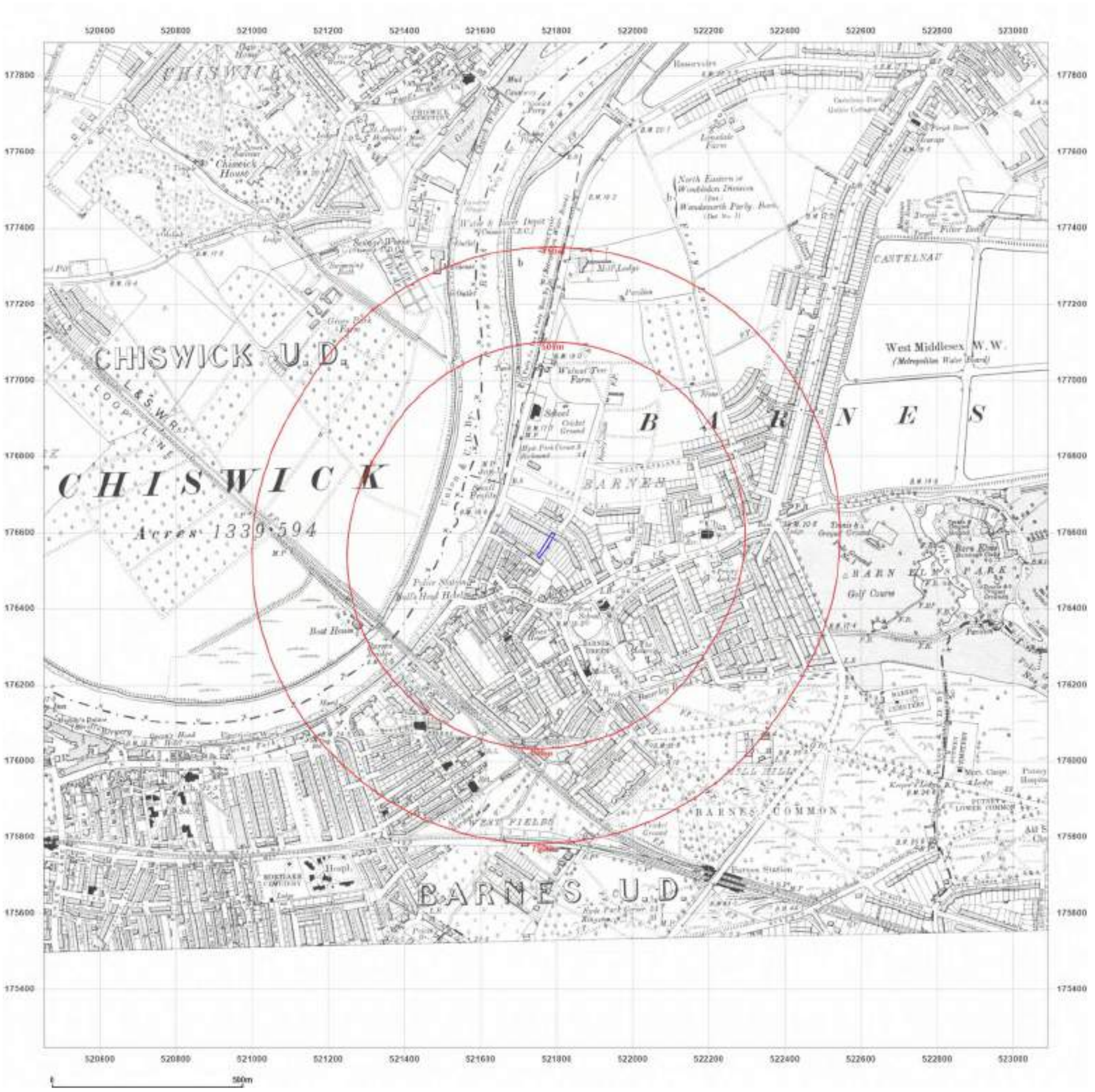

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: County Series

Map date: **1919**

Scale: 1:10,560

Printed at: 1:10,560

N
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S

Surveyed 1868
Revised 1919
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 03 April 2024

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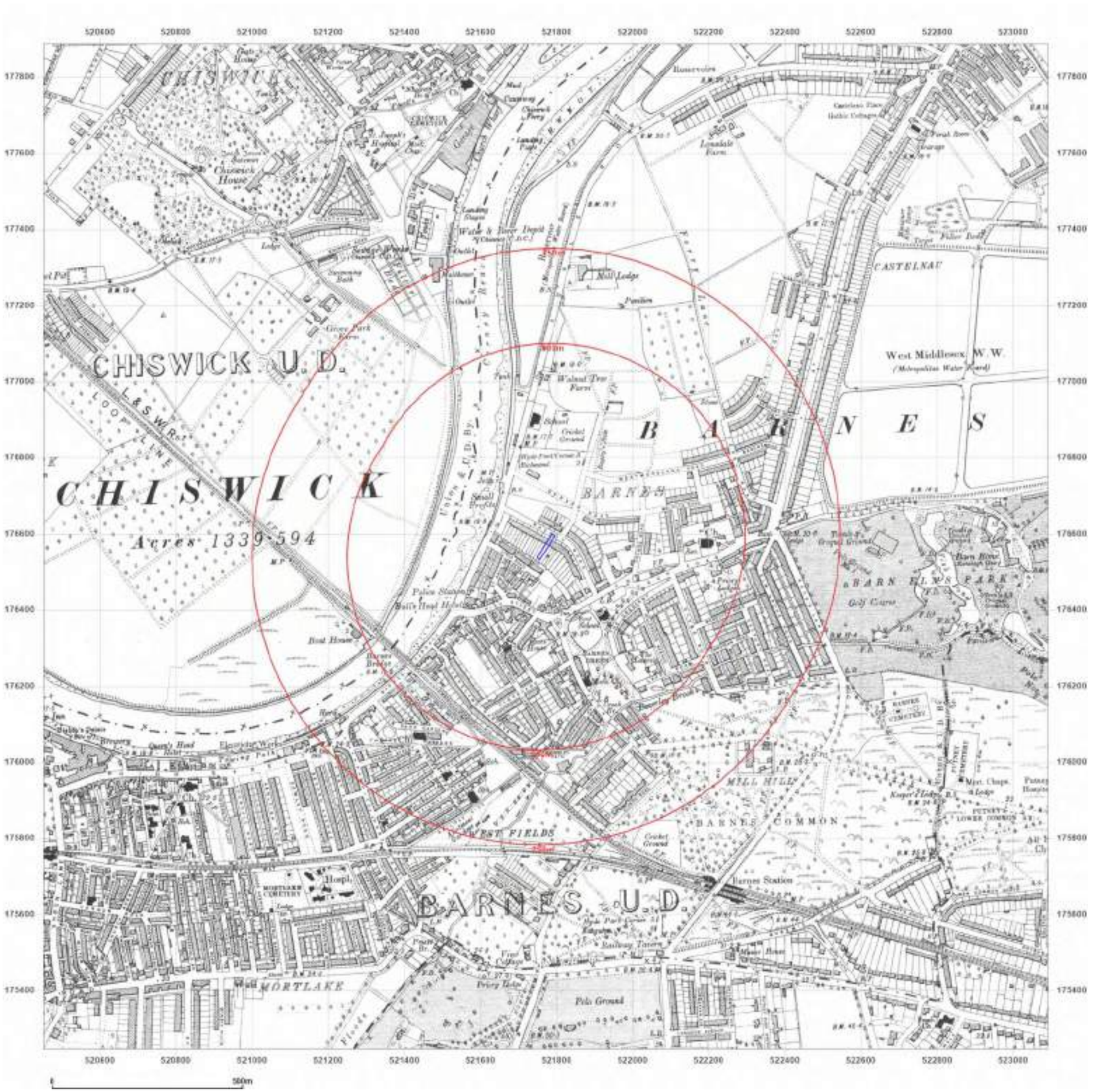

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: County Series

Map date: **1920**

Scale: 1:10,560

Printed at: 1:10,560

N
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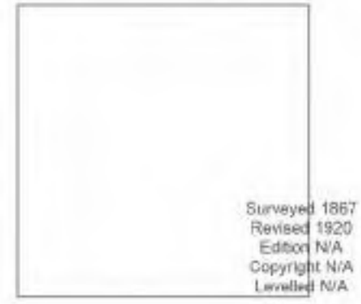

Powered by OS

Produced by
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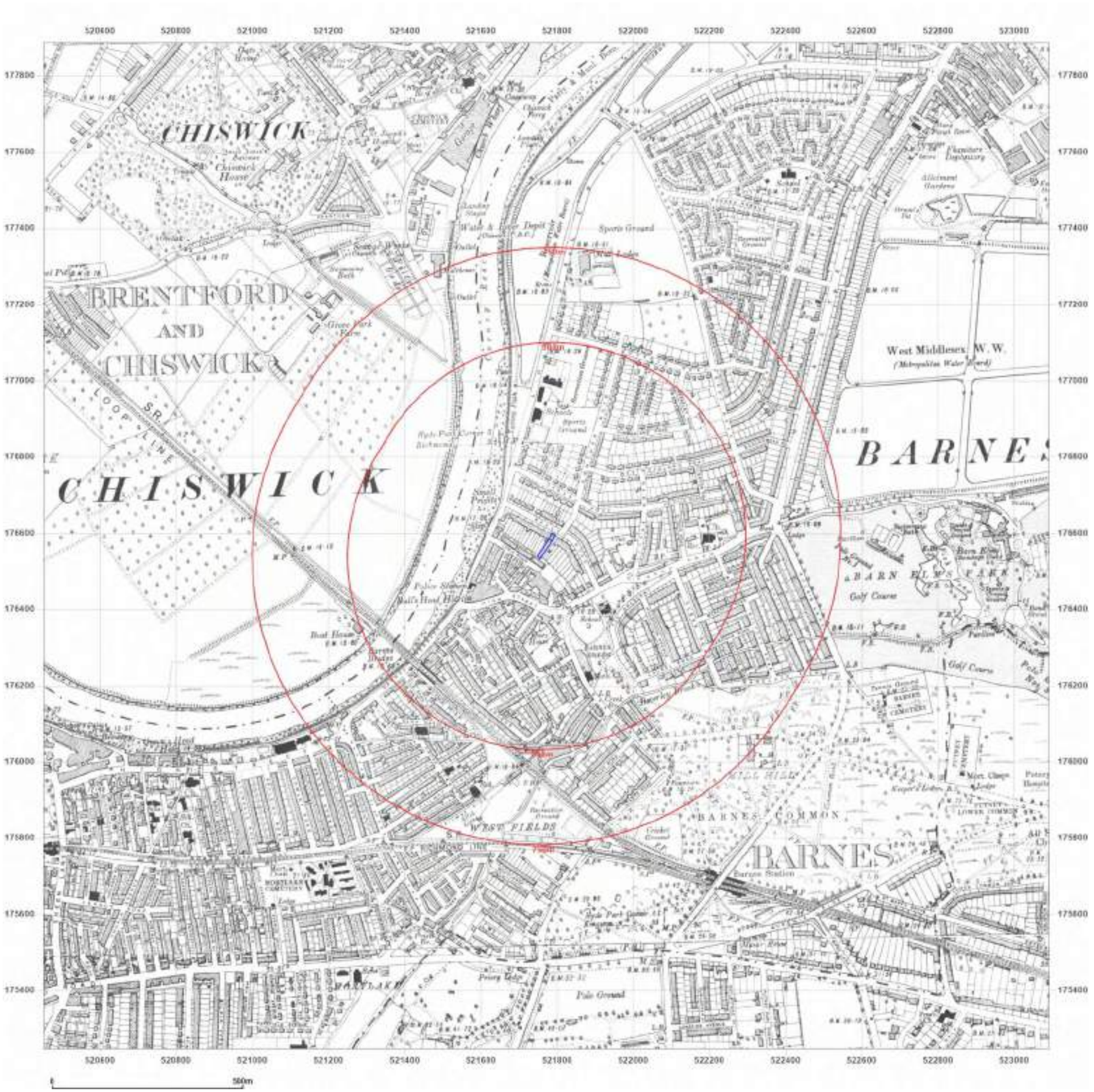
E: info@groundsure.com
W: www.groundsure.com

Production date: 03 April 2024

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: County Series

Map date: **1933**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1866
Revised 1933
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1866
~~Revised 1933~~
Edition N/A
Copyright N/A
Levelled N/A

Powered by OS

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W: www.groundsure.com

Production date: 03 April 2024

Map legend available at:
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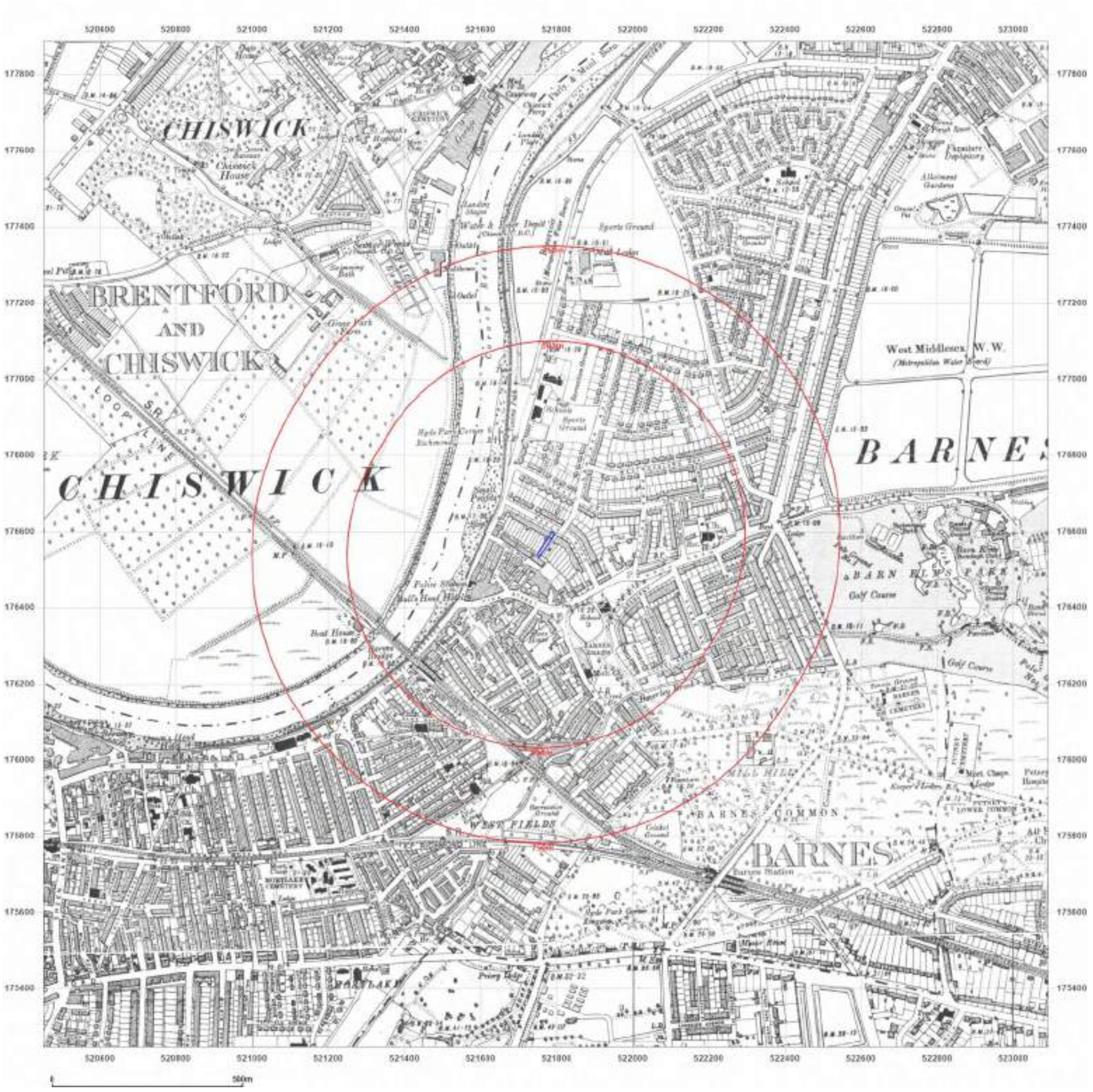

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: County Series

Map date: **1933-1938**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1866
Revised 1933
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1866
~~Revised 1938~~
Edition 1938
Copyright N/A
Levelled N/A

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Production date: 03 April 2024

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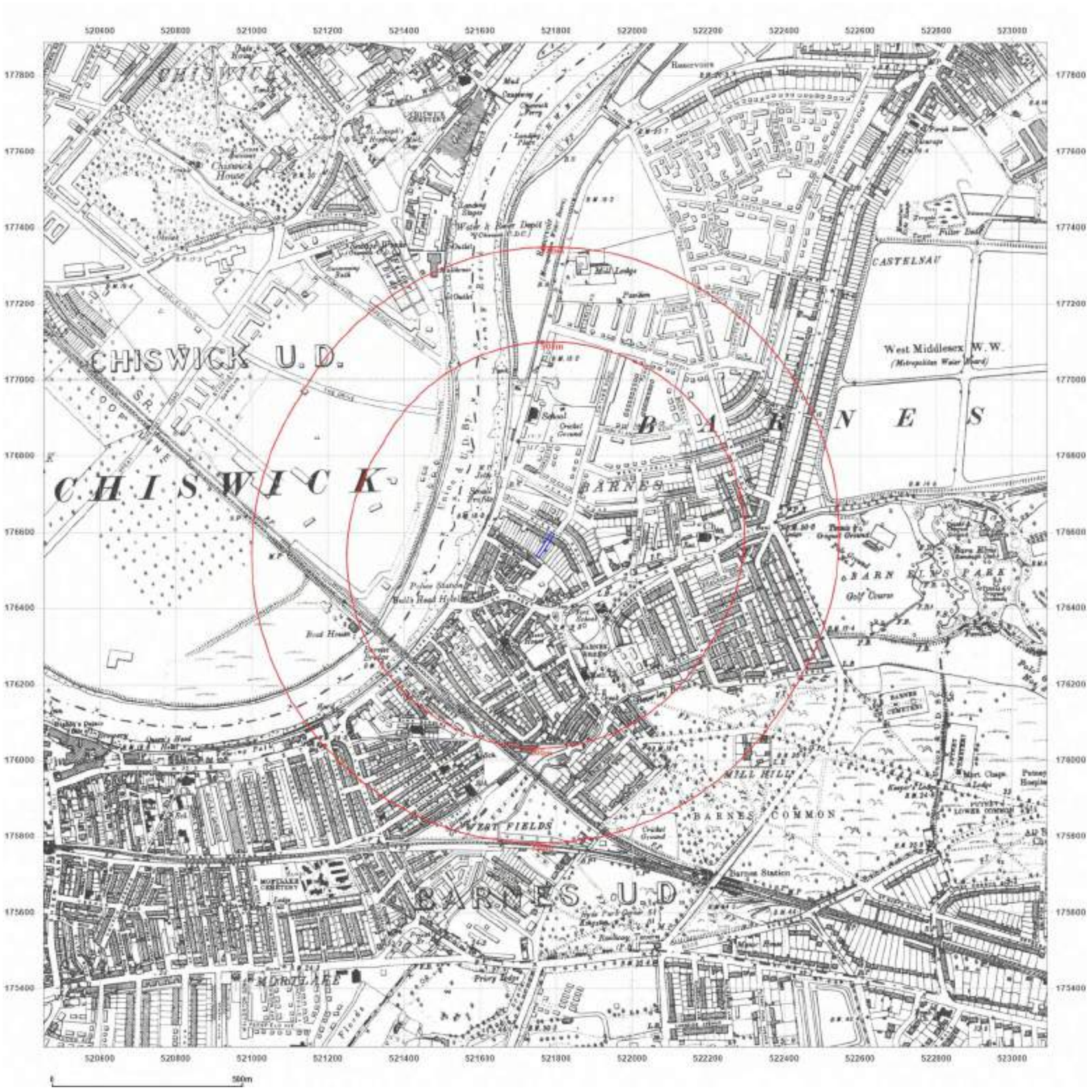

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1867
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 03 April 2024

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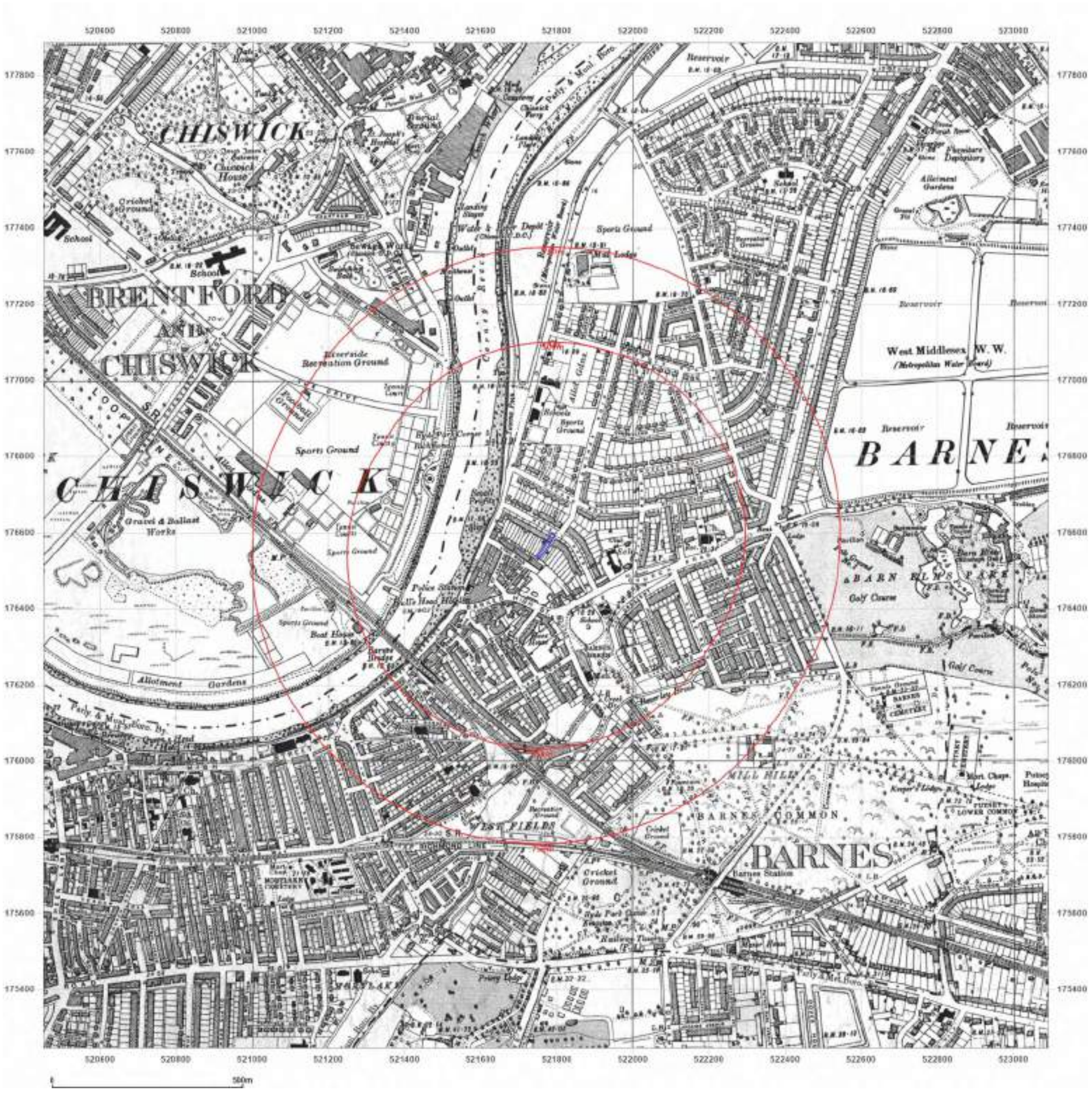

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: Provisional
Map date: **1947**
Scale: 1:10,560
Printed at: 1:10,560

N
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Surveyed 1940
Revised 1947
Edition N/A
Copyright N/A
Levelled N/A

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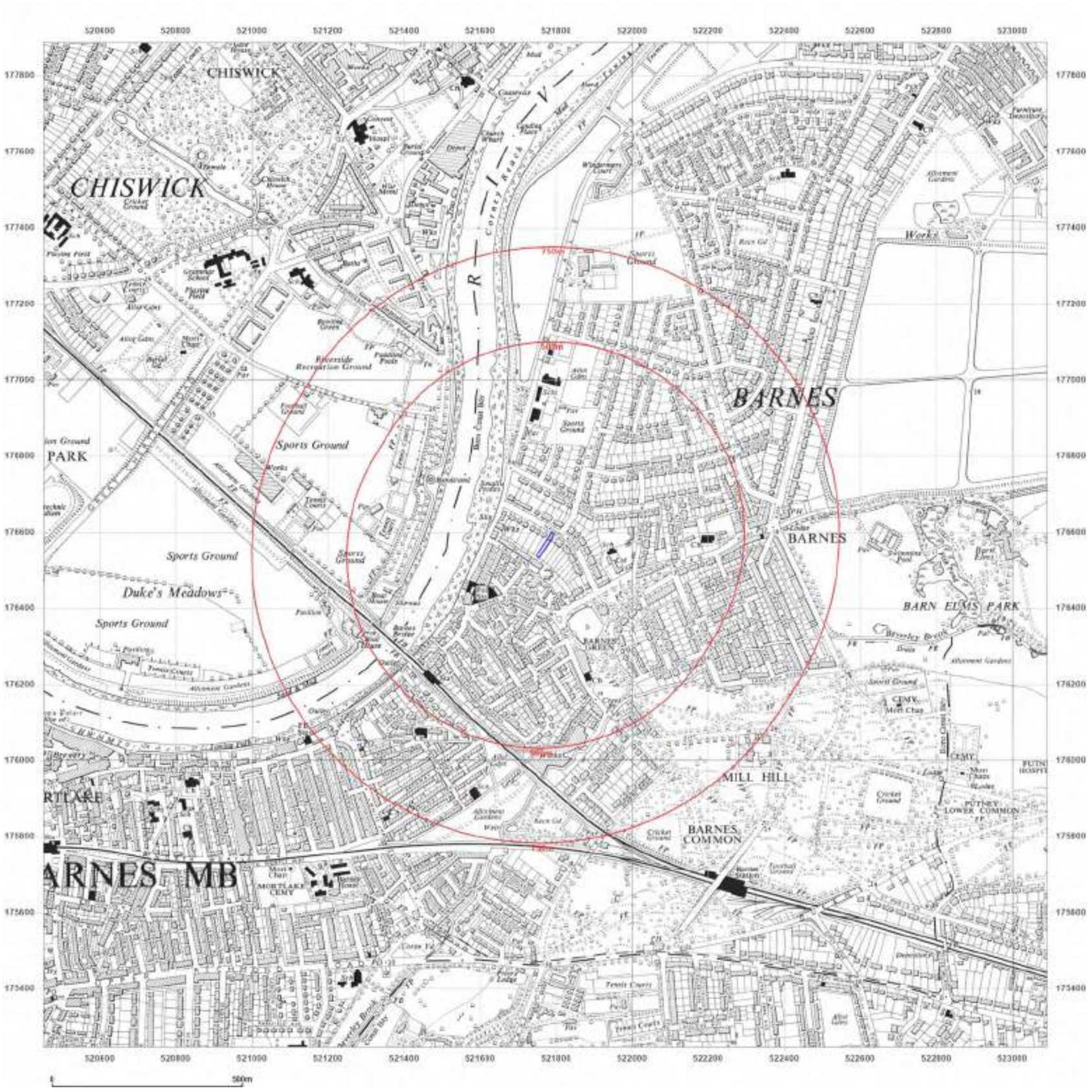
Production date: 03 April 2024

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

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

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

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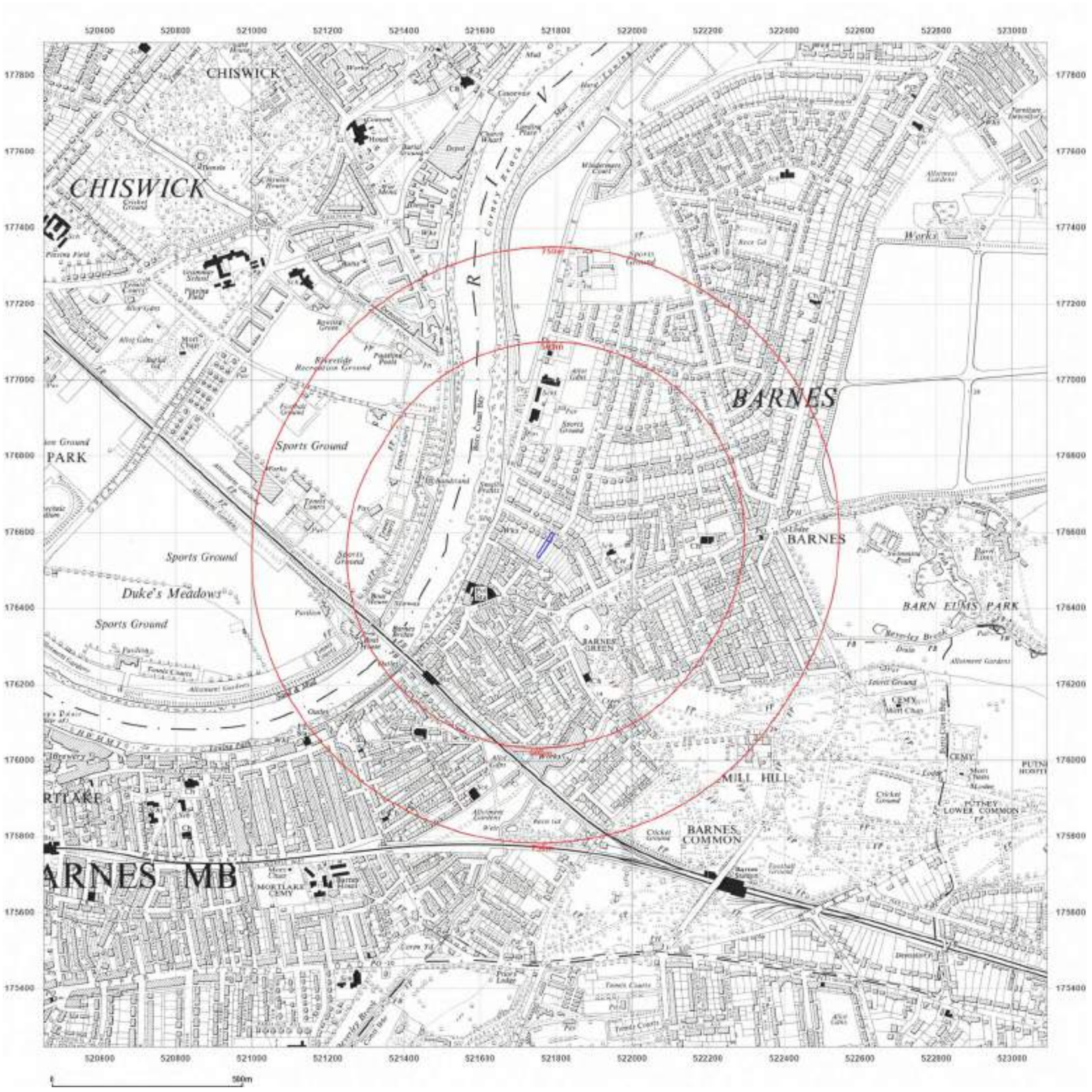
Production date: 03 April 2024

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: Provisional
Map date: **1962**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
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Surveyed 1958
Revised 1962
Edition 1958
Copyright 1958
Levelled N/A

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Production date: 03 April 2024

Map legend available at:
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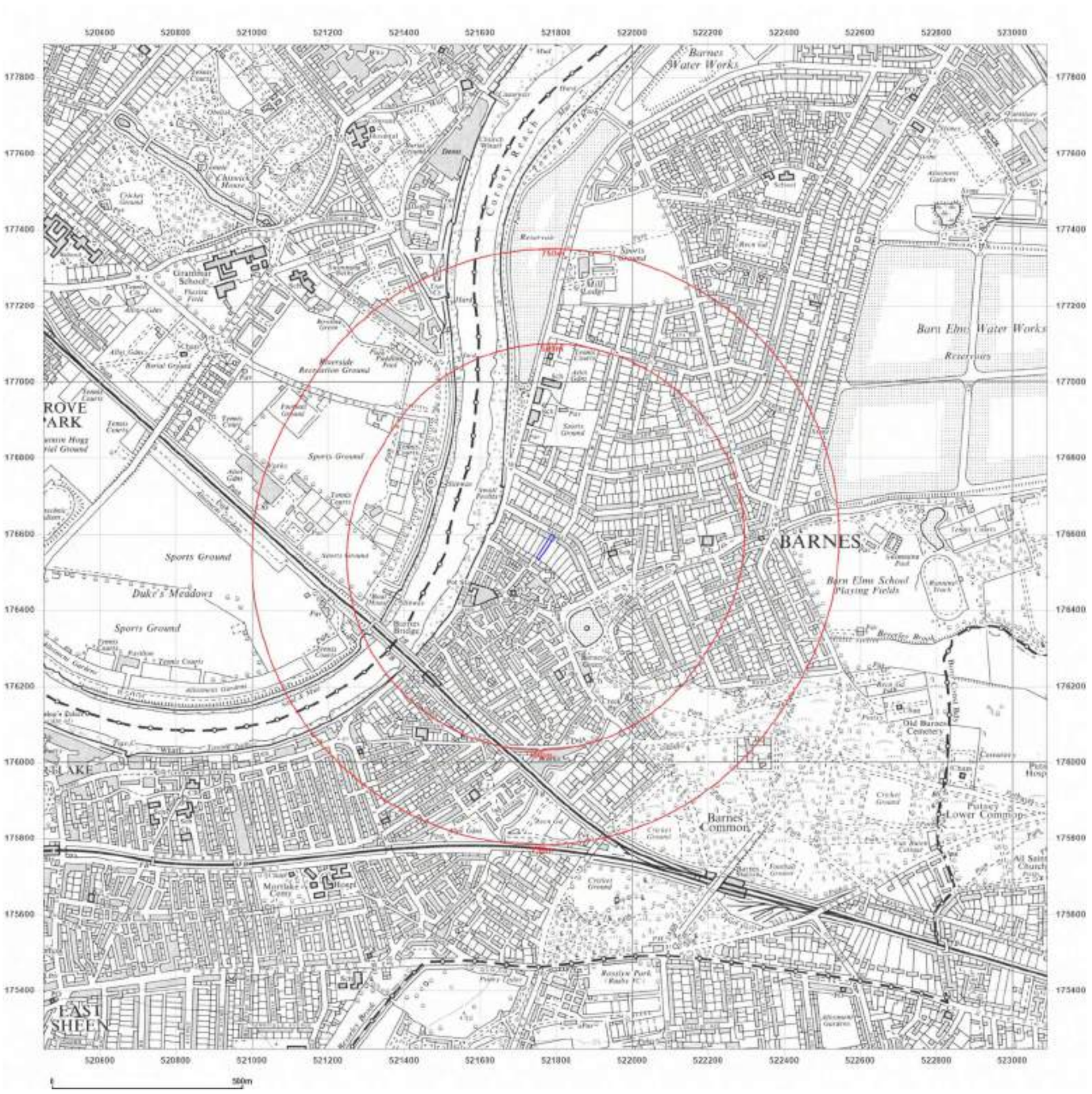

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: Provisional
Map date: **1967**
Scale: 1:10,560
Printed at: 1:10,560

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

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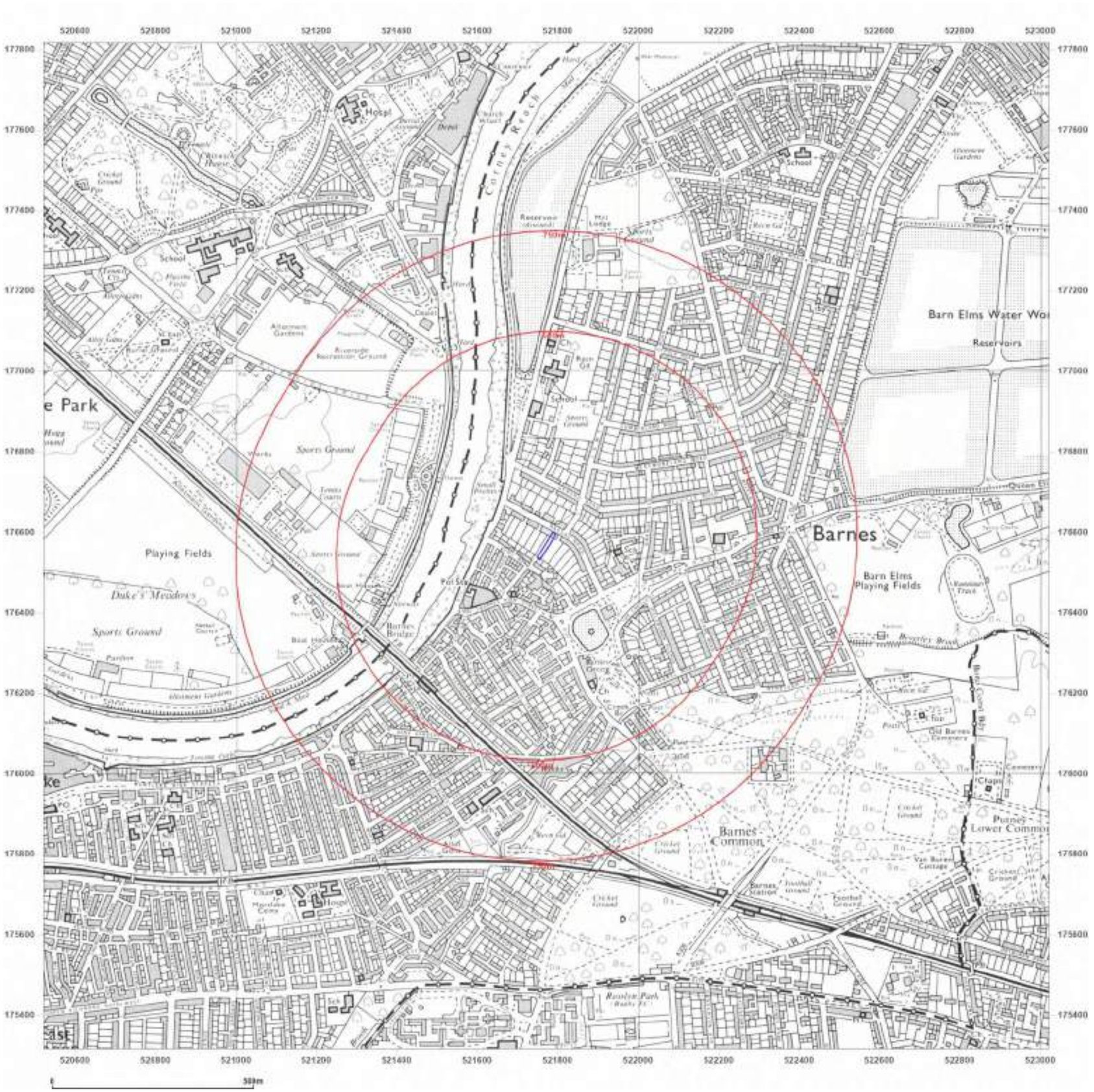

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: National Grid

Map date: **1974**

Scale: 1:10,000

Printed at: 1:10,000

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

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Production date: 03 April 2024

Map legend available at:
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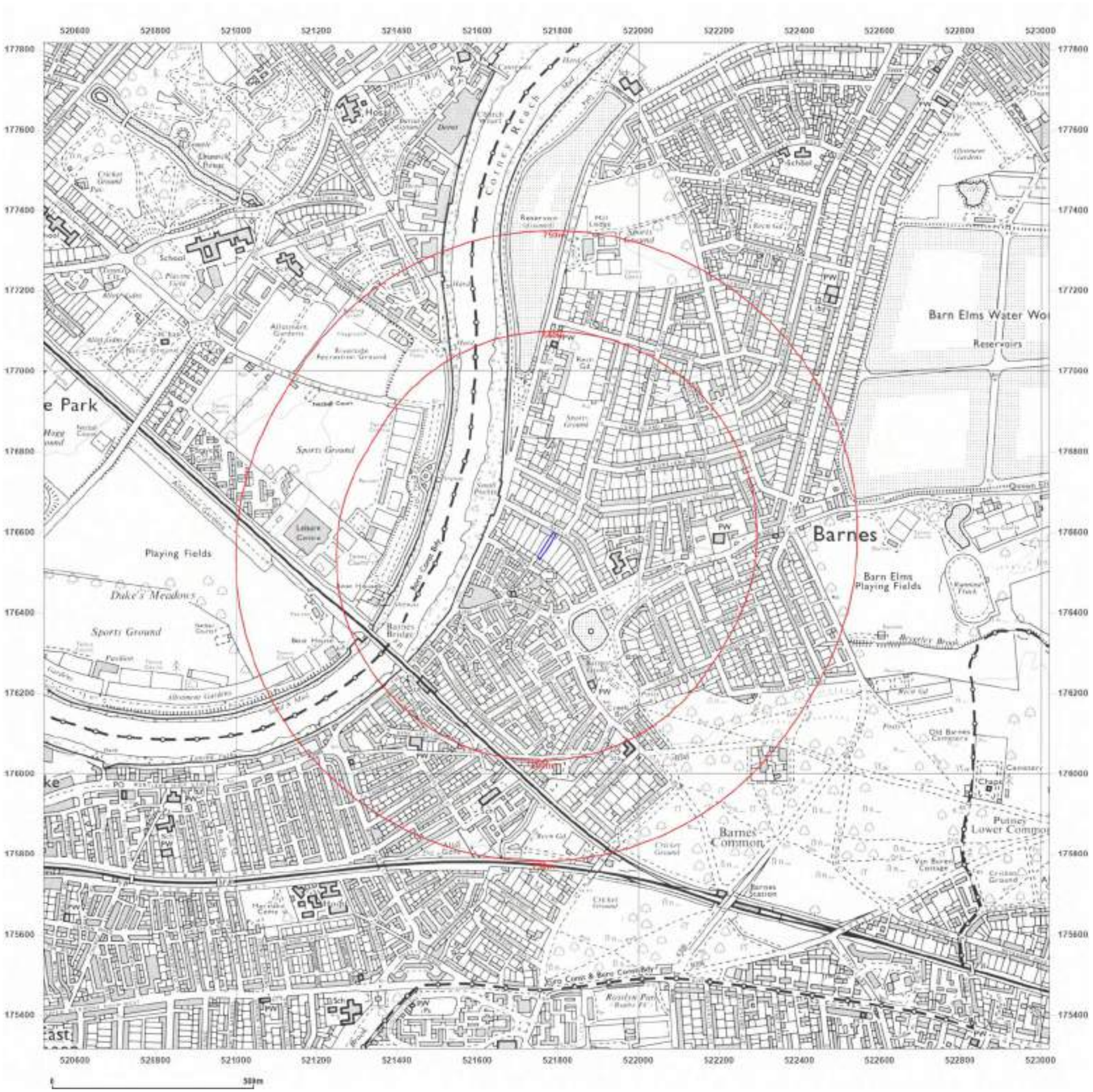

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: National Grid

Map date: **1987**

Scale: 1:10,000

Printed at: 1:10,000

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

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Production date: 03 April 2024

Map legend available at:
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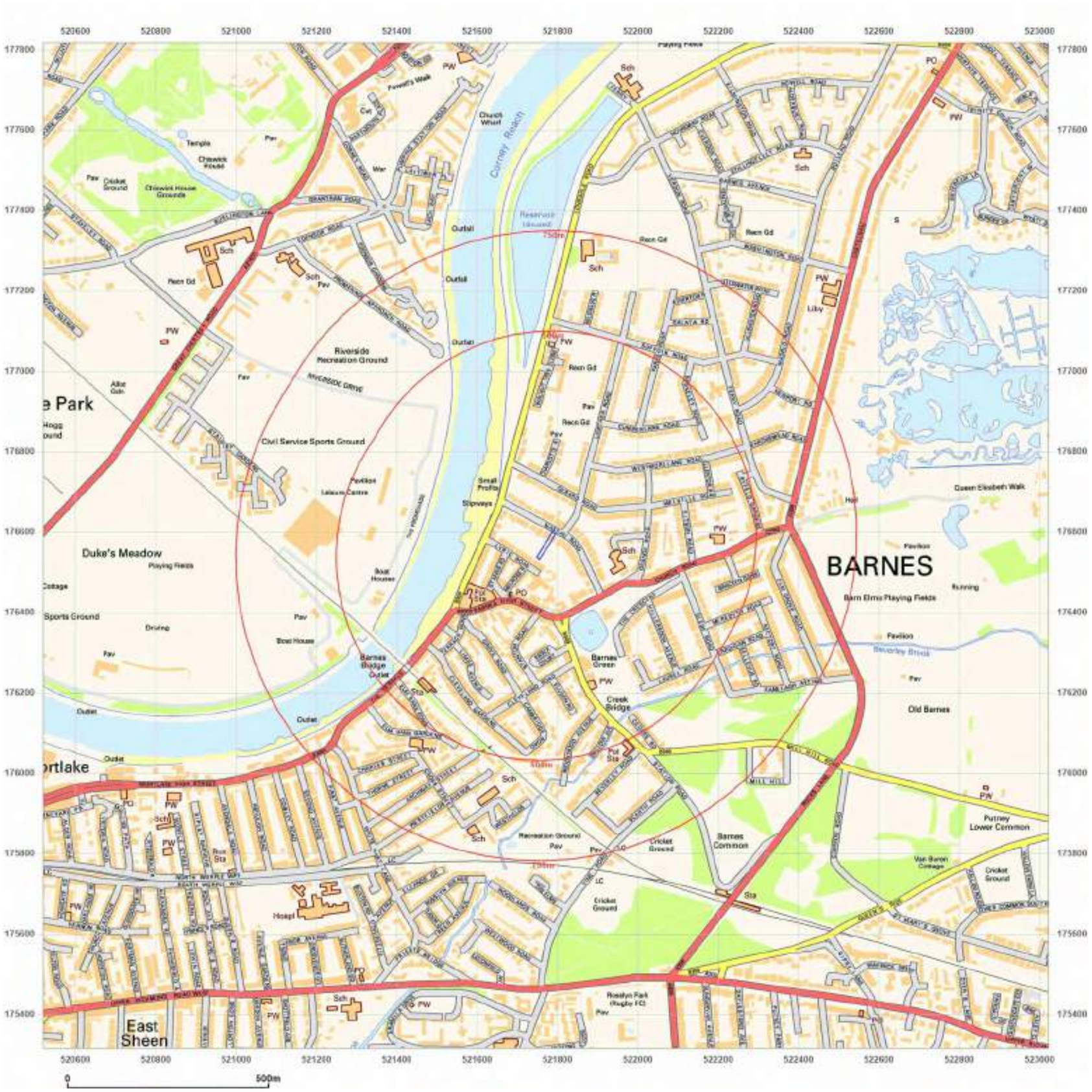

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: National Grid
Map date: **2001**
Scale: 1:10,000
Printed at: 1:10,000

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Production date: 03 April 2024

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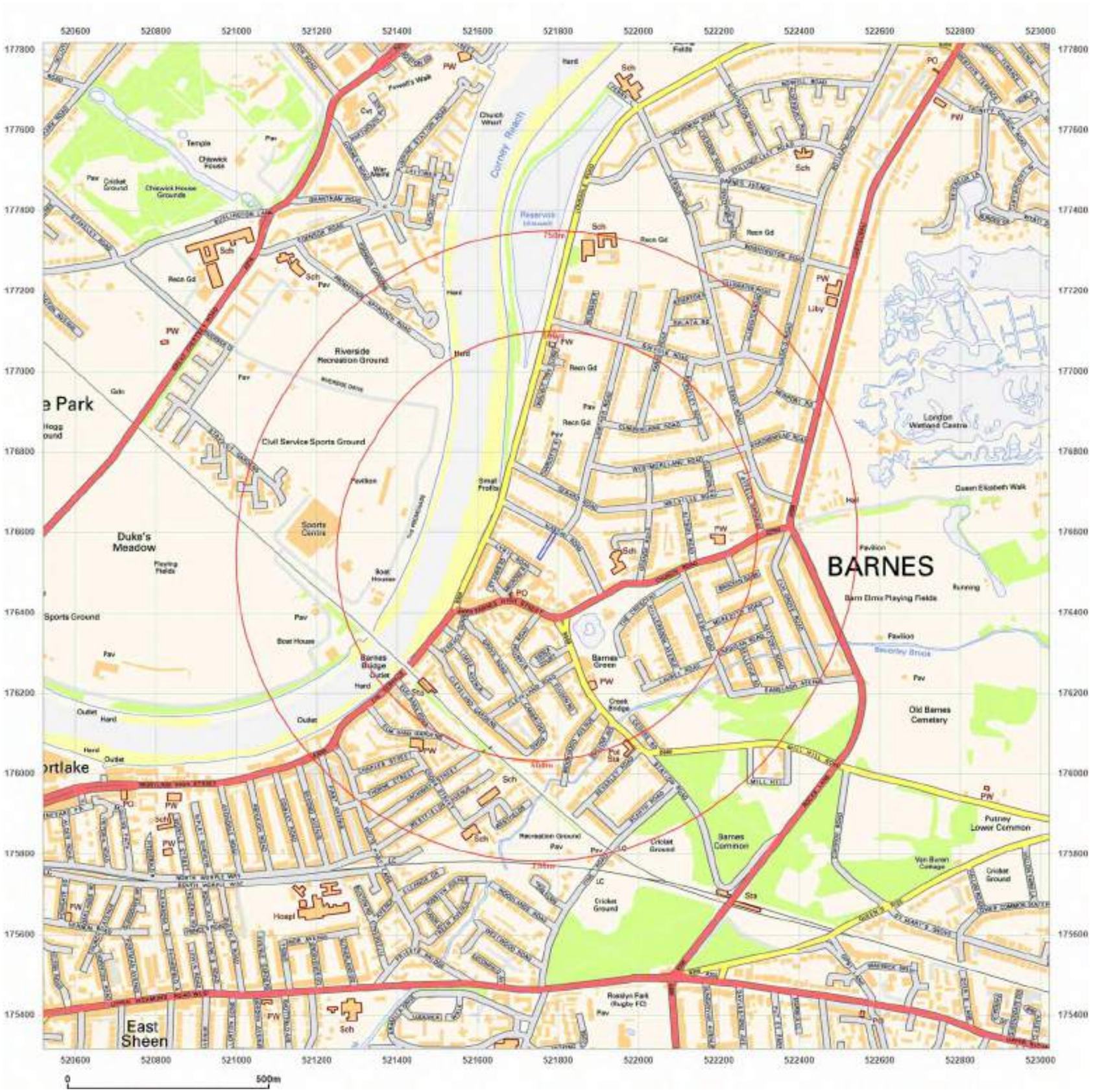

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

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

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Production date: 03 April 2024

Map legend available at:
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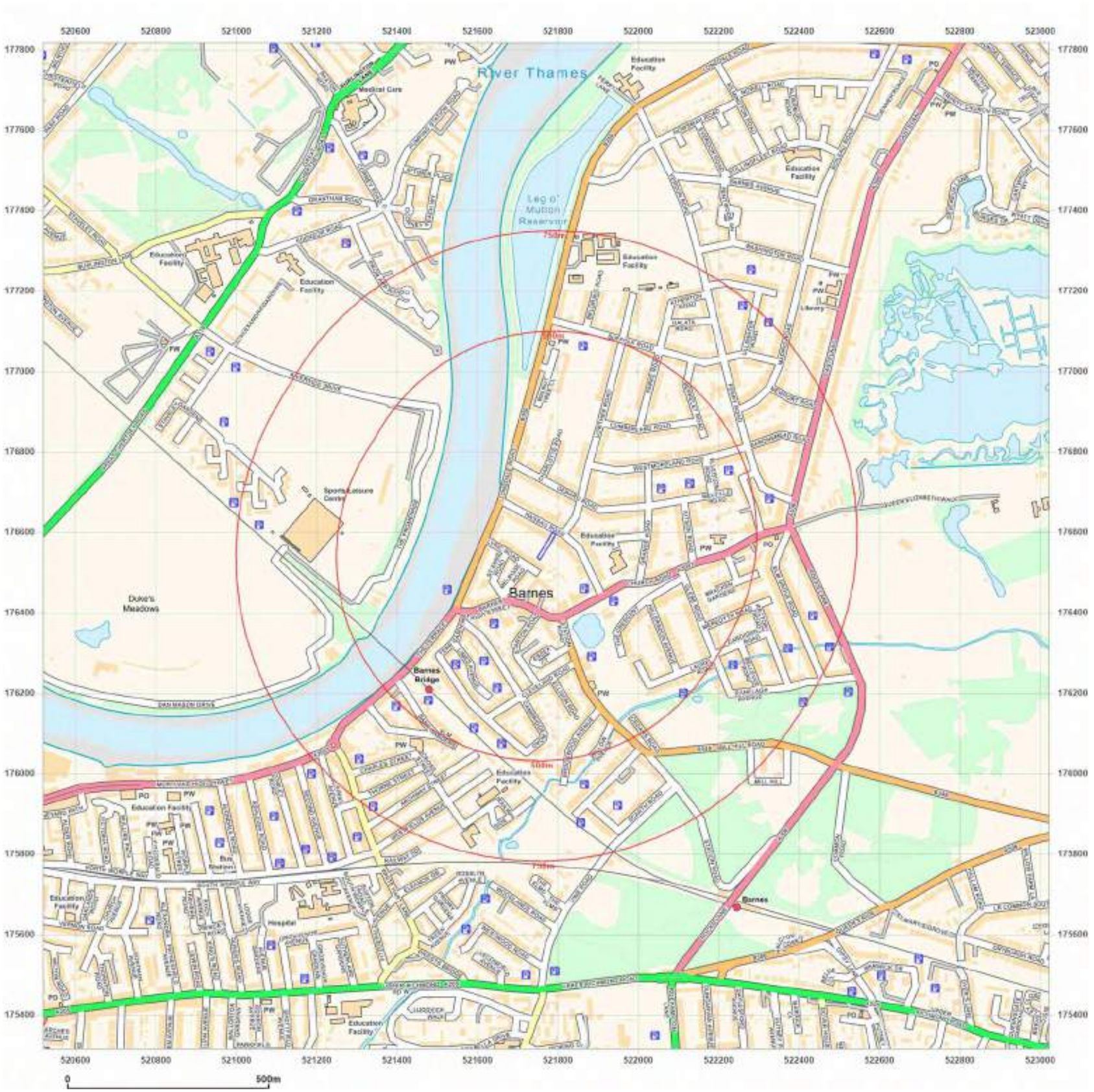

Groundsure INSIGHTS

Site Details:

34, NASSAU ROAD, BARNES, LONDON, RICHMOND UPON THAMES, SW13 9QE

Client Ref: GWPR5909
Report Ref: GS-R7I-VE4-EA3-BPT
Grid Ref: 521771, 176566

Map Name: National Grid
Map date: **2024**
Scale: 1:10,000
Printed at: 1:10,000

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Production date: 03 April 2024

Map legend available at:
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APPENDIX D: Trial Hole Logs

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Percussion Drilling Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5909	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS01	WLS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (80%), brick (15%) and chalk (5%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	SPT	N=28 (11,7/7,7,7,7)	1.20			
		1.50	D					Orange brown very sandy CLAY. Sand is fine. (KEMPTON PARK GRAVEL MEMBER).
					1.80			
		2.00	D					Light brown very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded of flint. (KEMPTON PARK GRAVEL MEMBER).
		2.00	SPT	27 (25,24/27,,,)				
		2.50	D					
		3.00	D		3.00			
		3.00	SPT	N=47 (18,12/11,12,12,12)				End of Borehole at 3.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots noted to 1.20

Groundwater noted at 2.90m bgl

Percussion Drilling Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5909	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS02	WLS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (80%), brick (15%) and chalk (5%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	SPT	N=21 (6,4/4,5,6,6)	1.20			
		1.50	D					Orange brown very sandy CLAY. Sand is fine. (KEMPTON PARK GRAVEL MEMBER).
		2.00	D					
		2.00	SPT	27 (25,22/27,,,)	2.20			
		2.50	D					Light brown very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded of flint. (KEMPTON PARK GRAVEL MEMBER).
		3.00	D					
		3.00	SPT	N=52 (20,11/12,14,13,13)				
		3.50	D					
		4.00	D		4.00			End of Borehole at 4.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

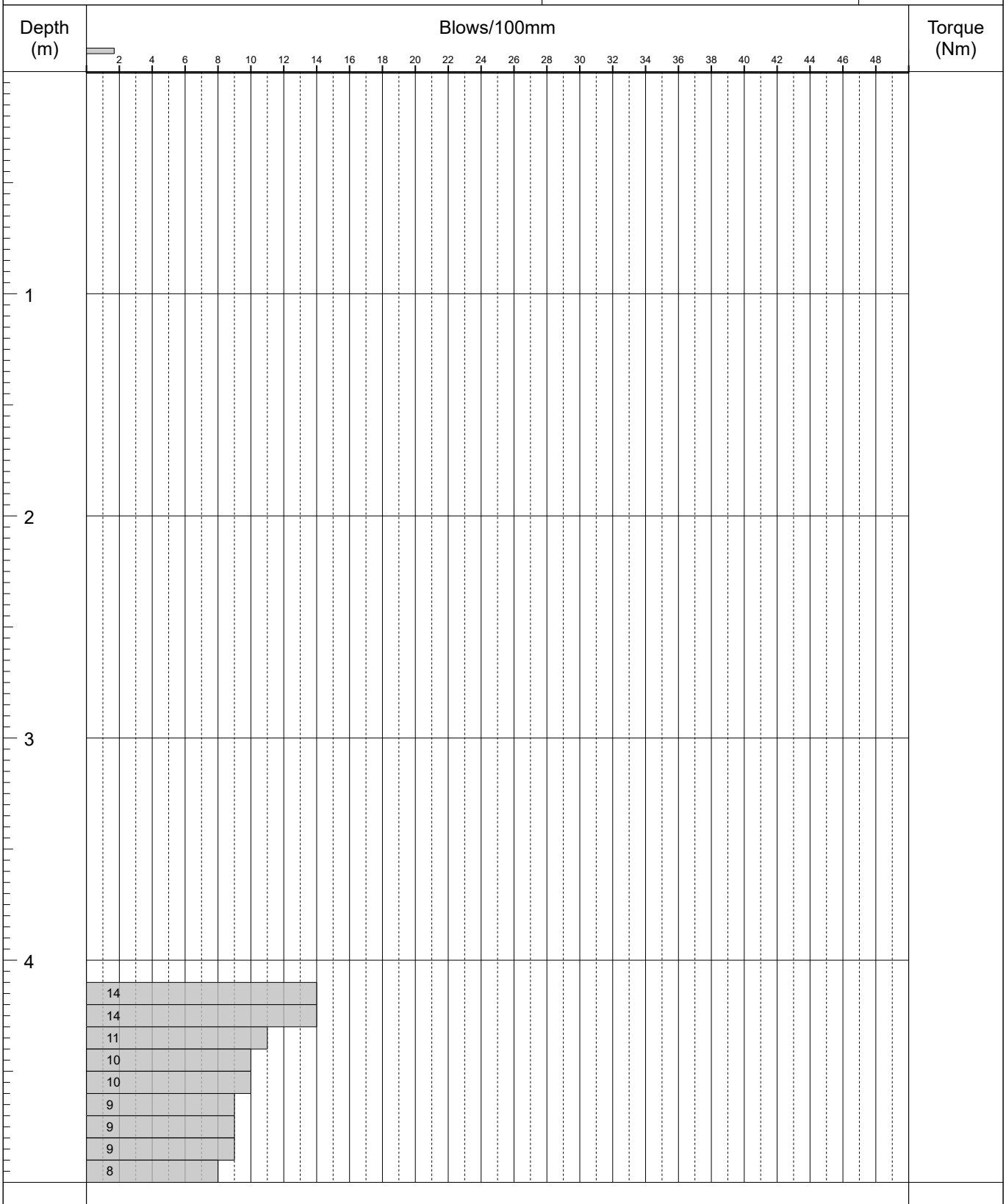
Remarks

Roots noted to 1.50. Groundwater noted at 2.80m bgl.

No SPT at 4.00m bgl due to sands filling up casing.

Probe Log

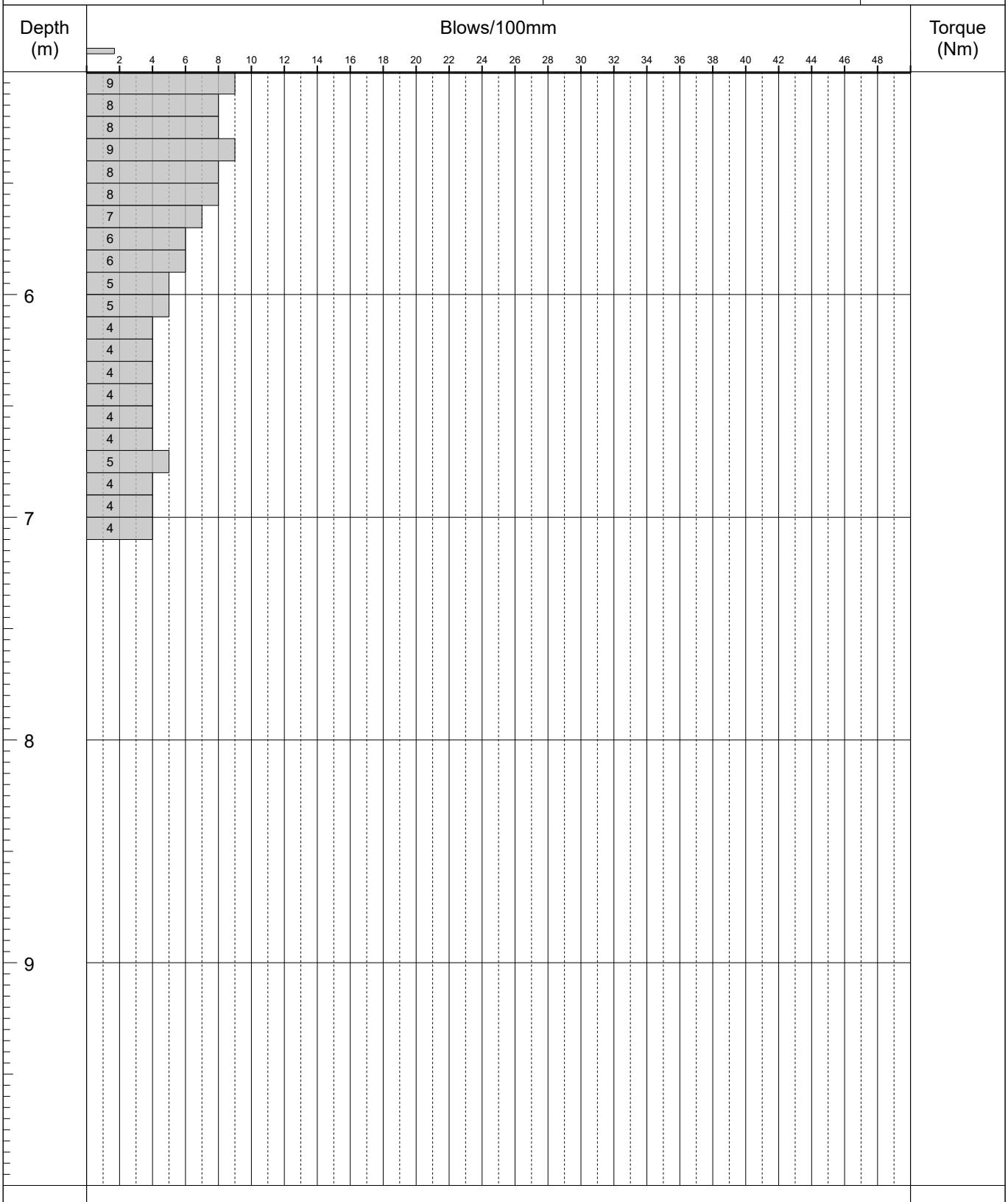
ground&water			Probe No DP02 Sheet 1 of 2
Project Name: 34 Nassau Road	Project No. GWPR5909	Co-ords:	Hole Type DP
Location: SW13 9QE		Level:	Scale 1:25
Client: Tom Richards		Dates:	Logged By



Remarks:	Fall Height	500	Cone Base Diameter		AGS
	Hammer Wt	64	Final Depth	7.00	
	Probe Type	DPSH- A			

Probe Log

ground&water			Probe No DP02 Sheet 2 of 2
Project Name: 34 Nassau Road	Project No. GWPR5909	Co-ords:	Hole Type DP
Location: SW13 9QE		Level:	Scale 1:25
Client: Tom Richards		Dates:	Logged By



Remarks:	Fall Height	500	Cone Base Diameter	
	Hammer Wt	64	Final Depth	7.00
	Probe Type	DPSH- A		

AGS

APPENDIX E: Geotechnical Laboratory Testing

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Laboratory Report

Contract Number: 71779

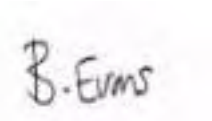
Client Ref: **GWPR5909**
Client PO: **GWPR5909**

Client: **Ground and Water Limited**

Contract Title: **34 Nassau Road SW13 9QE**
For the attention of: **Adam Young**

Date Received: **19-03-2024**
Date Completed: **28-03-2024**
Report Date: **28-03-2024**

This report has been checked and approved by:



Brendan Evans
Office Administrator

Description	Qty
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	2
1 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.4 & 5.3 - * UKAS	2
PSD Wet Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	3
Disposal of samples for job	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)
Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)
Wayne Honey (HR & HSE Manager)

GEO Site & Testing Services Ltd
Unit 3-4 Heol Aur, Dafen Ind Est, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784 040 Fax: 01554 784 040 info@gstl.co.uk https://gstl.co.uk

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377:1990 - Part 2 : 4.4 & 5.3)**	
Contract Number	71779	
Project Name	34 Nassau Road SW13 9QE	
Date Tested	27/03/2024	
	DESCRIPTIONS	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
WS01		D	1.50	-		Brown sandy fine to coarse gravelly silty CLAY
WS02		D	2.00	-		Brown fine to coarse gravelly silty CLAY
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		

Operator
Owain Davies

GSTL
GEOTECHNICAL SITE & TESTING LABORATORIES

NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX
(BS 1377:1990 - Part 2 : 4.4 & 5.3)

Contract Number	71779	
Project Name	34 Nassau Road SW13 9QE	
Date Tested	27/03/2024	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Remarks
WS01		D	1.50	-		21	36	18	18	74	CI Intermediate Plasticity
WS02		D	2.00	-		29	54	26	28	76	CH High Plasticity
				-							
				-							
				-							
				-							
				-							
				-							
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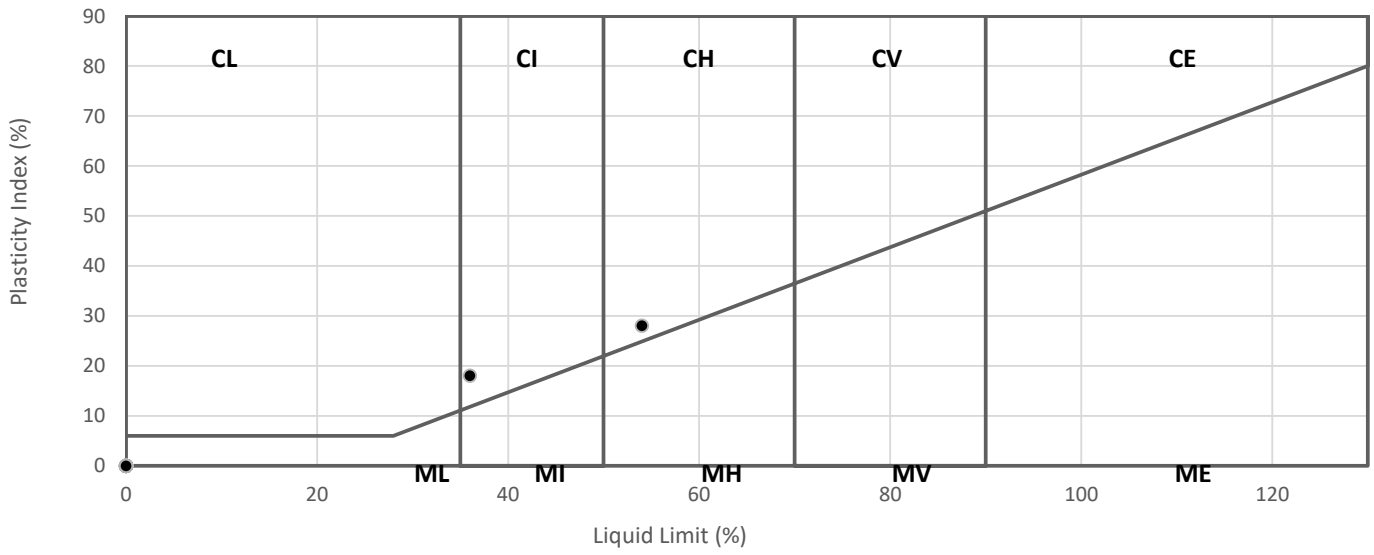
				-							
				-							
				-							
				-							

Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

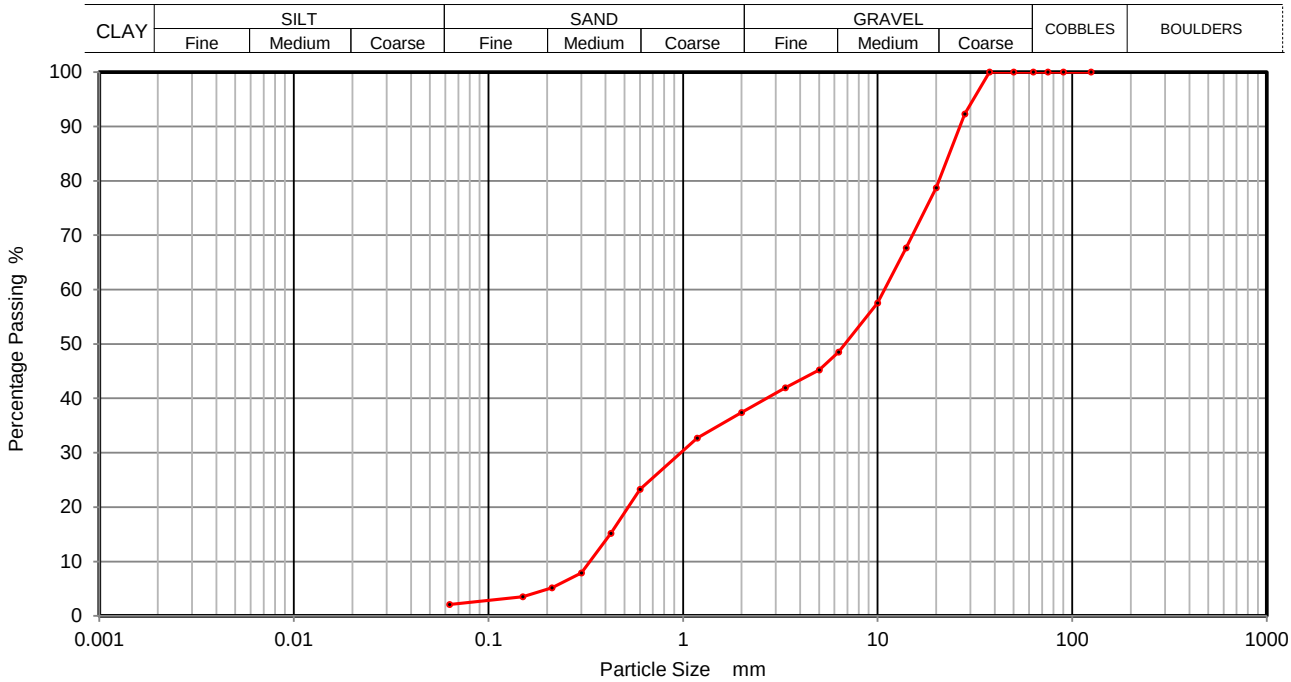
PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION
BS 5930:2015+A1:2020



Operator
Owain Davies

UKAS
TESTING
2788

GSTL	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve, Clause 9.2**	Contract Number	71779
		Borehole/Pit No.	WS01
Project Name	34 Nassau Road SW13 9QE	Sample No.	
Soil Description	Brown slightly silty/ clayey fine to coarse sandy fine to coarse GRAVEL	Depth Top	3.00
		Depth Base	
Date Tested	26/03/2024	Sample Type	D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	92		
20	79		
14	68		
10	58		
6.3	49		
5	45		
3.35	42		
2	37		
1.18	33		
0.6	23		
0.425	15		
0.3	8		
0.212	5		
0.15	4		
0.063	2		

Sample Proportions	% dry mass
Cobbles	0
Gravel	63
Sand	35
Silt and Clay	2

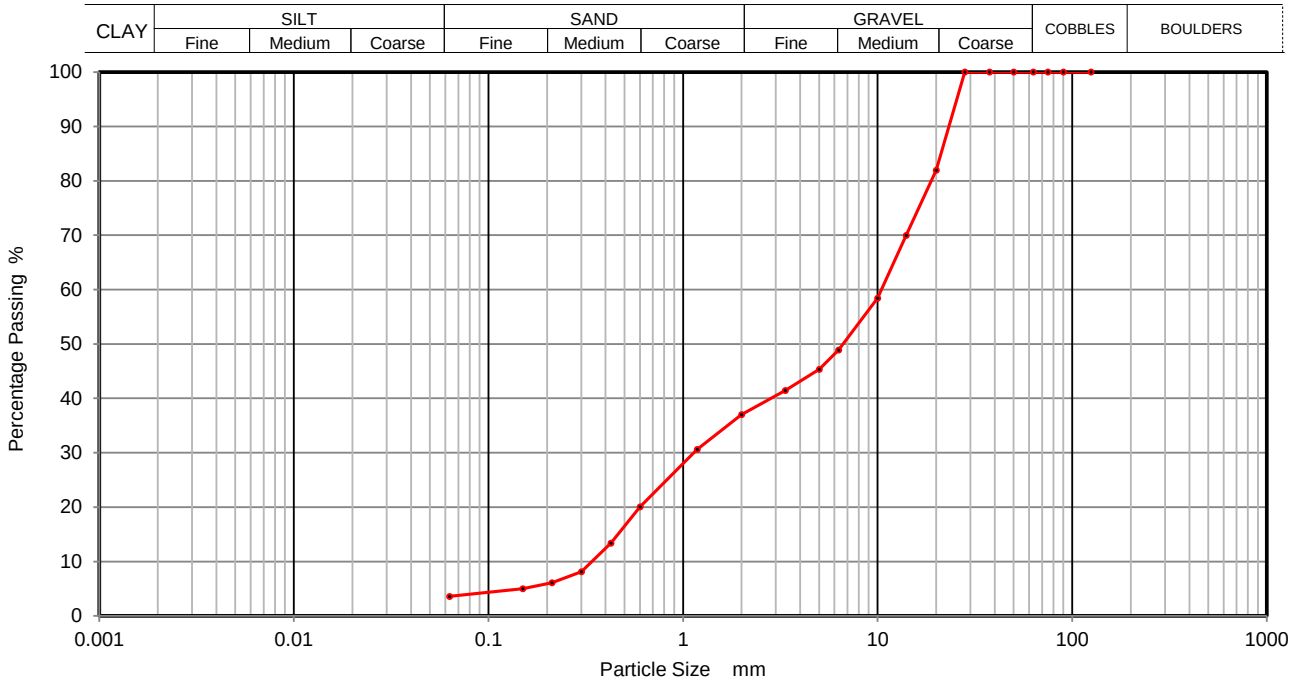
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
Cameron Thomas

UKAS TESTING 2788

GSTL	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve, Clause 9.2**	Contract Number	71779
		Borehole/Pit No.	WS02
Project Name	34 Nassau Road SW13 9QE	Sample No.	
Soil Description	Brown slightly silty/ clayey fine to coarse sandy fine to coarse GRAVEL	Depth Top	2.50
		Depth Base	
Date Tested	26/03/2024	Sample Type	D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	82		
14	70		
10	58		
6.3	49		
5	45		
3.35	41		
2	37		
1.18	31		
0.6	20		
0.425	13		
0.3	8		
0.212	6		
0.15	5		
0.063	4		

Sample Proportions	% dry mass
Cobbles	0
Gravel	63
Sand	33
Silt and Clay	4

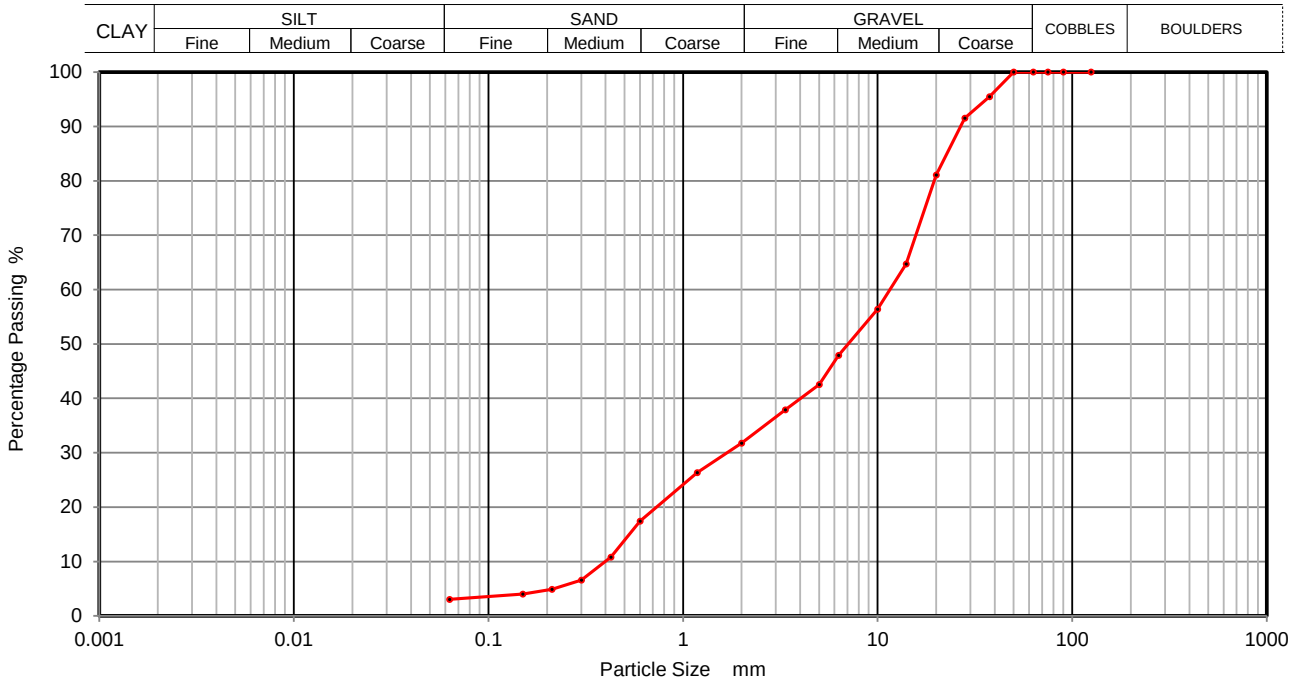
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
Cameron Thomas

UKAS TESTING 2788

GSTL	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve, Clause 9.2**	Contract Number	71779
		Borehole/Pit No.	WS02
Project Name	34 Nassau Road SW13 9QE	Sample No.	
Soil Description	Brown slightly silty/ clayey fine to coarse sandy fine to coarse GRAVEL	Depth Top	4.00
		Depth Base	
Date Tested	26/03/2024	Sample Type	D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	95		
28	92		
20	81		
14	65		
10	56		
6.3	48		
5	43		
3.35	38		
2	32		
1.18	26		
0.6	17		
0.425	11		
0.3	7		
0.212	5		
0.15	4		
0.063	3		

Sample Proportions	% dry mass
Cobbles	0
Gravel	68
Sand	29
Silt and Clay	3

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
Cameron Thomas

UKAS TESTING 2788

APPENDIX F: Chemical Laboratory Testing

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Ground and Water Ltd
2 The Long Barn
Norton Farm
Selbourne Road
Alton
Hampshire
GU34 3NB

e: adam.young@groundwater.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 24-009116

Project / Site name:	34 Nassau Road SW13 9QE	**Samples received on:**	14/03/2024
Your job number:	GWPR5909	**Samples instructed on/ Analysis started on:**	14/03/2024
Your order number:	GWPR5909	**Analysis completed by:**	20/03/2024
Report Issue Number:	1	**Report issued on:**	21/03/2024
Samples Analysed:	5 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-009116
Project / Site name: 34 Nassau Road SW13 9QE
Your Order No: GWPR5909

Lab Sample Number				145503	145504	145505	145506	145507
Sample Reference				WS01	WS02	WS01	WS02	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	0.20	2.00	1.50	3.00
Date Sampled				12/03/2024	12/03/2024	12/03/2024	12/03/2024	12/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	15	3.4	17	2.4
Total mass of sample received	kg	0.1	NONE	0.8	0.7	0.5	0.6	0.4
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	KSZ	KSZ	-	-	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	8	7.7	8.4	8	8.3
Total Cyanide	mg/kg	1	MCERTS	2	< 1.0	-	-	-
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	-	0.014	0.008
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	20	27	17	46	25
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	8.44	23	12.3
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	10	13.6	-	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	2.1	1
Total Sulphur	mg/kg	50	MCERTS	-	-	-	80	69
Total Sulphur	%	0.005	MCERTS	-	-	-	0.008	0.007
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	-	-	< 0.5	< 0.5
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Organic Matter (automated)	%	0.1	MCERTS	3.8	2.9	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.2	1.7	-	-	-
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	-	< 2.0	< 2.0
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-	< 2.0	< 2.0
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	0.38	< 0.05	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	0.1	< 0.05	-	-	-
Fluorene	mg/kg	0.05	MCERTS	0.43	< 0.05	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	7.2	0.59	-	-	-
Anthracene	mg/kg	0.05	MCERTS	3	0.16	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	14	1.7	-	-	-
Pyrene	mg/kg	0.05	MCERTS	11	1.7	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	5.7	1	-	-	-
Chrysene	mg/kg	0.05	MCERTS	5.7	1.3	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	6.1	1.6	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	2.3	0.68	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.7	0.84	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.2	0.52	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.63	0.17	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.6	0.6	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	66.1	10.9	-	-	-

Analytical Report Number: 24-009116
Project / Site name: 34 Nassau Road SW13 9QE
Your Order No: GWPR5909

Lab Sample Number				145503	145504	145505	145506	145507
Sample Reference				WS01	WS02	WS01	WS02	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	0.20	2.00	1.50	3.00
Date Sampled				12/03/2024	12/03/2024	12/03/2024	12/03/2024	12/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	19	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	1.7	1.2	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	-	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	24	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	67	33	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	220	160	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	0.6	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	21	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	55	49	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	74	-	-	-
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	4.4	4.2
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	8.9	8.5
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	-	< 0.020	-	-	-
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	-	< 0.020	-	-	-
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	-	< 0.050	-	-	-
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL	mg/kg	1	MCERTS	-	< 1.0	-	-	-
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL	mg/kg	2	MCERTS	-	< 2.0	-	-	-
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL	mg/kg	8	MCERTS	-	< 8.0	-	-	-
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL	mg/kg	8	MCERTS	-	< 8.0	-	-	-
TPHCWG - Aliphatic >C35 - C40 EH_CU_1D_AL	mg/kg	10	NONE	-	< 10	-	-	-
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL	mg/kg	10	NONE	-	< 10	-	-	-
TPHCWG - Aliphatic >C5 - C40 EH_CU+HS_1D_AL	mg/kg	10	NONE	-	< 10	-	-	-
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	-	< 0.010	-	-	-
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	-	< 0.010	-	-	-
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	-	< 0.050	-	-	-
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	-	< 1.0	-	-	-
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	-	< 2.0	-	-	-
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	-	< 10	-	-	-
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	-	< 10	-	-	-
TPHCWG - Aromatic >EC35 - EC40 EH_CU_1D_AR	mg/kg	10	NONE	-	< 10	-	-	-
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	-	< 10	-	-	-
TPHCWG - Aromatic >EC5 - EC40 EH_CU+HS_1D_AR	mg/kg	10	NONE	-	< 10	-	-	-
TPH Total >C5 - C40 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	-	< 10	-	-	-
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	< 5.0	-	-	-
Benzene	µg/kg	5	MCERTS	-	< 5.0	-	-	-
Toluene	µg/kg	5	MCERTS	-	< 5.0	-	-	-
Ethylbenzene	µg/kg	5	MCERTS	-	< 5.0	-	-	-
p & m-Xylene	µg/kg	5	MCERTS	-	< 5.0	-	-	-
o-Xylene	µg/kg	5	MCERTS	-	< 5.0	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 24-009116
Project / Site name: 34 Nassau Road SW13 9QE

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
145503	WS01	None Supplied	1.2	Brown clay and loam with gravel and vegetation
145504	WS02	None Supplied	0.2	Brown clay and loam with gravel and vegetation
145505	WS01	None Supplied	2	Brown sand with gravel
145506	WS02	None Supplied	1.5	Brown sandy clay
145507	WS02	None Supplied	3	Brown sand with gravel

Analytical Report Number : 24-009116
Project / Site name: 34 Nassau Road SW13 9QE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES	In-house method based on TRL 447	L038B	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction	L078B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS

Analytical Report Number : 24-009116
Project / Site name: 34 Nassau Road SW13 9QE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	D	MCERTS
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

APPENDIX G: Soil Assessment Criteria

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Ground and Water Limited

Soil Guideline Values and Generic Assessment Criteria

The Contaminated Land Regime reflects the UK Government's stated objectives of achieving sustainable development through the 'suitable for use approach'. At preliminary risk assessment stage, risks are evaluated qualitatively. As the site investigation progresses to a generic or detailed quantitative risk assessment, data is collected and assessment criteria are utilised to evaluate whether the contaminants represent an unacceptable risk to the identified receptors.

1. Contaminated Land Exposure Assessment Model (CLEA)

Current United Kingdom risk assessment practice is based on the Contaminated Land Exposure Assessment Model (CLEA).

The CLEA Guidance comprises the following documents:

1) EA Science Report SC050021/SR2: Human health toxicological assessment of contaminants in soil.
2) EA Science Report SC050021/SR3: Updated technical background to the CLEA model.
3) EA CLEA Bulletin (2009).
4) CLEA software version 1.07 (2015)
5) Toxicological reports and SGV technical notes.

The CLEA guidance and tools:

- Do not cover other types of risk to humans, such as fire, suffocation or explosion, or short-term and acute exposures;
- Do not cover risks to the environment, such as groundwater, ecosystems or buildings;
- Do not provide a definitive test for telling when human health risks are significant; and
- Are not a legal requirement in assessing land contamination risks. They are not part of the legal regime for Part 2A of the Environmental Protection Act 1990.

The CLEA guidance derives soil concentrations of contaminants above which (in the opinion of the EA) there may be a concern that warrants further investigation. It does not provide a definitive test for establishing that the risk is significant.

1.1. Land-use Scenarios

The CLEA model uses a range of standard land-use scenarios to develop conceptual exposure models outlined in the following sections.

1.1.1. Residential (with home grown produce) (RwHP)

Generic scenario assumes a typical two-storey house built on a ground bearing slab with a private garden having a lawn, flowerbeds and a small fruit and vegetable patch.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil and indoor dust ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours.
- Building type is a two-storey small-terraced house.

A sub-set of this land-use is residential apartments with communal landscaped gardens where the consumption of home grown vegetables will not occur. (Residential without homegrown produce (RwoHP)).

1.1.2. Allotments

Provision of open space (about 250sq.m) commonly made available to tenants by the local authority to grow fruit and vegetable for their own consumption. Typically, there are a number of plots to a site which may have a total area of up to 1 hectare. The tenants are assumed to be adults and that young children make occasional accompanied visits.

Although some allotment holders may choose to keep animals including rabbits, hens, and ducks, potential exposure to contaminated meat and eggs is not considered.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and inhalation of outdoor dust and vapours.
- There is no building.

1.1.3. Commercial/Industrial

The generic scenario assumes a typical commercial or light industrial property comprising a three-storey building at which employees spend most time indoors and are involved in office-based or relatively light physical work.

- Critical receptor is a working female adult (aged 16 to 65 years old).
- Exposure duration is a working lifetime of 49 years.
- Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts and inhalation of dust and vapours.
- Building type is a three-storey office (pre 1970).

2. LQM/CIEH Suitable 4 Use Levels (S4UL)

For derivation of these S4UL reference must be made to:

Nathanial, P., McCaffrey, C., Gillet, A., Ogden, R., Nathanial, J., *The LQM/CIEH S4UL's for Human Health Risk Assessment*. **Land Quality Press**. 2015

2.1. S4UL Background

The Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) S4UL for a given land use is the concentration of the contaminant in soil at which the predicted daily exposure,

as calculated by the CLEA software, equals the Health Criteria Value. The S4ULs have been derived for substances based on various generic land use and soil organic matter contents.

The final output for each contaminant represents a synthesis of new toxicological (and fate and transport) reviews published since the preparation of the 2nd edition LQM/CIEH GAC's (Nathanial et al., 2009).

In the derivation of LQM/CIEH S4UL's the principles of 'minimal' or 'tolerable' risk enshrined in SR2, which has not been withdrawn, has been maintained.

2.2. S4UL Land-use

S4UL's have been derived for the basic CLEA land-uses, as described in section 1.2, and for two new land uses:

- Public Open Spaces near Residential Housing (POSresi).
- Public Park (POSpark).

2.2.1. Public Open Spaces near Residential Housing (POSresi)

Includes the predominantly grassed areas adjacent to high density housing, the central green area on many 1930's – 1970's housing estates, and smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soils with planting. It is assumed that the close proximity to the place of residence will allow tracking back of soil to occur.

2.2.2. Public Park (POSpark)

An area of open space, usually owned and maintained by the local authority, provided for recreational uses including family visists and picnics, children's play area, informal sporting activities (not a dedicated sports pitch), and dog walking. It is assumed that tracking back of soils into places of residence will be negligible.

The following LQM/CIEH S4Uls (Copyright Land Quality Management Limited) have been reproduced with permission, to the publication number S4UL3072.

3. Category 4 Screening Levels (C4SLs)

In the case of Lead, no SGV or GAC has been published to date. This is likely to be due to the toxicity review that is currently being undertaken by the Environment Agency. In the absence of updated toxicity information the SGV derived using CLEA 1.07 methodology and related toxicity will be used.

The overall objective of the C4SLs research project was to assist the provision of technical guidance in support of Defra's revised Statutory Guidance (SG) for Part 2A of the Environmental Protection Act 1990 (Part 2A) (Defra, 2012a). Specifically, the project aimed to deliver:

- A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and
- A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

To help achieve a more targeted approach to identifying and managing contaminated land in relation to the risk (or possibility) of harm to human health, the revised SG presented a new four category

system for considering land under Part 2A, ranging from Category 4, where there is no risk that land poses a significant possibility of significant harm (SPOSH), or the level of risk is low, to Category 1, where the risk that land poses a significant possibility of significant harm (SPOSH) is unacceptably high. More specific guidance on what type of land should be considered as Category 4 (Human Health) is provided in Paragraphs 4.21 and 4.22 of the revised SG, as follows:

> *"4.21 The local authority should consider that the following types of land should be placed into Category 4: Human Health:*
> *(a) Land where no relevant contaminant linkage has been established.*
> *(b) Land where there are only normal levels of contaminants in soil, as explained in Section 3 of this Guidance.*
> *(c) Land that has been excluded from the need for further inspection and assessment because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of this Guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of this Guidance.*
> *(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed in the normal course of their lives).*
>
> *4.22 The local authority may consider that land other than the types described in paragraph 4.21 should be placed into Category 4: Human Health if following a detailed quantitative risk assessment it is satisfied that the level of risk posed is sufficiently low."*

The C4SLs are intended as "relevant technical tools" (in relation to Paragraph 4.21(c)) to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

> *"The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land."*

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to human health."*

The implication of Paragraph 47(h) of the IA is that minimal risk is well within Category 4 and that the C4SLs should describe a higher level of risk which, whilst not minimal, can still be considered low enough to allow a judgement to be made that land containing substances at, or below, the C4SLs would typically fall within Category 4. This reflects Paragraph 4.20 of the revised SG, which states:

> *"4.20 The local authority should not assume that land poses a significant possibility of significant harm if it considers that there is no risk or that the level of risk posed is low. For the purposes of this Guidance, such land is referred to as a "Category 4: Human Health" case. The authority may decide that the land is a Category 4: Human Health case as soon as it considers it has evidence to this effect, and this may happen at any stage during risk assessment including the early stages."*

C4SLs, therefore, should not be viewed as "SPOSH levels" and they should not be used as a legal trigger for the determination of land under Part 2A.

The generic screening values referred to before usually take the form of risk-based Soil Guideline Values (SGVs) or other Generic Assessment Criteria (GACs) that are most typically derived using the Environment Agency's Contaminated Land Exposure Assessment (CLEA) model, as described in the Environment Agency's SR2, SR3 and SR7 reports (EA, 2009b & c; EA, 2008). It is anticipated that C4SLs will be used in a similar manner; as generic screening criteria that can be used within a GQRA, albeit describing a higher level of risk than the SGVs.

The suggested approach to the development of C4SLs consists of the retention and use of the CLEA framework, modified according to considerations of the underlying science within the context of Defra's policy objectives relating to the revised SG. Within this context, it is suggested that the development of C4SLs may be achieved in one of three ways, namely:

- By modifying the toxicological parameters used within CLEA (while maintaining current exposure parameters);
- By modifying the exposure parameters embedded within CLEA (while maintaining current toxicological "minimal risk" interpretations); and
- By modifying both toxicological and exposure parameters.

There is also a suggested check on "other considerations" (e.g., background levels, epidemiological data, sources of uncertainty) within the approach, applicable to all three options.

It is suggested that a new term is defined for the toxicological guidance values associated with the derivation of C4SLs – a Low Level of Toxicological Concern (LLTC). A LLTC should represent an intake of low concern that remains suitably protective of health, and definitely does not approach an intake level that could be defined as SPOSH.

4. CL:AIRE Generic Assessment Criteria (GAC)

For derivation of the CL:AIRE Generic Assessment Criteria (GAC) reference should be made to the following report:

> CL:AIRE, *The Soil Generic Assessment Criteria for Human Health Risk Assessment.* **Contaminated Land: Applications in the Real Environment**. 2009.

Within this report, Contaminated Land: Applications in Real Environments (CL:AIRE) provided Generic Assessment Criteria (GAC) in accordance with the CLEA software and the principles outlined previously for a further 35 contaminants sometimes encountered on land affected by contamination.

5. SoBRA Acute GAC

The Society of Brownfield Risk Assessment (SoBRA) identified that most human health risk assessments focus on the chronic risks arising from long-term exposure to specific substances. As chronic risks often occur at lower doses than acute risks, they are often the key drivers, however, in some instances the acute dose may also be an important consideration within risk assessments.

The methodology for deriving the acute GAC were related to two distinct receptor groups:

- Members of the public, where the 'critical' receptor for this group will typically be a female child, which is consistent with CLEA residential and Public Open Space/allotments land-uses;
- Workers involved with excavations. The critical receptor for this group is assumed to be a female working adult, without the use of PPE.

The acute GACs relate to short term exposure of high concentrations of a substance that lead to acute effects. They are not considered to be average exposures across a specific / defined area. As a result, the GACs should be normally be compared with the maximum likely concentration that the individual may be exposed to, and not the average concentration within a specific area.

The SoBRA acute GAC will primarily be used for contaminants that do not currently have any GAC, most notably Cyanide.

6. Detailed Quantitative Risk Assessments (DQRA)

Where the adoption of a GAC is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses, then a DQRA may be undertaken to develop site specific values for relevant soil contaminants.

- Establishing the plausibility that generic exposure pathways exist in practice by measurement and observation.
- Developing more accurate parameters using site data.

7. Phytotoxicity

CLEA guidance only addresses human health toxicity; assessment of plant toxicity (phytotoxicity) is based on threshold trigger values obtained from the following source:

- BS3882:2015 – *Specification for Topsoil*

The trigger values are relevant only to those contaminants, where present in excess, have the potential to inhibit plant growth, or kill plants (Cu, Ni and Zn). The criteria have been based on a wide range of planting that are common within a multi-purpose topsoil.

8. Statistical Tests

DEFRA R&D Publication CLR 7 (DOE 1994) addressed the statistical treatment of test results and their comparison to Soil Guideline Values.

Consideration must be given to the appropriate area of land to be considered termed the critical averaging area.

For a communal open space or commercial land-use, the critical averaging area will depend on the proposed layout. For a residential use with private gardens the averaging area is the individual plot.

It may be appropriate to compare the upper 95th percentile concentration with the Soil Guideline Value, subject to applying a statistical test to establish that the range of concentrations are reasonably consistent and belonging to the same underlying distribution of data.

CL:AIRE published guidance in 2020, *Guidance in comparing soil contamination data with a critical concentration,* superseding the CL:AIRE/CIEH 2008 report of the same name. The guidance provides ways to assist land contamination stakeholders to apply statistical methods to their data to enable decisions under the legislative framework; either planning system or Part 2A of the Environmental Protection Act 1990.

The use of the statistical tests should only be applied if the following statements are valid for the datasets:

- Averaging areas, as well as the smallest area of concern have been identified on the basis of the CSM, including the desk study and/or the site walkover;
- The sample locations were chosen using a simple random, stratified random or stratified systematic (square, herringbone or triangular grid) sampling pattern, rather than being targeted to locations suspected of being contaminated;
- The sample locations are relatively evenly spread across the area and are not clustered, to avoid giving undue weight to some parts of the site over others in the calculated statistics;
- The analyses do not suggest a hotspot or outlier of contamination that should be treated as a separate zone. This has been established by a histogram and/or a names statistical test;
- The sample locations are all taken from one population (i.e. the same material);
- Where an averaging zone encompasses several averaging areas, analyses do not show a spatial trend or other spatial pattern across that zone; and
- The number of samples has been shown to be sufficient for a statistical analysis.

Any included statistical spreadsheet is based on an in-house method of statistical analysis, in line with those outlined within the CL:AIRE guidance (2020).

Treatment of Hot-Spots

- A statistical test is applied to establish whether the data is a part of a single set, or whether data outliers are present.
- Provided that the data is based on random sampling and no distinct contamination source was present at the sampling location, the hot-spot(s) may be excluded and the mean of the remaining data assessed.

9. Ground and Water Limited Soil Assessment Criteria

The Soil Assessment Criteria used in the preparation of the Generic Quantitative Risk Assessment are tabulated in the following pages, where the source of each has been outlined in the previous sections.

9.1. Inorganics

SoBRA – Acute Generic Assessment Criteria						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Cyanide	24	24	24	1400	24	24

9.2. Metals

C4SL Low Level of Toxicological Concern						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Lead	< 200	< 310	< 80	< 2300	< 630	< 1300

LQM/CIEH Suitable 4 Use Levels – Metals and Semi-metals						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Arsenic	37	40	43	640	79	170
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11000	45	240000	21000	46000
Cadmium	11	85	1.9	190	120	532
Chromium (III)	910	910	18000	8600	1500	33000
Chromium (VI)	6	6	1.8	33	7.7	220
Copper	2400	7100	520	68000	12000	44000
Elemental Mercury	1.2	1.2	21	58	16	30
Inorganic Mercury	40	56	19	1100	120	240
Methylmercury	11	15	6	320	40	68
Nickel	130	180	53	980	230	800
Selenium	250	430	88	12000	1100	1800
Vanadium	410	1200	91	9000	2000	5000
Zinc	3700	40000	620	730000	81000	170000

Phytotoxicity (Harmful to Plants) Threshold Trigger Values			
Determinand	**Soil pH < 6.0 (mg/kg)**	**Soil pH 6.0 – 7.0 (mg/kg)**	**Soil pH > 7.0 (mg/kg)**
Copper	100	135	200
Nickel	60	75	110
Zinc	200	200	300
Notes: BS3882:2015 – *Specification for Topsoil*. Based on a wide range of common plants that will be exposed to multi-purpose topsoil. Toxicity of contaminant may also be impacted by pH of soils. Site observation of plant vitality may give additional guidance.			

CL:AIRE Soil Generic Assessment Criteria				
Determinand	**Residential (mg/kg)**	**Residential without plant uptake (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Antimony	ND	550	ND	7500
Barium	ND	1300	ND	22000
Molybdenum	ND	670	ND	17000
ND – Not derived				

9.3. Total Petroleum Hydrocarbons (TPHs)

9.3.1. BTEX Compounds

LQM/CIEH Suitable 4 Use Levels – BTEX Compounds							
Determinand	**Soil Organic Matter**	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Benzene	1.0% SOM	0.087	0.38	0.017	27	72	90
	2.5% SOM	0.170	0.70	0.034	47	72	100
	6.0% SOM	0.370	1.40	0.075	90	73	110
Toluene	1.0% SOM	130	880	22	56000	56000	87000
	2.5% SOM	290	1900	51	110000	56000	95000
	6.0% SOM	660	3900	120	180000	56000	100000
Ethylbenzene	1.0% SOM	47	83	16	5700	24000	17000
	2.5% SOM	110	190	39	13000	24000	22000
	6.0% SOM	260	440	91	27000	25000	27000
o-Xylene	1.0% SOM	60	88	28	6600	41000	17000
	2.5% SOM	140	210	67	15000	42000	24000
	6.0% SOM	330	480	160	33000	43000	33000
m-Xylene	1.0% SOM	59	82	31	6200	41000	17000
	2.5% SOM	140	190	74	14000	42000	24000
	6.0% SOM	320	450	170	31000	43000	33000
p-Xylene	1.0% SOM	56	79	29	5900	41000	17000
	2.5% SOM	130	180	69	14000	42000	23000
	6.0% SOM	310	430	160	30000	43000	31000
SOM = Soil Organic Matter Content (%)							

9.3.2. Total Petroleum Hydrocarbons – Aliphatic

LQM/CIEH Suitable 4 Use Levels For TPH							
Aliphatic		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
EC 5-6	1.0% SOM	42	42	730	3,200 (304) [sol]	570,000 (304) [sol]	95,000 (304) [sol]
	2.5% SOM	78	78	1,700	5,900 (558) [sol]	590,000	130,000 (558) [sol]
	6.0% SOM	160	160	3,900	12,000 (1150) [sol]	600,000 (1150)[sol]	180,000 (1150) [sol]
EC >6-8	1.0% SOM	100	100	2,300	7,800 (144) [sol]	600,000	150,000 (144) [sol]
	2.5% SOM	230	230	5,600	17,000 (322) [sol]	610,000	220,000 (322) [sol]
	6.0% SOM	530	530	13,000	40,000 (736) [sol]	620,000	320,000 (736) [sol]
EC >8-10	1.0% SOM	27	27	320	2,000 (78) [sol]	13,000	14,000 (78) [sol]
	2.5% SOM	65	65	770	4,800 (118) [vap]	13,000	18,000 (118) [vap]
	6.0% SOM	150	150	1,700	11,000 (451) [vap]	13,000	21,000 (451) [vap]
EC >10-12	1.0% SOM	130 (48) [vap]	130 (48) [vap]	2,200	9,700 (48) [sol]	13,000	21,000 (48) [sol]
	2.5% SOM	330 (118) [vap]	330 (118) [vap]	4,400	23,000 (118) [vap]	13,000	23,000 (118) [vap]
	6.0% SOM	760 (283) [vap]	760 (283) [vap]	7,300	47,000 (283) [vap]	13,000	24,000 (283) [vap]
EC >12-16	1.0% SOM	1,100 (24) [sol]	1,100 (24) [sol]	11,000	59,000 (24) [sol]	13,000	25,000 (24) [sol]
	2.5% SOM	2,400 (59) [sol]	2,400 (59) [sol]	13,000	82,000 (59) [sol]	13,000	25,000 (59) [sol]
	6.0% SOM	4,300 (142) [sol]	4,400 (142) [sol]	13,000	90,000 (142) [sol]	13,000	26,000 (142) [sol]
EC >16-35	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000
EC >35-44	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.3.3. Total Petroleum Hydrocarbons – Aromatic

LQM/CIEH Suitable 4 Use Levels For TPH							
Aromatic		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
EC 5-7 (Benzene)	1.0% SOM	70	370	13	26,000 (1220) [sol]	56,000	76,000 (1220 [sol]
	2.5% SOM	140	690	27	46,000 (2260) [sol]	56,000	84,000 (2260) [sol]
	6.0% SOM	300	1,400	57	86,000 (4710) [sol]	56,000	92,000 (4710) [sol]
EC >7-8 (Toluene)	1.0% SOM	130	860	22	56,000 (869) [vap]	56,000	87,000 (869) [sol]
	2.5% SOM	290	1,800	51	110,000 (1920) [sol]	56,000	95,000 (1920) [sol]
	6.0% SOM	660	3,900	120	180,000 (4360) [vap]	56,000	100,000 (4360) [vap]
EC >8-10	1.0% SOM	34	47	8.6	3,500 (613) [vap]	5,000	7,200 (613) [vap]
	2.5% SOM	83	110	21	8,100 (1500) [vap]	5,000	8,500 (1500) [vap]
	6.0% SOM	190	270	51	17,000 (3850) [vap]	5,000	9,300 (3580) [vap]
EC >10-12	1.0% SOM	74	250	13	16,000 (364) [sol]	5,000	9,200 (364) [sol]
	2.5% SOM	180	590	31	28,000 (899) [sol]	5,000	9,700 (889) [sol]
	6.0% SOM	380	1,200	74	34,000 (2150) [sol]	5,000	10,000
EC >12-16	1.0% SOM	140	1,800	23	36,000 (169) [sol]	5,100	10,000
	2.5% SOM	330	2,300 (419) [sol]	57	37,000	5,100	10,000
	6.0% SOM	660	2,500	130	38,000	5,000	10,000
EC >16-21	1.0% SOM	260	1,900	46	28,000	3,800	7,600
	2.5% SOM	540	1,900	110	28,000	3,800	7,700
	6.0% SOM	930	1,900	260	28,000	3,800	7,800
EC >21-35	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >35-44	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >44-70	1.0% SOM	1,600	1,900	1,200	28,000	3,800	7,800
	2.5% SOM	1,800	1,900	2,100	28,000	3,800	7,800
	6.0% SOM	1,900	1,900	3,000	28,000	3,800	7,900

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.4. Polycyclic Aromatic Hydrocarbons (PAHs)

LQM/CIEH Suitable 4 Use Levels For Polycyclic Aromatic Hydrocarbons (PAHs)							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Acenapthene	1.0% SOM	210	3,000 (57.0) sol	34	84,000(57.0) sol	15,000	29,000
	2.5% SOM	510	4,700(141) sol	85	97,000(141) sol	15,000	30,000
	6.0% SOM	1100	6,000(336) sol	200	100,000	15,000	30,000
Acenapthylene	1.0% SOM	170	2,900(86.1) sol	28	83,000(86.1) sol	15,000	29,000
	2.5% SOM	420	4,600(212) sol	69	97,000(212) sol	15,000	30,000
	6.0% SOM	920	6,000(506) sol	160	100,000	15,000	30,000
Anthracene	1.0% SOM	2,400	31,000(1.17) vap	380	520,000	74,000	150,000
	2.5% SOM	5,400	35,000	950	540,000	74,000	150,000
	6.0% SOM	11,000	37,000	2,200	540,000	74,000	150,000
Benzo(a)anthracene	1.0% SOM	7.20	11	2.90	170	29	49
	2.5% SOM	11	14	6.50	170	29	56
	6.0% SOM	13	15	13	180	29	62
Benzo(a)pyrene	1.0% SOM	2.20	3.20	0.97	35	5.70	11
	2.5% SOM	2.70	3.20	2.00	35	5.70	12
	6.0% SOM	3.00	3.20	3.50	36	5.70	13
Benzo(b)flouranthene	1.0% SOM	2.60	3.90	0.99	44	7.10	13
	2.5% SOM	3.30	4.00	2.10	44	7.20	15
	6.0% SOM	3.70	4.00	3.90	45	7.20	16
Benzo(ghi)perylene	1.0% SOM	320	360	290	3,900	640	1,400
	2.5% SOM	340	360	470	4,000	640	1,500
	6.0% SOM	350	360	640	4,000	640	1,600
Benzo(k)flouranthene	1.0% SOM	77	110	37	1,200	190	370
	2.5% SOM	93	110	75	1,200	190	410
	6.0% SOM	100	110	130	1,200	190	440
Chrysene	1.0% SOM	15	30	4.10	350	57	93
	2.5% SOM	22	31	9.40	350	57	110
	6.0% SOM	27	32	19	350	57	120
Dibenzo(ah)anthracene	1.0% SOM	0.24	0.31	0.14	3.50	0.57	1.10
	2.5% SOM	0.28	0.32	0.27	3.50	0.57	1.30
	6.0% SOM	0.30	0.32	0.43	3.60	0.58	1.40
Flouranthene	1.0% SOM	280	1,500	52	23,000	3,100	6,300
	2.5% SOM	560	1,600	130	23,000	3,100	6,300
	6.0% SOM	890	1,600	290	23,000	3,100	6,300
Flourene	1.0% SOM	170	2,800 (30.9) sol	27	63,000(30.9) sol	9,900	20,000
	2.5% SOM	400	3,800(76.5) sol	67	68,000	9,900	20,000
	6.0% SOM	860	4,500(183) sol	160	71,000	9,900	20,000
Indeno(123-cd)pyrene	1.0% SOM	27	45	9.50	500	82	150
	2.5% SOM	36	46	21	510	82	170
	6.0% SOM	41	46	39	510	82	180
Napthalene	1.0% SOM	2.30	2.6	4.10	190 (76.4) sol	4,900	1,200(76.4) sol
	2.5% SOM	5.60	5.6	10	460 (183) sol	4,900	1,900(183) sol
	6.0% SOM	13	13	24	1,100 (432) sol	4,900	3,000
Phenanthrene	1.0% SOM	95	1,300(183) sol	15	22,000	3,100	6,200
	2.5% SOM	220	1,500	38	22,000	3,100	6,200
	6.0% SOM	440	1,500	90	23,000	3,100	6,300
Pyrene	1.0% SOM	620	3,700	110	54,000	7,400	15,000
	2.5% SOM	1200	3,800	270	54,000	7,400	15,000
	6.0% SOM	2000	3,800	620	54,000	7,400	15,000
Coal Tar (Benzo(a)pyrene used as marker compound)	1.0% SOM	0.79	1.2	0.32	15	2.20	4.40
	2.5% SOM	0.98	1.2	0.67	15	2.20	4.70
	6.0% SOM	1.10	1.2	1.20	15	2.20	4.80

SOM = Soil Organic Matter Content (%)

vap – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

sol – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.5. Volatile and Semi-volatile Organic Compounds

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Chloroalkanes & alkenes							
1,2 Dichloroethane	1.0% SOM	0.0071	0.0092	0.0046	0.67	29	21
	2.5% SOM	0.011	0.013	0.0083	0.97	29	24
	6.0% SOM	0.019	0.023	0.016	1.70	29	28
1,1,2,2 Tetrachloroethane	1.0% SOM	1.60	3.90	0.41	270	1,400	1,800
	2.5% SOM	3.40	8.00	0.89	550	1,400	2,100
	6.0% SOM	7.50	17	2.00	1,100	1,400	2,300
1,1,1,2 Tetrachloroethane	1.0% SOM	1.20	1.50	0.79	110	1,400	1,500
	2.5% SOM	2.80	3.50	1.90	250	1,400	1,800
	6.0% SOM	6.40	8.20	4.40	560	1,400	2,100
Tetrachloroethene	1.0% SOM	0.18	0.18	0.65	19	1,400	810 [sol](424)
	2.5% SOM	0.39	0.40	1.50	42	1,400	1,100 [sol](951)
	6.0% SOM	0.90	0.92	3.60	95	1,400	1,500
1,1,1 Trichloroethane	1.0% SOM	8.80	9.00	48	660	140,000	57,000 [vap](1425)
	2.5% SOM	18	18	110	1,300	140,000	76,000 [vap](2915)
	6.0% SOM	39	40	240	3,000	140,000	100,000 [vap] (6392)
Tetrachloromethene	1.0% SOM	0.026	0.026	0.45	2.90	890	190
	2.5% SOM	0.056	0.056	1.00	6.30	920	270
	6.0% SOM	0.130	0.130	2.40	14	950	400
Trichloroethene	1.0% SOM	0.016	0.017	0.041	1.20	120	70
	2.5% SOM	0.034	0.036	0.091	2.60	120	91
	6.0% SOM	0.075	0.080	0.210	5.70	120	120
Trichloromethane	1.0% SOM	0.91	1.20	0.42	99	2,500	2,600
	2.5% SOM	1.70	2.10	0.83	170	2,500	2,800
	6.0% SOM	3.40	4.20	1.70	350	2,500	3,100
Vinyl Chloride	1.0% SOM	0.00064	0.00077	0.00055	0.059	3.50	4.80
	2.5% SOM	0.00087	0.00100	0.00100	0.077	3.50	5.00
	6.0% SOM	0.00014	0.00150	0.00180	0.120	3.50	5.40
Explosives							
2,4,6 Trinitrotoluene	1.0% SOM	1.60	65	0.24	1,000	130	260
	2.5% SOM	3.70	66	0.58	1,000	130	270
	6.0% SOM	8.10	66	1.40	1,000	130	270
RDX (Hexogen/Cyclonite/1,3,5-trinitro-1,3,5-triazacyclohexane)	1.0% SOM	120	13,000	17	210,000	26,000	49,000(18.7)[sol]
	2.5% SOM	250	13,000	38	210,000	26,000	51,000
	6.0% SOM	540	13,000	85	210,000	27,000	53,000
HMX (Octogen/1,3,5,7-tetrenitro-1,3,5,7-tetrazacyclo-octane)	1.0% SOM	5.70	67,00	0.86	110,000	13,000	23,000(0.35)[vap]
	2.5% SOM	13	67,00	1.90	110,000	13,000	23,000(0.39)[vap]
	6.0% SOM	26	67,00	3.90	110,000	13,000	24,000(0.48)[vap]
Atrazine	1.0% SOM	3.30	610	0.50	9,300	1,200	2,300
	2.5% SOM	7.60	620	1.20	9,400	1,200	2,400
	6.0% SOM	17.40	620	2.70	9,400	1,200	2,400
[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.							
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.							

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Pesticides							
Aldrin	1.0% SOM	5.70	7.30	3.20	170	18	30
	2.5% SOM	6.60	7.40	6.10	170	18	31
	6.0% SOM	7.10	7.50	9.60	170	18	31
Dieldrin	1.0% SOM	0.97	7.00	0.17	170	18	30
	2.5% SOM	2.00	7.30	0.41	170	18	30
	6.0% SOM	3.50	7.40	0.96	170	18	31
Dichlorvos	1.0% SOM	0.032	6.40	0.0049	140	16	26
	2.5% SOM	0.066	6.50	0.0100	140	16	26
	6.0% SOM	0.140	6.60	0.0220	140	16	27
Alpha - Endosulfan	1.0% SOM	7.40	160(0.003)[vap]	1.20	5,600(0.003)[vap]	1,200	2,400
	2.5% SOM	18	280(0.007)[vap]	2.90	7,400(0.007)[vap]	1,200	2,400
	6.0% SOM	41	410(0.016)[vap]	6.80	8,400(0.016)[vap]	1,200	2,400
Beta - Endosulfan	1.0% SOM	7.00	190(0.00007)[vap]	1.10	6,300(0.00007)[vap]	1,200	2,400
	2.5% SOM	17	320(0.0002)[vap]	2.70	7,800(0.0002)[vap]	1,200	2,400
	6.0% SOM	39	440(0.0004)[vap]	6.40	8700	1,200	2,500
Alpha - Hexachlorocyclohexanes	1.0% SOM	0.23	6.90	0.035	170	24	47
	2.5% SOM	0.55	9.20	0.087	180	24	48
	6.0% SOM	1.20	11	0.210	180	24	48
Beta - Hexachlorocyclohexanes	1.0% SOM	0.085	3.70	0.013	65	8.10	15
	2.5% SOM	0.200	3.80	0.032	65	8.10	15
	6.0% SOM	0.460	3.80	0.077	65	8.10	16
Gamma - Hexachlorocyclohexanes	1.0% SOM	0.06	2.90	0.0092	67	8.2	14
	2.5% SOM	0.14	3.30	0.0230	69	8.2	15
	6.0% SOM	0.33	3.50	0.0540	70	8.2	15
Chlorobenzenes							
Chlorobenzene	1.0% SOM	0.46	0.46	5.90	56	11,000	1,300(675)[sol]
	2.5% SOM	1.00	1.00	14	130	13,000	2,000(1520)[sol]
	6.0% SOM	2.40	2.40	32	290	14,000	2,900
1,2-Dichlorobenzene	1.0% SOM	23	24	94	2,000 (571) [sol]	90,000	24,000(571)[sol]
	2.5% SOM	55	57	230	4,800 (1370) [sol]	95,000	36,000(1370)[sol]
	6.0% SOM	130	130	540	11,000 (3240) [sol]	98,000	51,000(3240)[sol]
1,3-Dichlorobenzene	1.0% SOM	0.40	0.44	0.25	30	300	390
	2.5% SOM	1.00	1.10	0.60	73	300	440
	6.0% SOM	2.30	2.50	1.50	170	300	470
1,4-Dichlorobenzene	1.0% SOM	61	61	15	4,400 (224)[vap]	17,000[g]	36,000 (224)[vap]
	2.5% SOM	150	150	37	10,000 (540)[vap]	17,000[g]	36,000 (540)[vap]
	6.0% SOM	350	350	88[g]	25,000 (1280)[vap]	17,000[g]	36,000 (1280)[vap]
1,2,3,-Trichlorobenzene	1.0% SOM	1.50	1.50	4.70	102	1,800	770(134[vap]
	2.5% SOM	3.60	3.70	12	250	1,800	1,100(330)[vap]
	6.0% SOM	8.60	8.80	28	590	1,800	1,600(789)[vap]
1,2,4,-Trichlorobenzene	1.0% SOM	2.60	2.60	55	220	15,000	1,700(318)[vap]
	2.5% SOM	6.40	6.40	140	530	17,000	2,600(786)[vap]
	6.0% SOM	15	15	320	1,300	19,000	4,000(1880)[vap]
1,3,5,-Trichlorobenzene	1.0% SOM	0.33	0.33	4.70	23	1,700	380(36.7)[vap]
	2.5% SOM	0.81	0.81	12	55	1,700	590(90.8)[vap]
	6.0% SOM	1.90	1.90	140	130	1,800	860(217)[vap]

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Chlorobenzenes (cont.)							
1,2,3,4,- Tetrachlorobenzene	1.0% SOM	15	24	4.40	1,700(122)^{vap}	830	1,500(122)^{vap}
	2.5% SOM	36	56	11	3,080(304)^{vap}	830	1,600
	6.0% SOM	78	120	26	4,400(728)^{vap}	830	1,600
1,2,3,5,- Tetrachlobenzene	1.0% SOM	0.66	0.75	0.38	49(39.4)^{vap}	78	110(39)^{vap}
	2.5% SOM	1.60	1.90	0.90	120(98.1)^{vap}	79	120
	6.0% SOM	3.70	4.30	2.20	240(235)^{vap}	79	130
1,2,4, 5,- Tetrachlobenzene	1.0% SOM	0.33	0.73	0.06	42(19.7)^{sol}	13	25
	2.5% SOM	0.77	1.70	0.16	72(49.1)^{sol}	13	26
	6.0% SOM	1.60	3.50	0.37	96	13	26
Pentachlrobenzene	1.0% SOM	5.80	19	1.20	640(43.0)^{sol}	100	190
	2.5% SOM	12	30	3.10	770(107)^{sol}	100	190
	6.0% SOM	22	38	7.00	830	100	190
Hexachlorobenzene	1.0% SOM	1.80(0.20)^{vap}	4.10 (0.20)^{vap}	0.47	110(0.20)^{vap}	16	30
	2.5% SOM	3.30(0.50)^{vap}	5.70 (0.50)^{vap}	1.10	120	16	30
	6.0% SOM	4.90	6.70 (1.2)^{vap}	2.50	120	16	30
Phenols & Chlorophenols							
BTEX	1.0% SOM	280	750	66	760^{dir}(31,000)	760^{dir}(11,000)	760^{dir}(8,600)
	2.5% SOM	550	1,300	140	1,500^{dir}(35,000)	1,500^{dir}(11,000)	1,500^{dir}(9,700)
	6.0% SOM	1100	2,300	280	3,200^{dir}(37,000)	3,200^{dir}(11,000)	3,200^{dir}(11,000)
Chlorophenols (4 Congeners)	1.0% SOM	0.87	94	0.13	3,500	620	1,100
	2.5% SOM	2.00	150	0.30	4,000	620	1,100
	6.0% SOM	4.50	210	0.70	4,300	620	1,100
Pentachlorophenols	1.0% SOM	0.22	27(16.4)^{vap}	0.03	400	60	110
	2.5% SOM	0.52	29	0.08	400	60	120
	6.0% SOM	1.20	31	0.19	400	60	120
Others							
Carbon Disulphide	1.0% SOM	0.14	0.14	4.80	11	11,000	1,300
	2.5% SOM	0.29	0.29	10	22	11,000	1,900
	6.0% SOM	0.62	0.62	23	47	12,000	2,700
Hexachloro-1,3-Butadiene	1.0% SOM	0.29	0.32	0.25	31	25	48
	2.5% SOM	0.70	0.78	0.61	68	25	50
	6.0% SOM	1.60	1.80	1.40	120	25	51
^{vap} – GAC presented exceeds the vapour saturation limit, which is presented in brackets.							
^{sol} – GAC presented exceeds the soil saturation limit, which is presented in brackets.							

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
1,1,2 Trichloroethane	1.0% SOM	0.60	0.88	0.28	94
	2.5% SOM	1.20	1.8	0.61	190
	6.0% SOM	2.70	3.9	1.40	400
1,1-Dichloroethane	1.0% SOM	2.40	2.50	9.20	280
	2.5% SOM	3.90	4.10	17	450
	6.0% SOM	7.40	7.70	35	850
1,1-Dichloroethene	1.0% SOM	0.23	0.23	2.80	26
	2.5% SOM	0.40	0.41	5.60	46
	6.0% SOM	0.82	0.82	12	92
1,2,4-Trimethylbenzene	1.0% SOM	0.35	0.41	0.38	42
	2.5% SOM	0.85	0.99	0.93	99
	6.0% SOM	2.00	2.30	2.20	220
1,2-Dichloropropane	1.0% SOM	0.024	0.024	0.62	3.3
	2.5% SOM	0.042	0.042	1.20	5.9
	6.0% SOM	0.084	0.085	2.60	12
2,4-Dimethylphenol	1.0% SOM	19	210	3.10	16000*
	2.5% SOM	43	410	7.20	24000*
	6.0% SOM	97	730	17	30000*
2,4-Dinitrotoluene	1.0% SOM	1.50	170*	0.22	3700*
	2.5% SOM	3.20	170	0.49	3700*
	6.0% SOM	7.20	170	1.10	3800*
2,6-Dinitrotoluene	1.0% SOM	0.78	78	0.12	1900*
	2.5% SOM	1.70	84	0.27	1900*
	6.0% SOM	3.90	87	0.61	1900*
2-Chloronapthalene	1.0% SOM	3.70	3.80	40	390*
	2.5% SOM	9.20	9.30	98	960*
	6.0% SOM	22	22	230	2200*
Biphenyl	1.0% SOM	66*	220*	14	18000*
	2.5% SOM	160	500*	35	33000*
	6.0% SOM	360	980*	83	48000*
Bis (2-ethylhexyl) phthalate	1.0% SOM	280*	2700*	47*	85000*
	2.5% SOM	610*	2800*	120*	86000*
	6.0% SOM	1100*	2800*	280*	86000*
Bromobenzene	1.0% SOM	0.87	0.91	3.2	97
	2.5% SOM	2.0	2.1	7.6	220
	6.0% SOM	4.7	4.9	18	520
Bromodichloromethane	1.0% SOM	0.016	0.019	0.016	2.1
	2.5% SOM	0.030	0.034	0.032	3.7
	6.0% SOM	0.061	0.070	0.068	7.6
Bromoform	1.0% SOM	2.8	5.2	0.95	760
	2.5% SOM	5.9	11	2.1	1500
	6.0% SOM	13	23	4.6	3100
Butyl benzyl phthalate	1.0% SOM	1400*	42000*	220*	940000*
	2.5% SOM	3300*	44000*	550*	940000*
	6.0% SOM	7200*	44000*	1300*	950000*

*soil concentration above saturation limit

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Chloroethane	1.0% SOM	8.3	8.4	110	960
	2.5% SOM	11	11	200	1300
	6.0% SOM	18	18	380	2100
Chloromethane	1.0% SOM	0.0083	0.0085	0.066	1.0
	2.5% SOM	0.0098	0.0099	0.13	1.2
	6.0% SOM	0.013	0.013	0.23	1.6
***Cis* 1,2 Dichloroethene**	1.0% SOM	0.11	0.12	0.26	14
	2.5% SOM	0.19	0.20	0.50	24
	6.0% SOM	0.37	0.39	1.0	47
Dichloromethane	1.0% SOM	0.58	2.10	0.10	270
	2.5% SOM	0.98	2.80	0.19	360
	6.0% SOM	1.70	4.50	0.34	560
Diethyl Phthalate	1.0% SOM	120*	1800*	19*	150000*
	2.5% SOM	260*	3500*	41*	220000*
	6.0% SOM	570*	6300*	94*	290000*
Di-*n*-butyl phthalate	1.0% SOM	13*	450*	2.00	15000*
	2.5% SOM	31*	450*	5.00	15000*
	6.0% SOM	67*	450*	12	15000*
Di-*n*-octyl phthalate	1.0% SOM	2300*	3400*	940*	89000*
	2.5% SOM	2800*	3400*	2100*	89000*
	6.0% SOM	3100*	3400*	3900*	89000*
Hexachloroethane	1.0% SOM	0.20	0.22	0.27	22*
	2.5% SOM	0.48	0.54	0.67	53*
	6.0% SOM	1.10	1.30	1.60	120*
Isopropylbenzene	1.0% SOM	11	12	32	1400*
	2.5% SOM	27	28	79	3300*
	6.0% SOM	64	67	190	7700*
Methyl *tert*-butyl ether (MTBE)	1.0% SOM	49	73	23	7900
	2.5% SOM	84	120	44	13000
	6.0% SOM	160	220	90	24000
Propylbenzene	1.0% SOM	34	40	34	4100*
	2.5% SOM	82	97	83	9700*
	6.0% SOM	190	230	200	21000*
Styrene	1.0% SOM	8.10	35	1.60	3300*
	2.5% SOM	19	78	3.70	6500*
	6.0% SOM	43	170	8.70	11000*
Total Cresols (2-, 3-, and 4-methylphenol)	1.0% SOM	80	3700	12	160000
	2.5% SOM	180	5400	27	180000*
	6.0% SOM	400	6900	63	180000*
***Trans* 1,2 Dichloroethene**	1.0% SOM	0.19	0.19	0.93	22
	2.5% SOM	0.34	0.35	1.90	40
	6.0% SOM	0.70	0.71	0.24	81
Tributyl tin oxide	1.0% SOM	0.25	1.40	0.042	130*
	2.5% SOM	0.59	3.10	0.100	180*
	6.0% SOM	1.30	5.70	0.240	200*

*soil concentration above saturation limit

C4SL Low Level of Toxicological Concern							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
1,2-Dichloroethane (Ethylene Dichloride)	1.0% SOM	0.11	0.16	0.054	12	300	300
	2.5% SOM	0.18	0.24	0.10	17	310	330
	6.0% SOM	0.31	0.41	0.19	29	310	380
Cis-1,2-Dichloroethene	1.0% SOM	0.46	0.50	0.89	38	3,800	2,000
	2.5% SOM	0.78	0.84	1.7	64	3,800	2,400
	6.0% SOM	1.5	1.6	3.6	120	3,900	3,100
Tetrachloroethene (PCE)	1.0% SOM	0.31	0.32	2	24	3,200	1,400
	2.5% SOM	0.70	0.71	4.8	55	3,300	1,900
	6.0% SOM	1.60	1.60	11	130	3,400	2,500
Trans-1,2-Dichloroethene	1.0% SOM	0.90	0.93	3.70	69	13,000	5,600
	2.5% SOM	1.60	1.70	7.50	120	13,000	7,000
	6.0% SOM	3.30	3.40	16	260	13,000	9,100
Trichloroethene (TCE)	1.0% SOM	0.0093	0.0097	0.032	0.73	76	41
	2.5% SOM	0.020	0.020	0.072	1.5	78	54
	6.0% SOM	0.043	0.045	0.16	3.4	79	69
Vinyl Chloride (Chloroethene)	1.0% SOM	0.0064	0.015	0.0017	1.1	7.8	18
	2.5% SOM	0.010	0.019	0.0031	1.4	7.8	19
	6.0% SOM	0.017	0.029	0.0058	2.2	7.8	19

9.6. Asbestos

No asbestos or asbestos containing materials (ACM's) are considered acceptable on-site from a human health perspective. Therefore the GAC for asbestos & ACM's within any imported material should be none detected (ND).

APPENDIX H: Settlement and Heave Analysis Modelling

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 37 Horse Fair, Banbury, Oxfordshire OX16 0AE. Registered in England No 07032001

Pdisp Inputs and Outputs

Analysis Options

Property	Value
General	
Poisson's ra...	0.30000
Max E Ratio	1.50000
H boundary...	-44.00000
GSA piled r...	☐
Displaceme...	☑
Elastic	
Elastic	☑
Analysis Me...	Mindlin
Legacy	☐
Calculate H...	☑
Stiffness	Weighted aver...
Heave	☑
Effect of soil above lo...	
Vertical ...	☐
Horizont...	☑
Consolidation	
Consolidation	☐

Short Term Soil Profile

Layer ref.	Name	Level at top	No of intermediate displacement levels	Young's modulus		Poisson's ratio	Colour
				Top	Bottom		
		[m]		[kN/m²]	[kN/m²]		
Defaults	Layer #	0.000	5	50000	50000	0.200	
1	MG	0.000	5	10000	10000	0.450	
2	KPGM(c)	-1.200	5	24150	24150	0.450	
3	KPGM(g)	-2.200	5	100000	100000	0.300	
4	KPGM(g)	-4.000	5	78000	32000	0.300	
5	LCF	-6.000	5	22500	45000	0.450	
6	LCF	-7.000	5	45000	265500	0.450	

Long Term Soil Profile

Layer ref.	Name	Level at top	No of intermediate displacement levels	Young's modulus		Poisson's ratio	Colour
				Top	Bottom		
		[m]		[kN/m²]	[kN/m²]		
Defaults	Layer #	0.000	5	50000	50000	0.200	
1	MG	0.000	5	10000	10000	0.450	
2	KPGM(c)	-1.200	5	18113	18113	0.450	
3	KPGM(g)	-2.200	5	100000	100000	0.300	
4	KPGM(g)	-4.000	5	78000	32000	0.300	
5	LCF	-6.000	5	16875	33750	0.450	
6	LCF	-7.000	5	33750	199125	0.450	

Model 1 Pressures Applied

Load ref.	Name	Load position					Load value
		Z (level)	Polygon			Number of rectangles	Normal
			Wizard	Coordinates	Rectangle tolerance		(local z)
		[m]		[m]	[%]		[kN/m²]
Defaults	Poly Load #	0.000			10.0	5	0.00
1	Retaining Wall 1	-3.800	More...	(0,0) (24,0) (23,1) (1,1) (0,0)	10.0	11	-72.20
2	Retaining Wall 2	-3.800	More...	(24,0) (24,10.5) (23,9.5) (23,	10.0	11	-72.20
3	Retaining Wall 3	-3.800	More...	(24,10.5) (0,10.5) (1,9.5) (23	10.0	11	-72.20
4	Retainin Wall 4	-3.800	More...	(0,10.5) (0,0) (1,1) (1,9.5) (0,	10.0	11	-72.20

Model 2 Pressures Applied

Load ref.	Name	Load position					Load value
		Z (level)	Polygon			Number of rectangles	Normal
			Wizard	Coordinates	Rectangle tolerance		(local z)
		[m]		[m]	[%]		[kN/m²]
Defaults	Poly Load #	0.000			10.0	5	0.00
1	Retaining Wall 1	-3.800	More...	(0,0) (24,0) (23,1) (1,1) (0,0)	10.0	11	30.00
2	Retaining Wall 2	-3.800	More...	(24,0) (24,10.5) (23,9.5) (23,	10.0	11	30.00
3	Retaining Wall 3	-3.800	More...	(24,10.5) (0,10.5) (1,9.5) (23	10.0	11	30.00
4	Retainin Wall 4	-3.800	More...	(0,10.5) (0,0) (1,1) (1,9.5) (0,	10.0	11	30.00

Model 3 Pressures Applied

Load ref.	Name	Load position					Load value
		Z (level)	Polygon			Number of rectangles	Normal
			Wizard	Coordinates	Rectangle tolerance		(local z)
		[m]		[m]	[%]		[kN/m²]
Defaults	Poly Load #	0.000			10.0	5	0.00
1	Retaining Wall 1	-3.800	More...	(0,0) (24,0) (23,1) (1,1) (0,0)	10.0	11	30.00
2	Retaining Wall 2	-3.800	More...	(24,0) (24,10.5) (23,9.5) (23,	10.0	11	30.00
3	Retaining Wall 3	-3.800	More...	(24,10.5) (0,10.5) (1,9.5) (23	10.0	11	30.00
4	Retainin Wall 4	-3.800	More...	(0,10.5) (0,0) (1,1) (1,9.5) (0,	10.0	11	30.00
5	Mass X	-3.800	More...	(1,1) (23,1) (23,9.5) (1,9.5) (	10.0	1	-72.20

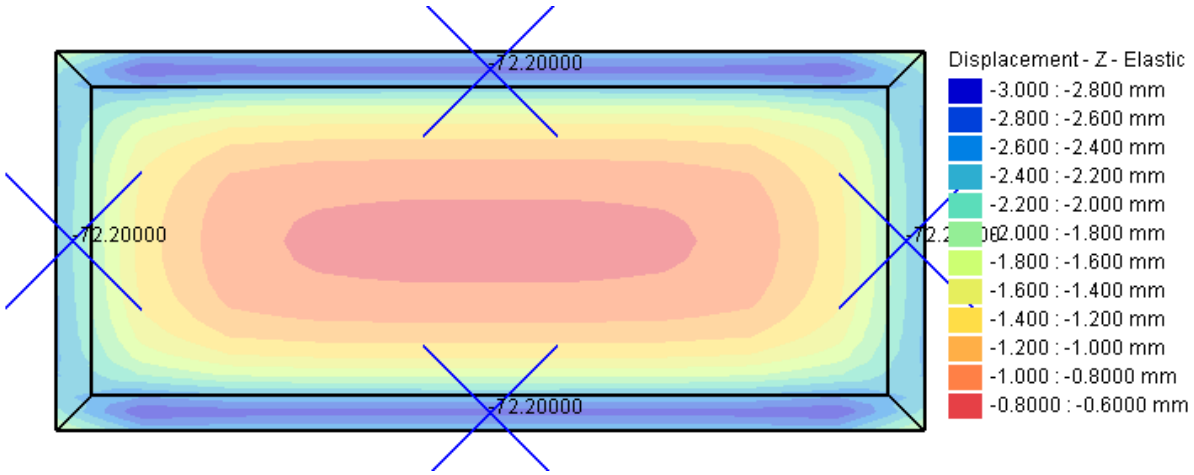
Model 4 Pressures Applied

Load ref.	Name	Load position					Load value
		Z (level)	Polygon			Number of rectangles	Normal
			Wizard	Coordinates	Rectangle tolerance		(local z)
		[m]		[m]	[%]		[kN/m²]
Defaults	Poly Load #	0.000			10.0	5	0.00
1	Retaining Wall 1	-3.800	More...	(0,0) (24,0) (23,1) (1,1) (0,0)	10.0	11	93.00
2	Retaining Wall 2	-3.800	More...	(24,0) (24,10.5) (23,9.5) (23,	10.0	11	93.00
3	Retaining Wall 3	-3.800	More...	(24,10.5) (0,10.5) (1,9.5) (23	10.0	11	93.00
4	Retainin Wall 4	-3.800	More...	(0,10.5) (0,0) (1,1) (1,9.5) (0,	10.0	11	93.00
5	Mass X	-3.800	More...	(1,1) (23,1) (23,9.5) (1,9.5) (	10.0	1	-72.20
6	Slab	-3.800	More...	(0,0) (24,0) (24,10.5) (0,10.5	10.0	1	10.00

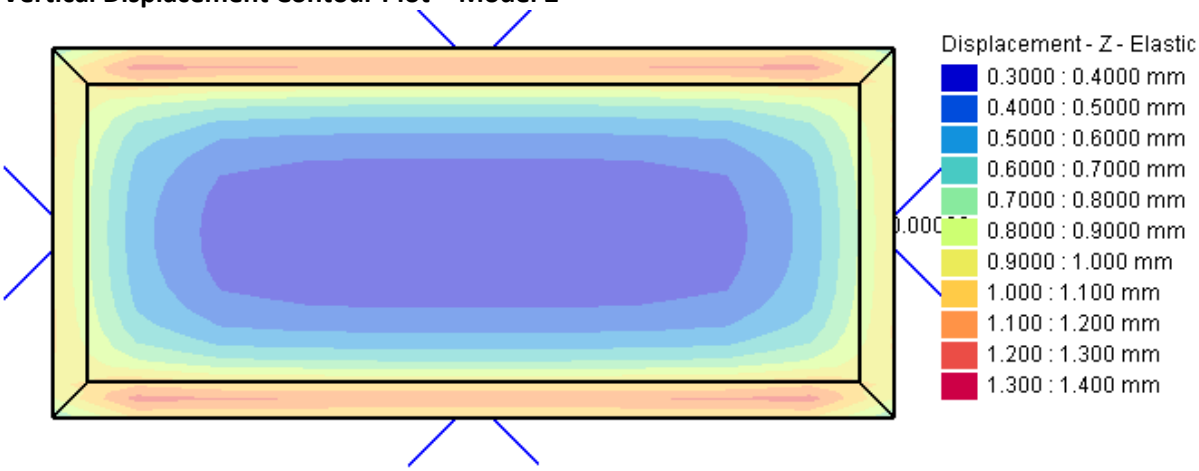
Model 5 Pressures Applied

Load ref.	Name	Load position					Load value
		Z (level)	Polygon			Number of rectangles	Normal
			Wizard	Coordinates	Rectangle tolerance		(local z)
		[m]		[m]	[%]		[kN/m²]
Defaults	Poly Load #	0.000			10.0	5	0.00
1	Retaining Wall 1	-3.800	More...	(0,0) (24,0) (23,1) (1,1) (0,0)	10.0	11	93.00
2	Retaining Wall 2	-3.800	More...	(24,0) (24,10.5) (23,9.5) (23,	10.0	11	93.00
3	Retaining Wall 3	-3.800	More...	(24,10.5) (0,10.5) (1,9.5) (23	10.0	11	93.00
4	Retainin Wall 4	-3.800	More...	(0,10.5) (0,0) (1,1) (1,9.5) (0,	10.0	11	93.00
5	Mass X	-3.800	More...	(1,1) (23,1) (23,9.5) (1,9.5) (	10.0	1	-72.20
6	Slab	-3.800	More...	(0,0) (24,0) (24,10.5) (0,10.5	10.0	1	10.00

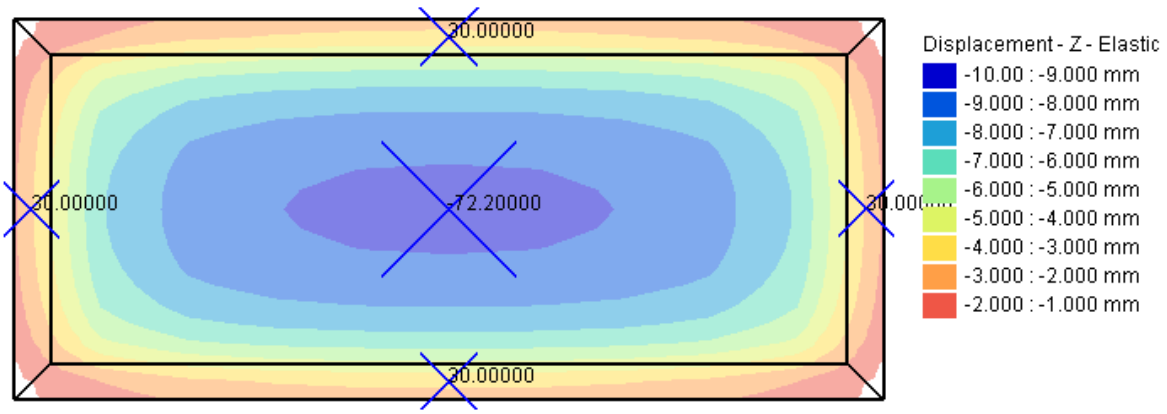
Vertical Displacement Contour Plot – Model 1



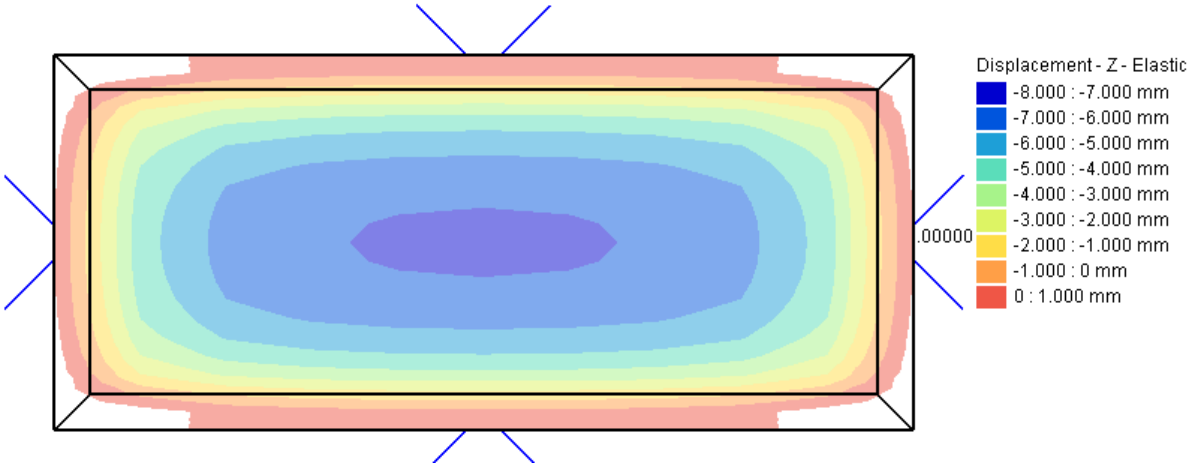
Vertical Displacement Contour Plot – Model 2



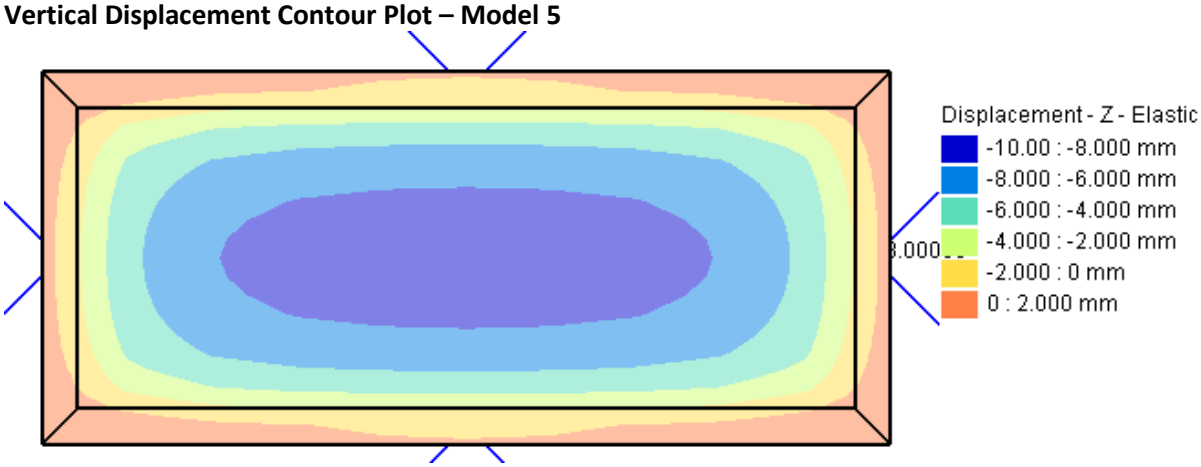
Vertical Displacement Contour Plot – Model 3



Vertical Displacement Contour Plot – Model 4



Vertical Displacement Contour Plot – Model 5



APPENDIX I: Waste Hazard Assessment

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

50972-04UVQ-2V5JZ

Job name

GWPR5909

Description/Comments

Project

GWPR5909

Site

34 Nassau Road SW13 9QE

Classified by

Name:
Adam Young
Date:
05 Apr 2024 08:04 GMT
Telephone:

Company:
Ground and Water
2 The long Barn, Norton Farm, Selbourne Road,
Alton
GU34 3NB

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: -

Course	Date
Hazardous Waste Classification	-

Purpose of classification

2 - Material Characterisation

Address of the waste

34 Nassau Road **Post Code** SW13 9QE

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Redevelopment of site

Description of the specific process, sub-process and/or activity that created the waste

Waste created during the excavation of soils

Description of the waste

Made Ground

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01--12032024-1.20		Non Hazardous		3
2	WS02--12032024-0.20		Non Hazardous		5
3	WS01--12032024-2.00		Non Hazardous		8
4	WS02--12032024-1.50		Non Hazardous		9
5	WS02--12032024-3.00		Non Hazardous		10

Related documents

#	Name	Description
1	24-009116_HWOL.hwol	i2 Analytical .hwol file used to populate the Job

Report

Created by: Adam Young

Created date: 05 Apr 2024 08:04 GMT

Classification of sample: WS01--12032024-1.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS01--12032024-1.20
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<**LOD**
2	monohydric phenols			P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				2 mg/kg	1.884	3.768 mg/kg	0.000377 %		
4	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		1.7 mg/kg	23.173	32.697 mg/kg	0.00327 %	✓	
5	pH			PH		8 pH		8 pH	8pH		
6	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		18 mg/kg		14.94 mg/kg	0.00149 %	✓	
7	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		67 mg/kg	1.126	62.611 mg/kg	0.00626 %	✓	
9	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.9 mg/kg		0.747 mg/kg	0.0000747 %	✓	
10	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		24 mg/kg	1.579	31.464 mg/kg	0.00315 %	✓	
11	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	220 mg/kg		182.6 mg/kg	0.0183 %	✓	
12	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		55 mg/kg	1.785	81.494 mg/kg	0.00815 %	✓	
14	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		110 mg/kg	2.469	225.447 mg/kg	0.0225 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene				0.38	mg/kg		0.315	mg/kg	0.0000315 %	✓	
			205-917-1	208-96-8									
16		acenaphthene				0.1	mg/kg		0.083	mg/kg	0.0000083 %	✓	
			201-469-6	83-32-9									
17		anthracene				3	mg/kg		2.49	mg/kg	0.000249 %	✓	
			204-371-1	120-12-7									
18		benzo[a]anthracene				5.7	mg/kg		4.731	mg/kg	0.000473 %	✓	
		601-033-00-9	200-280-6	56-55-3									
19		benzo[a]pyrene; benzo[def]chrysene				4.7	mg/kg		3.901	mg/kg	0.00039 %	✓	
		601-032-00-3	200-028-5	50-32-8									
20		benzo[b]fluoranthene				6.1	mg/kg		5.063	mg/kg	0.000506 %	✓	
		601-034-00-4	205-911-9	205-99-2									
21		benzo[k]fluoranthene				2.3	mg/kg		1.909	mg/kg	0.000191 %	✓	
		601-036-00-5	205-916-6	207-08-9									
22		benzo[ghi]perylene				2.6	mg/kg		2.158	mg/kg	0.000216 %	✓	
			205-883-8	191-24-2									
23		chrysene				5.7	mg/kg		4.731	mg/kg	0.000473 %	✓	
		601-048-00-0	205-923-4	218-01-9									
24		dibenz[a,h]anthracene				0.63	mg/kg		0.523	mg/kg	0.0000523 %	✓	
		601-041-00-2	200-181-8	53-70-3									
25		fluoranthene				14	mg/kg		11.62	mg/kg	0.00116 %	✓	
			205-912-4	206-44-0									
26		fluorene				0.43	mg/kg		0.357	mg/kg	0.0000357 %	✓	
			201-695-5	86-73-7									
27		indeno[123-cd]pyrene				2.2	mg/kg		1.826	mg/kg	0.000183 %	✓	
			205-893-2	193-39-5									
28		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
29		phenanthrene				7.2	mg/kg		5.976	mg/kg	0.000598 %	✓	
			201-581-5	85-01-8									
30		pyrene				11	mg/kg		9.13	mg/kg	0.000913 %	✓	
			204-927-3	129-00-0									
31		chromium in chromium(III) compounds { chromium(III) oxide }				25	mg/kg	1.462	36.539	mg/kg	0.00365 %		
			215-160-9	1308-38-9									
										Total:	0.0733 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS02--12032024-0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS02--12032024-0.20
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<**LOD**
2	monohydric phenols			P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<**LOD**
4	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		1.2 mg/kg	23.173	23.636 mg/kg	0.00236 %	✓	
5	pH			PH		7.7 pH		7.7 pH	7.7 pH		
6	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		19 mg/kg		16.15 mg/kg	0.00161 %	✓	
7	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		33 mg/kg	1.126	31.581 mg/kg	0.00316 %	✓	
9	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.6 mg/kg		0.51 mg/kg	0.000051 %	✓	
10	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		21 mg/kg	1.579	28.194 mg/kg	0.00282 %	✓	
11	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	160 mg/kg		136 mg/kg	0.0136 %	✓	
12	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		49 mg/kg	1.785	74.353 mg/kg	0.00744 %	✓	
14	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		74 mg/kg	2.469	155.319 mg/kg	0.0155 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
16		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
17		anthracene		204-371-1	120-12-7		0.16	mg/kg		0.136	mg/kg	0.0000136 %	✓	
18		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1	mg/kg		0.85	mg/kg	0.000085 %	✓	
19		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.84	mg/kg		0.714	mg/kg	0.0000714 %	✓	
20		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.6	mg/kg		1.36	mg/kg	0.000136 %	✓	
21		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.68	mg/kg		0.578	mg/kg	0.0000578 %	✓	
22		benzo[ghi]perylene		205-883-8	191-24-2		0.6	mg/kg		0.51	mg/kg	0.000051 %	✓	
23		chrysene	601-048-00-0	205-923-4	218-01-9		1.3	mg/kg		1.105	mg/kg	0.000111 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.17	mg/kg		0.145	mg/kg	0.0000145 %	✓	
25		fluoranthene		205-912-4	206-44-0		1.7	mg/kg		1.445	mg/kg	0.000145 %	✓	
26		fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
27		indeno[123-cd]pyrene		205-893-2	193-39-5		0.52	mg/kg		0.442	mg/kg	0.0000442 %	✓	
28		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
29		phenanthrene		201-581-5	85-01-8		0.59	mg/kg		0.501	mg/kg	0.0000501 %	✓	
30		pyrene		204-927-3	129-00-0		1.7	mg/kg		1.445	mg/kg	0.000145 %	✓	
31		benzene	601-020-00-8	200-753-7	71-43-2		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
32		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
34		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
35		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
36		toluene	601-021-00-3	203-625-9	108-88-3		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
37		TPH (C6 to C40) petroleum group			TPH		<40	mg/kg		<40	mg/kg	<0.004 %		<LOD
38		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		24	mg/kg	1.462	35.077	mg/kg	0.00351 %		
											Total:	0.0558 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS01--12032024-2.00

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS01--12032024-2.00
Moisture content:
3.4%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 3.4% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH				8.4 pH		8.4 pH	8.4 pH		
				PH							
								Total:	0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS02--12032024-1.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS02--12032024-1.50
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH		PH		8 pH		8 pH	8pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS02--12032024-3.00

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS02--12032024-3.00
Moisture content:
2.4%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 2.4% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH		PH		8.3 pH		8.3 pH	8.3 pH		
								Total:	0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Appendix A: Classifier defined and non GB MCL determinands

monohydric phenols (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)
Data source: CLP combined data
Data source date: 26 Mar 2019
Hazard Statements: Muta. 2; H341 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 2; H373 , Skin Corr. 1B; H314 , Skin Corr. 1B; H314 >= 3 % , Skin Irrit. 2; H315 1 <= conc. < 3 % , Eye Irrit. 2; H319 1 <= conc. < 3 % , Aquatic Chronic 2; H411

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

GB MCL index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

GB MCL index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from ECHA's C&L inventory database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 30 Apr 2020
Hazard Statements: Acute Tox. 4; H302 , Skin Sens. 1; H317 , Eye Irrit. 2; H319

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

chromium in chromium(VI) compounds {chromium(VI) oxide}

Most likely worst case.

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Most likely worst case.

boron {boron tribromide}

Most likely worst case.

arsenic {arsenic}

Most likely worst case.

cadmium {cadmium sulfide}

Most likely worst case.

copper {dicopper oxide; copper (I) oxide}

Most likely worst case.

mercury {mercury}

Most likely worst case.

nickel {nickel dihydroxide}

Most likely worst case.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Worse case

selenium {selenium}

Most likely worst case.

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most likely worst case.

zinc {zinc sulphate}

Most likely worst case.

chromium in chromium(III) compounds {chromium(III) oxide}

Most likely worst case.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2024.96.6000.11109 (05 Apr 2024)
HazWasteOnline Database: 2024.95.5999.11108 (04 Apr 2024)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021
GB MCL List v2.0 - version 2.0 of 20th October 2023
GB MCL List v3.0 - version 3.0 of 11th January 2024
GB MCL List v4.0 - version 4.0 of 2nd March 2024

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Analytical Report Number : 24-012288

Project / Site name:	34 Nassau Road SW13 9QE	**Samples received on:**	14/03/2024
Your job number:	GWPR5909	**Samples instructed on/ Analysis started on:**	04/04/2024
Your order number:	GWPR5909	**Analysis completed by:**	10/04/2024
Report Issue Number:	1	**Report issued on:**	10/04/2024
Samples Analysed:	10:1 WAC sample		

Signed:

Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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Waste Acceptance Criteria Analytical Results

Report No:	**24-012288**						
					Client:	**GANDW**	
Location	**34 Nassau Road SW13 9QE**						
Lab Reference (Sample Number)	161662				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	12/03/2024				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS02						
Depth (m)	0.20						
Solid Waste Analysis							
TOC (%)**	1.3				3%	5%	6%
Loss on Ignition (%) **	3.4				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	6.35				100	--	--
pH (units)**	7.5				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	0.76				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00742			0.0742	0.5	2	25
Barium *	0.00316			0.0316	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	< 0.00040			< 0.0040	0.5	10	70
Copper *	0.025			0.25	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	< 0.000400			< 0.00400	0.5	10	30
Nickel *	0.0014			0.014	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0051			0.051	4	50	200
Chloride *	0.67			6.7	800	15000	25000
Fluoride*	0.30			3.0	10	150	500
Sulphate *	1.6			16	1000	20000	50000
TDS*	27			270	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	15.8			158	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.7						
Dry Matter (%)	85						
Moisture (%)	15						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 24-012288
Project / Site name: 34 Nassau Road SW13 9QE

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
161662	WS02	None Supplied	0.2	Brown clay and loam with gravel and vegetation

Analytical Report Number : 24-012288
Project / Site name: 34 Nassau Road SW13 9QE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	ISO 17025

Analytical Report Number : 24-012288
Project / Site name: 34 Nassau Road SW13 9QE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025
WAC Leachate 10:1		In-house method	L043B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report

Analytical Report Number : 24-012288
Project / Site name: 34 Nassau Road SW13 9QE

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS02	N/A	S	161662	c	BTEX and/or Volatile organic compounds in soil	L073B	c
WS02	N/A	S	161662	c	PCB's By GC-MS in soil	L027B	c
WS02	N/A	S	161662	c	Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	L064B	c
WS02	N/A	S	161662	c	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088	c

Percussion Drilling Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5909	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS01	WLS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (80%), brick (15%) and chalk (5%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	SPT	N=28 (11,7/7,7,7,7)	1.20			
		1.50	D					Orange brown very sandy CLAY. Sand is fine. (KEMPTON PARK GRAVEL MEMBER).
					1.80			
		2.00	D					Light brown very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded of flint. (KEMPTON PARK GRAVEL MEMBER).
		2.00	SPT	27 (25,24/27,,,)				
		2.50	D					
		3.00	D		3.00			
		3.00	SPT	N=47 (18,12/11,12,12,12)				End of Borehole at 3.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots noted to 1.20

Groundwater noted at 2.90m bgl

Percussion Drilling Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5909	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS02	WLS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (80%), brick (15%) and chalk (5%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	SPT	N=21 (6,4/4,5,6,6)	1.20			
		1.50	D					Orange brown very sandy CLAY. Sand is fine. (KEMPTON PARK GRAVEL MEMBER).
		2.00	D					
		2.00	SPT	27 (25,22/27,,,)	2.20			
		2.50	D					Light brown very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded of flint. (KEMPTON PARK GRAVEL MEMBER).
		3.00	D					
		3.00	SPT	N=52 (20,11/12,14,13,13)				
		3.50	D					
		4.00	D		4.00			End of Borehole at 4.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

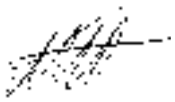
Roots noted to 1.50. Groundwater noted at 2.80m bgl.

No SPT at 4.00m bgl due to sands filling up casing.

Contamination Letter Report

34 Nassau Road SW13 9QE

On behalf of Tom Richards

Report Reference: GWPR5986/CLR/June 2024			Status: Final
Issue	Prepared By	Checked By	Verified By
V1.02			
	Adam Young BSc (Hons) Geology Engineer	Miltiadis Mellios MSc(Eng) CGeol FGS MIEnvSc GMICE Principal Engineer	Francis Williams MGeol (Hons) FGS CEnv CGeol Director

Site Investigations | Environmental Consultants | Geotechnical Engineers

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Contamination Letter Report and Remediation Strategy	
REPORT REFERENCE	GWPR5986/CLR/June 2024 V1.02. The conditions and limitations of this contamination report can be viewed within Appendix A, with the aims of the investigation provided within Appendix B. A technical glossary has also been provided within Appendix C. A previous ground investigation report has been undertaken by Ground and Water Limited, this report must be read in conjunction with the previous – GWPR5909/Updated Basement Impact Assessment. This report supersedes the previous version. A full scale Environmental Desk Study and Contamination Assessment including a gas, vapours, radon & groundwater risk assessment were not part of the remit of this report; however Included within the fee proposal was an allowance to undertake chemical laboratory testing on soil samples recovered from the site to enable recommendations for the safe redevelopment of the site and the protection of site workers, end-users and the public from any potential contamination identified.
SITE DETAILS	The site comprised an 800m^2 rectangular shaped plot of land, with a north-east to south-west orientation, located along the south side of Nassau Road. The site was located within Barns, a mainly residential area within The London Borough of Richmond Upon Thames. A Site Location Plan is provided within Figure 1.
PROPOSED DEVELOPMENT	At the time of reporting, June 2024, the proposed development was understood to comprise the construction of a basement under the existing house and a small extension to the rear, to a maximum depth of 3.80m bgl, along with a small lightwell to the front. A pool, pool house and patio are also proposed in the rear garden. The levels on-site were considered to remain the same.
ANTICIPATED GEOLOGY AND HYDROGEOLOGY	The BGS Solid and Drift Geological Map for the area revealed that the site was underlain by the superficial Kempton Park Gravel Member, underlain by the bedrock of the London Clay Formation. Alluvium was noted to be ~148m north-west of the site. An area of artificial ground was noted ~190m south-east of the site. No other superficial deposits, outcrops of other bedrock deposits or areas of Made/Worked Ground were noted within a 250m radius of the site. The DEFRA online maps indicated that the site was located on Secondary A Aquifer associated with the superficial Kempton Park Gravel Member, underlain by Unproductive Strata associated with the London Clay Formation. From analysis of hydrogeological and topographical maps the groundwater table was anticipated to be encountered at shallow to moderate depth within the Kempton Park Gravel Member, capping the impermeable London Clay Formation. Perched water was also likely to be found within the Made Ground, especially after periods of intense or prolonged rainfall. It was considered that the groundwater was flowing westwards, towards the River Thames and in alignment with local topography. The nearest surface water feature was observed to be the river Thames, approximately 200m west of

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	the site.
SITE WORKS	Site works were undertaken on 08/03/2024 and comprised the drilling of the 2no. Modular Window Sample Boreholes to 3.00m and 6.00m bgl with Standard Penetration Tests at 1.00m intervals. Elevated levels of Lead, Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenz(a,h)anthracene were found within the Made Ground sample WS01/1.20m bgl. Further site works were undertaken in order to establish the spread of contamination across site. This was undertaken on 24/04/2024 and comprised the excavation of 5No. Trial pits to depths between 0.80m – 1.20m bgl. A sample from each of these (at various depths) was taken for contamination testing, in order to confirm the type of remediation required.
GROUND CONDITIONS ENCOUNTERED	A summary of the ground conditions encountered can be viewed below. The trial hole logs can be seen within Appendix D.

Summary of Strata Encountered (TP1 – TP5)

Strata	Top Depth (m bgl)	Base Depth (m bgl)	Thickness (m)
MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to subrounded of flint (80%), brick (15%) and chalk (5%).	GL	>1.20	>1.20

GROUNDWATER	No groundwater strikes were noted in any of the trial pits.
ROOTS	Roots were noted to depth in all of the trail pits. It should be noted that roots may be found to greater depths at other locations on the site, particularly close to trees and/or trees that have been removed both within the site and its close environs.
CHEMICAL / CONTAMINATION	A set of samples (5No. Made Ground) were submitted to the accredited chemical laboratory for analysis. The results can be viewed in Appendix E. The synopsis for the trial hole locations and their final depth can be seen tabulated below. A trial hole location plan is provided within Figure 1. The table also indicates whether any locations targeted a source of contamination as well as the proposed end-use. The proposed development can be seen in Figure 2.

Trial Hole Location Synopsis

Trial Hole/Final Depth	Sampling Strategy	Proposed End-Use
WS1/3.00m bgl	Random	Pool/hardstanding
WS2/4.00m bgl	Random	Terrace/hardstanding
TP1/1.20m bgl	Random	Terrace/hardstanding
TP2/1.20m bgl	Random	Soft Landscaping
TP3/1.20m bgl	Random	Soft Landscaping
TP4/1.20m bgl	Random	Pool/hardstanding
TP5/1.20m bgl	Random	Soft Landscaping

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The investigation area totals approximately 221m2 soft landscape and with five sampling locations, given an unknown hotspot shape, the sampling density means that a hotspot with an area of approximately 70.56m2 and a radius of approximately 8.4m would be encountered (CLR 4).

Sampling depths were chosen to reflect the receptor of concern (e.g. human health, controlled waters and vegetation). The remaining samples were scheduled under a random strategy. The receptors relevant to the sampling depths are tabulated below.

Summary of Receptors per Sample Depth	
Depth	**Receptors**
Shallow Samples (< 0.75m bgl)	• End Users (Residents/Future site visitors) • Construction workers during development • Site operatives during maintenance works • Neighbours and public • Vegetation within soft landscaped areas (shallow rooted) • Secondary A Aquifer (Kempton Park Gravel Member) • Buried Concrete • Receiving landfill
Moderate Samples (0.75 – 1.50m bgl)	• Construction workers during development • Site operatives during maintenance works • Vegetation within soft landscaped areas (deep rooted) • Secondary A Aquifer (Kempton Park Gravel Member) • Buried Concrete • Receiving landfill • Underground services (water pipes)

Based on the proposed development, the results of the chemical laboratory testing were compared to the Generic Assessment Criteria (GAC) for a ***'Residential with homegrown produce'*** land-use scenario, as this was considered the most appropriate land-use scenario. The Soil Assessment Criteria can be viewed in Appendix F.

The comparison between the laboratory analysis and the assessment criteria indicates that there is an unacceptable risk to future receptors caused by exceedances of the following determinands: Lead; Benzo(a)pyrene; Benzo(b)fluoranthene; Dibenzo(a,h)anthracene; and Chrysene – within TP1, TP3 and WS1. The remaining determinands were identified at below the adopted screening value and are not considered to represent an unacceptable risk to future receptors. Where an unacceptable risk to future receptors remains, mitigation is required – this will be outlined later in the report.

ASBESTOS

Asbestos was detected in 2No. samples (TP1/0.20 and TP3/0.80), as chrysotile fibres. Quantification was undertaken on the sample and indicated that asbestos was present at < 0.001%.

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A quantification risk assessment was carried out for the concentration recorded, in accordance with the guidance within CIRIA 733. The background, considerations taken, and the calculations can be seen in Appendix G. A summary of the results is shown in the table below.

Asbestos Risk Assessment				
Sample	**Mesothelioma Accumulated Risk (fibres/ml.year)**	**Mesothelioma Risk**	**Lung Cancer Accumulated Risk (fibres/ml.year)**	**Lung Cancer Risk**
TP1/0.20m	0.00091	Insignificant	0.00065	Insignificant
TP3/0.80m	0.00091	Insignificant	0.00065	Insignificant

Based on CIRIA Table 14.1 for Mesothelioma and 14.3 for Lung Cancer, the risk for TP1/0.20 and TP3/0.80m bgl were considered to be insignificant. **Therefore, no remediation procedures were considered necessary with respect to asbestos in Made Ground.**

An **Asbestos Management Strategy** should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination.

REMEDIATION STRATEGY

Based on the results of the intrusive works, chemical analyses and risk assessments undertaken, the following has been identified that requires further action:

- 6No. contaminants within TP1, TP3 and WS1 were identified (Asbestos, Lead, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene and Chrysene), these have been found at an unacceptable concentration that requires remediation.

A hotspot removal around TP3 is required, remediation is not required around TP1 due to the proposed terrace/hardstanding. In addition to this, remediation is also not required around WS1 due to the proposed pool/hardstanding.

The identified contamination was found to be present in the form of a hotspot with a radius of 5m centred around TP3. In order to mitigate against the unacceptable level, a reduce dig of 800mm and subsequent backfill of certified clean soils should be undertaken.

It should be noted that if the excavation falls into root protection zones, then adjustment will be needed for those areas, with 150mm of clean topsoil placed in these no-dig areas, if applicable.

Based on the available information within this report it was proposed that the following remedial methodology should be undertaken within **any soft landscape areas within an 5m radius around TP3**:

- Reduce dig of 800mm;
- Validation of hotspot extent;
- Placement of 800mm clean capping of soil;
- Validation of the clean capping system by a suitably trained Ground and Water Limited engineer.

Full liaison must be made with the statutory authority, prior to the implementation of this remediation strategy and/or removal of soils from the site. All works must be undertaken to meet their approval.

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800mm Reduce Dig

Made Ground should be removed to a minimum depth of 0.80m bgl in an 5m radius centred on TP3 to allow for the placement of clean soils, this must be undertaken on any soft landscape areas on-site within the radius. Samples must be taken from the base and walls of the excavation and tested to enable validation that the unacceptable concentrations have been removed. Should these samples indicate unacceptable concentrations, further removal is required.

Materials should be removed and stockpiled on an impermeable liner with raised edges and covered at all times. This contamination stockpile destined for removal from site should be stored away from imported soils to avoid cross-contamination. Materials to be removed off-site must be classified by carrying out Waste Acceptance Produce (WAP) testing. A registered contractor must undertake the removal of waste. Consignment notes for the removal of waste must be obtained and kept for inclusion within the final validation Report.

800mm Clean Capping of Soil

The resulting void should be backfilled with clean certified soils. It is recommended that at least the top 150mm of the clean capping should comprise suitable topsoil for use as a growing medium. It is a requirement that this should be no less than 100mm thick.

All subsoil and topsoil must be fit for purpose to ensure that the receptors cannot come into contact with determinands that could be detrimental to their health.

Validation

The remediation works outlined above will need to be inspected and independently validated by a Ground and Water Limited Engineer. All excavations will need to be inspected, documented and photographed.

The remediation works should be validated through a site visit, sampled and photographed by a suitably trained Ground and Water Limited Engineer following the 800mm reduce dig, and after placement of the clean soils.

It is required that clean soils will be brought onto site as part of the validation works. Any soil which is to be imported onto the site must undergo chemical analysis to prove that it is suitable for the purpose for which it is intended.

The soil must be fit for purpose and must either be supplied with traceable chemical laboratory test certificates or be tested, prior to placing (ideally) and after placing, to ensure that the future receptors (human health and vegetation) cannot come into contact with compounds that could be detrimental to their health. The compounds that are to be tested for are those given in the Generic Assessment Criteria, which can be viewed in Appendix F of this report.

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Contamination Letter Report and Remediation Strategy	
WASTE CLASSIFICATION	The excavation of foundations and soils is likely to produce waste which will require classification and then recycling or removal from site. Under the Landfill (England and Wales) Regulations 2002 (as amended), prior to disposal all waste must be classified as; • Inert; • Non-hazardous, or; • Hazardous. The Environment Agency's Hazardous Waste Technical Guidance (WM3) document outlines the methodology for classifying wastes. Once classified the waste can be removed to the appropriately licensed facilities, with some waste requiring pre-treatments prior to disposal. Following the investigation, 5No. samples of Made Ground were submitted to the analytical laboratory to undergo a suite of testing for contamination testing, as discussed in the previous sections. Sampling depths were chosen to reflect the receptor of concern, human health, and typically comprised a surface or near surface sample and periodically to 1.00m bgl. Any horizon where olfactory or visual evidence of contamination was present was also sampled. Based on a risk phase analysis of the chemical laboratory test results, in accordance with EC Hazardous Waste Directive and undertaken by Ground and Water Limited, all soil samples of Made Ground encountered on-site were NON-HAZARDOUS. The results of the assessment are given within Appendix H. It is important to note that whilst we consider our in-house assessment tool to be an accurate interpretation of the requirements of WM3, therefore producing an initial classification in accordance with the guidance, this method classifies soils as either non-hazardous or hazardous and landfill operators have their own assessment tools and can often come to different conclusions. As a result, some landfill operators could refuse to take apparently suitable waste. It is recommended that the receiving landfill views the results of this assessment and the chemical laboratory results to determine their own classification. In addition to the samples described above, 2No. samples were scheduled to undergo Waste Acceptance Criteria (WAC) testing with single batch leachate. Both samples were labelled as inert waste. Where contaminated soils are to be removed, they should be placed on an impermeable membrane (visqueen or similar) to ensure that no cross-contamination of soils occurs.
DUTY OF CARE	Groundworkers must maintain a good standard of personal hygiene including the wearing of overalls, boots, gloves and eye protectors and the use of dust masks during periods of dry weather.

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	To prevent exposure to airborne dust by both the general public and construction personnel the site should be kept damp during dry weather and at other times when dust is generated as a result of construction activities. The site should be securely fenced at all times to prevent unauthorised access. Washing facilities should be provided and eating restricted to mess huts.

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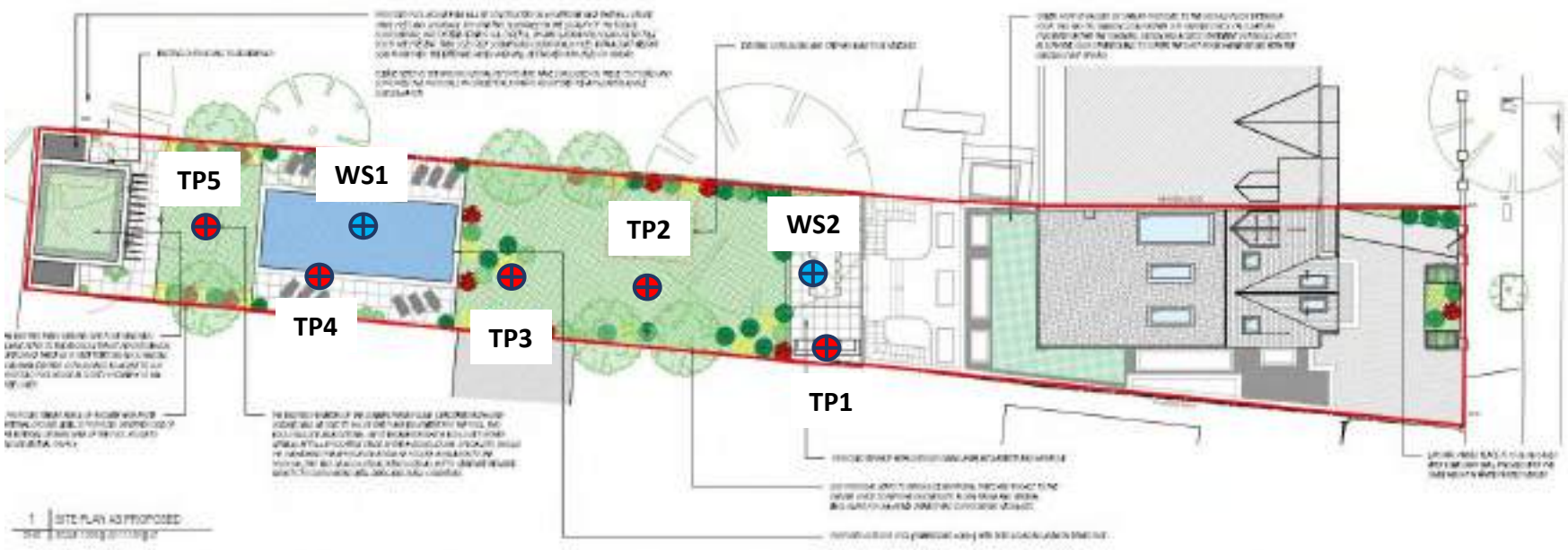
FIGURES



Site boundary

Hand excavated trial pit

Windowless Sampler Borehole

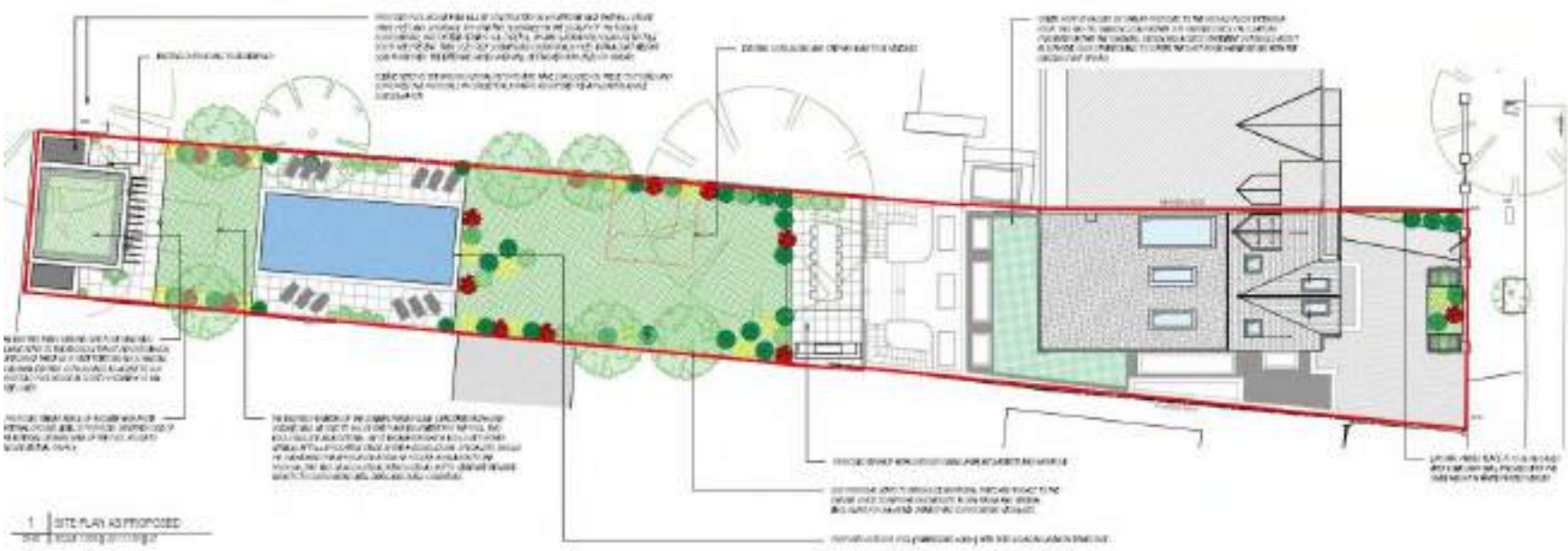
34 Nassau Road SW13 9QE

May 2024

Figure 1 – Trial Hole Location Plan

GWPR5986

ground&water



Site boundary

34 Nassau Road SW13 9QE	
	May 2024
Figure 2 – Proposed Development	**GWPR5986**

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APPENDIX A: Conditions and Limitations

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The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment/contaminated land considerations.

The conclusions and recommendations relate to 34 Nassau Road SW13 9QE.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

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The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

The aim of the investigation was understood to be to supply the client and their designers with information regarding the ground conditions underlying the site to assist them in preparing an appropriate scheme for development.

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APPENDIX B: Scope of the Investigation

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The investigation was to be undertaken to provide parameters for the design of foundations by means of in-situ and laboratory geotechnical testing undertaken on soil samples recovered from trial holes.

A full scale Environmental Desk Study and Contamination Assessment including a gas, vapours, radon & groundwater risk assessment were not part of the remit of this report; however Included within the fee proposal was an allowance to undertake chemical laboratory testing on soil samples recovered from the site to enable recommendations for the safe redevelopment of the site and the protection of site workers, end-users and the public from any potential contamination identified.

The techniques adopted for the investigation were chosen considering the requirements of the client, anticipated ground conditions, and bearing in mind the nature of the site, limitations to site access and other logistical limitations.

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APPENDIX C: Technical Glossary

TECHNICAL GLOSSARY

The list of possible definitions within the report may be seen below. Please note that some definitions may not be relevant to this report.

HYDROGEOLOGY:

A **Principal Aquifer** is a layer of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary (A) Aquifers consist of deposits with 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. These are generally aquifers formerly classified as Minor Aquifers.

Secondary (B) Aquifers consist of deposits with predominantly lower permeability layers with may stoke and yield limited amounts of groundwater due to localised features such as fissures, think permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary Aquifers (Undifferentiated) are assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both a minor aquifer and non-aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers.

FLOOD ZONES:

Environment Agency Flood Zone 2, defined as; land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

Environment Agency Flood Zone 3 shows the extent of a river flood with a 1 in 100 (1%0 or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

Environment Agency Flood Zone 3 area that benefits from flood defences, defined as; land and property in this flood zone would have a high probability of flooding without the local flood defences. These protect the area against a river flood with a 1% chance of happening each year, or a flood from the sea with a 0.5% chance of happening each year.

GROUNDWATER SOURCE PROTECTION ZONES (SPZS):

Inner Zone (SPZ1): This zone is 50 day travel time of pollutant to source with a 50 metres default minimum radius.

Outer Zone (SPZ2): This zone is 400 day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken.

Total Catchment (SPZ3): This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.

Zone of Special Interest (SPZ4): This zone is where local conditions require additional protection.

IN-SITU STRENGTH GEOTECHNICAL TESTING:

Windowless Sample and/or Cable Percussion and/or Rotary Boreholes provide samples of the ground for assessment but they do not give any engineering data. The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide information on the geotechnical engineering properties of soil. The test uses a thick-walled sample tube, with an outside diameter of 50mm and an inside diameter of 35mm, and a length of around 650mm. This is driven into the ground at the bottom of a borehole by blows from a slide hammer with a weight of 63.5kg falling through a distance of 760mm. The sample tube is driven 150mm into the ground and then the number of blows needed for the tube to penetrate each 75mm up to a depth of 450mm is recorded. The sum of the number of blows is termed the "standard penetration resistance" or the "N-value".

Dynamic Probing involves the driving of a metal cone into the ground via a series of steel rods. These rods are driven from the surface by a hammer system that lifts and drops a 63.5kg (SHDP) hammer onto the top of the rods through a set height, thus ensuring a consistent energy input. The number of hammer blows that are required to drive the cone down by each 100mm increment are recorded. These blow counts then provide a comparative assessment from which correlations have been published, based on dynamic energy, which permits engineering parameters to be generated. (The Dynamic Probe 'Super Heavy' (SHDP) Tests were conducted in accordance with BS 1377; 1990; Part 9, Clause 3.2).

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APPENDIX D: Trial Hole Logs

Percussion Drilling Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5909	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS01	WLS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (80%), brick (15%) and chalk (5%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	SPT	N=28 (11,7/7,7,7,7)	1.20			
		1.50	D					Orange brown very sandy CLAY. Sand is fine. (KEMPTON PARK GRAVEL MEMBER).
					1.80			
		2.00	D					Light brown very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded of flint. (KEMPTON PARK GRAVEL MEMBER).
		2.00	SPT	27 (25,24/27,,,)				
		2.50	D					
		3.00	D		3.00			
		3.00	SPT	N=47 (18,12/11,12,12,12)				End of Borehole at 3.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots noted to 1.20

Groundwater noted at 2.90m bgl

Percussion Drilling Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5909	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS02	WLS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (80%), brick (15%) and chalk (5%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	SPT	N=21 (6,4/4,5,6,6)	1.20			
		1.50	D					Orange brown very sandy CLAY. Sand is fine. (KEMPTON PARK GRAVEL MEMBER).
		2.00	D					
		2.00	SPT	27 (25,22/27,,,)	2.20			
		2.50	D					Light brown very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded of flint. (KEMPTON PARK GRAVEL MEMBER).
		3.00	D					
		3.00	SPT	N=52 (20,11/12,14,13,13)				
		3.50	D					
		4.00	D		4.00			End of Borehole at 4.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

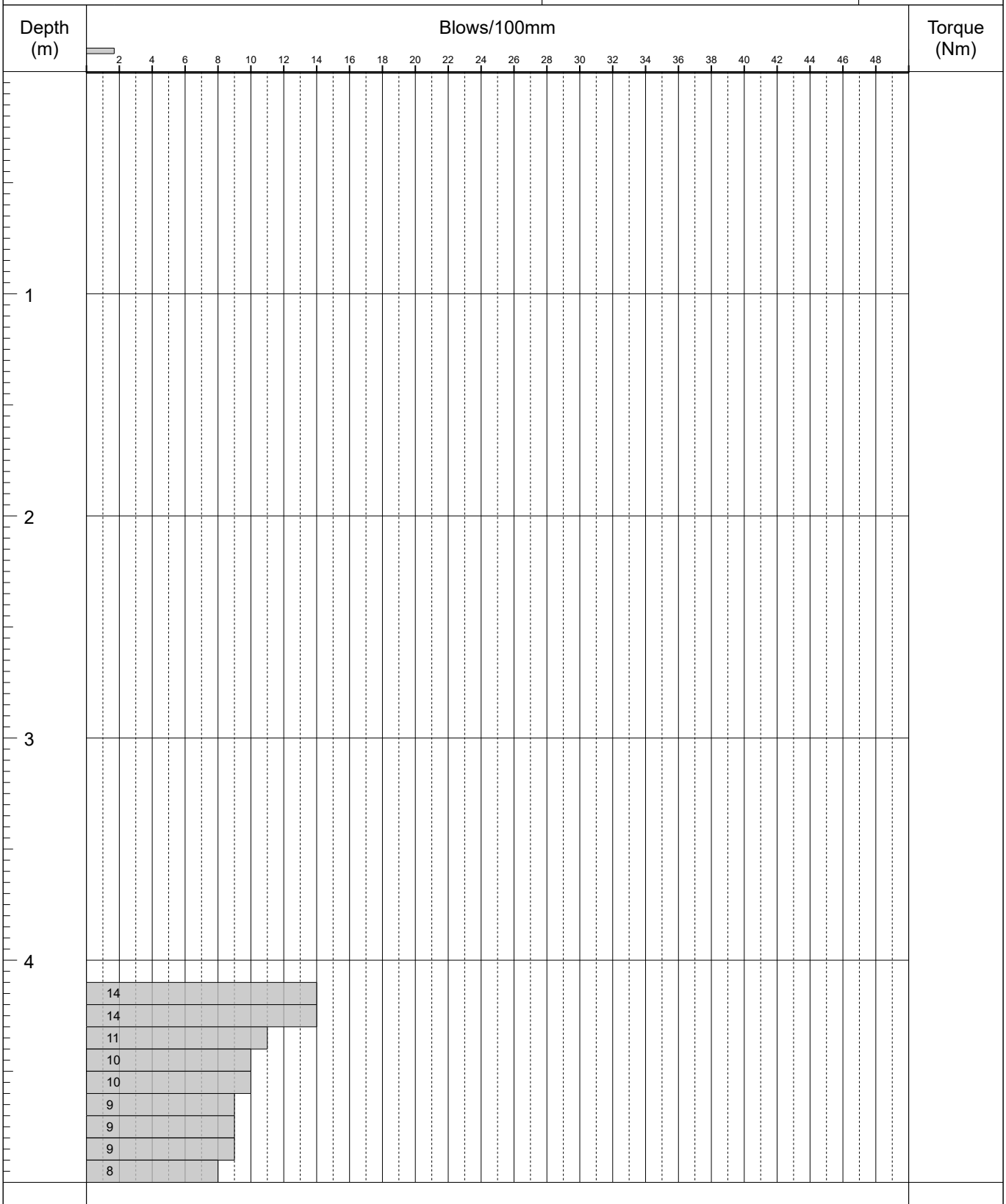
Remarks

Roots noted to 1.50. Groundwater noted at 2.80m bgl.

No SPT at 4.00m bgl due to sands filling up casing.

Probe Log

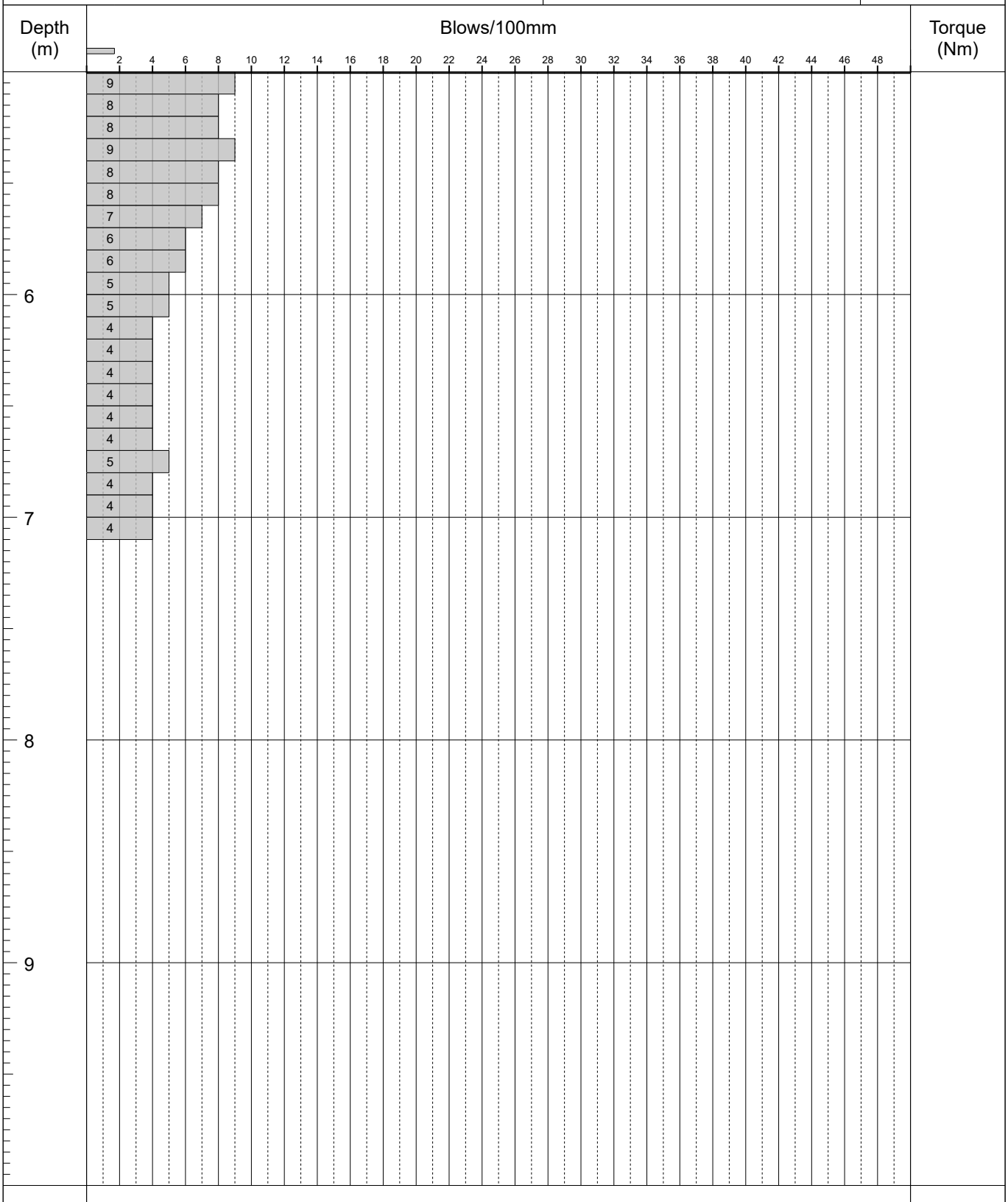
ground&water			Probe No DP02 Sheet 1 of 2
Project Name: 34 Nassau Road	Project No. GWPR5909	Co-ords:	Hole Type DP
Location: SW13 9QE		Level:	Scale 1:25
Client: Tom Richards		Dates:	Logged By



Remarks:	Fall Height	500	Cone Base Diameter		AGS
	Hammer Wt	64	Final Depth	7.00	
	Probe Type	DPSH- A			

Probe Log

ground&water			Probe No DP02 Sheet 2 of 2
Project Name: 34 Nassau Road	Project No. GWPR5909	Co-ords:	Hole Type DP
Location: SW13 9QE		Level:	Scale 1:25
Client: Tom Richards		Dates:	Logged By



Remarks:	Fall Height	500	Cone Base Diameter	
	Hammer Wt	64	Final Depth	7.00
	Probe Type	DPSH- A		

AGS

Trial Pit Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5986	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP1	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (80%), brick (15%) and chalk (5%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	D		1.20			End of Borehole at 1.200m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

Roots noted to depth.

No groundwater encountered.

Trial Pit Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5986	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP2	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (85%) and brick (15%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	D		1.20			End of Borehole at 1.200m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

Roots noted to depth.

No groundwater encountered.

Trial Pit Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5986	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP3	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (85%), brick (10%) and chalk (5%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	D		1.20			End of Borehole at 1.200m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

Roots noted to depth.

No groundwater encountered.

Trial Pit Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5986	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP4	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (80%), brick (15%) and chalk (5%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	D		1.20			End of Borehole at 1.200m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

Roots noted to depth.

No groundwater encountered.

Trial Pit Log

Project Name: 34 Nassau Road	Client: Tom Richards	Date:
Location: SW13 9QE	Contractor:	
Project No. : GWPR5986	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP5	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Dark brown sandy gravelly CLAY. Sand is fine. gravel is fine to coarse, angular to sub-rounded of flint (80%), brick (15%) and chalk (5%).
		0.50	D					
		0.80	D					
		1.00	D					
		1.20	D		1.20			End of Borehole at 1.200m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

Roots noted to depth.

No groundwater encountered.

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APPENDIX E: Chemical Laboratory Testing

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e: adam.young@groundwater.co.uk

i2 Analytical Ltd.
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Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 24-009116

Project / Site name:	34 Nassau Road SW13 9QE	**Samples received on:**	14/03/2024
Your job number:	GWPR5909	**Samples instructed on/ Analysis started on:**	14/03/2024
Your order number:	GWPR5909	**Analysis completed by:**	20/03/2024
Report Issue Number:	1	**Report issued on:**	21/03/2024
Samples Analysed:	5 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-009116
Project / Site name: 34 Nassau Road SW13 9QE
Your Order No: GWPR5909

Lab Sample Number				145503	145504	145505	145506	145507
Sample Reference				WS01	WS02	WS01	WS02	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	0.20	2.00	1.50	3.00
Date Sampled				12/03/2024	12/03/2024	12/03/2024	12/03/2024	12/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	15	3.4	17	2.4
Total mass of sample received	kg	0.1	NONE	0.8	0.7	0.5	0.6	0.4
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	KSZ	KSZ	-	-	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	8	7.7	8.4	8	8.3
Total Cyanide	mg/kg	1	MCERTS	2	< 1.0	-	-	-
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	-	0.014	0.008
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	20	27	17	46	25
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	8.44	23	12.3
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	10	13.6	-	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	2.1	1
Total Sulphur	mg/kg	50	MCERTS	-	-	-	80	69
Total Sulphur	%	0.005	MCERTS	-	-	-	0.008	0.007
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	-	-	< 0.5	< 0.5
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Organic Matter (automated)	%	0.1	MCERTS	3.8	2.9	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.2	1.7	-	-	-
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	-	< 2.0	< 2.0
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-	< 2.0	< 2.0
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	0.38	< 0.05	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	0.1	< 0.05	-	-	-
Fluorene	mg/kg	0.05	MCERTS	0.43	< 0.05	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	7.2	0.59	-	-	-
Anthracene	mg/kg	0.05	MCERTS	3	0.16	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	14	1.7	-	-	-
Pyrene	mg/kg	0.05	MCERTS	11	1.7	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	5.7	1	-	-	-
Chrysene	mg/kg	0.05	MCERTS	5.7	1.3	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	6.1	1.6	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	2.3	0.68	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.7	0.84	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.2	0.52	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.63	0.17	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.6	0.6	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	66.1	10.9	-	-	-

Analytical Report Number: 24-009116
Project / Site name: 34 Nassau Road SW13 9QE
Your Order No: GWPR5909

Lab Sample Number				145503	145504	145505	145506	145507
Sample Reference				WS01	WS02	WS01	WS02	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	0.20	2.00	1.50	3.00
Date Sampled				12/03/2024	12/03/2024	12/03/2024	12/03/2024	12/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	19	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	1.7	1.2	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	-	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	24	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	67	33	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	220	160	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	0.6	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	21	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	55	49	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	74	-	-	-
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	4.4	4.2
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	8.9	8.5
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	-	< 0.020	-	-	-
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	-	< 0.020	-	-	-
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	-	< 0.050	-	-	-
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL	mg/kg	1	MCERTS	-	< 1.0	-	-	-
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL	mg/kg	2	MCERTS	-	< 2.0	-	-	-
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL	mg/kg	8	MCERTS	-	< 8.0	-	-	-
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL	mg/kg	8	MCERTS	-	< 8.0	-	-	-
TPHCWG - Aliphatic >C35 - C40 EH_CU_1D_AL	mg/kg	10	NONE	-	< 10	-	-	-
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL	mg/kg	10	NONE	-	< 10	-	-	-
TPHCWG - Aliphatic >C5 - C40 EH_CU+HS_1D_AL	mg/kg	10	NONE	-	< 10	-	-	-
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	-	< 0.010	-	-	-
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	-	< 0.010	-	-	-
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	-	< 0.050	-	-	-
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	-	< 1.0	-	-	-
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	-	< 2.0	-	-	-
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	-	< 10	-	-	-
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	-	< 10	-	-	-
TPHCWG - Aromatic >EC35 - EC40 EH_CU_1D_AR	mg/kg	10	NONE	-	< 10	-	-	-
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	-	< 10	-	-	-
TPHCWG - Aromatic >EC5 - EC40 EH_CU+HS_1D_AR	mg/kg	10	NONE	-	< 10	-	-	-
TPH Total >C5 - C40 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	-	< 10	-	-	-
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	< 5.0	-	-	-
Benzene	µg/kg	5	MCERTS	-	< 5.0	-	-	-
Toluene	µg/kg	5	MCERTS	-	< 5.0	-	-	-
Ethylbenzene	µg/kg	5	MCERTS	-	< 5.0	-	-	-
p & m-Xylene	µg/kg	5	MCERTS	-	< 5.0	-	-	-
o-Xylene	µg/kg	5	MCERTS	-	< 5.0	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 24-009116
Project / Site name: 34 Nassau Road SW13 9QE

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
145503	WS01	None Supplied	1.2	Brown clay and loam with gravel and vegetation
145504	WS02	None Supplied	0.2	Brown clay and loam with gravel and vegetation
145505	WS01	None Supplied	2	Brown sand with gravel
145506	WS02	None Supplied	1.5	Brown sandy clay
145507	WS02	None Supplied	3	Brown sand with gravel

Analytical Report Number : 24-009116
Project / Site name: 34 Nassau Road SW13 9QE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES	In-house method based on TRL 447	L038B	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction	L078B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS

Analytical Report Number : 24-009116
Project / Site name: 34 Nassau Road SW13 9QE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	D	MCERTS
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

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Analytical Report Number : 24-012288

Project / Site name:	34 Nassau Road SW13 9QE	**Samples received on:**	14/03/2024
Your job number:	GWPR5909	**Samples instructed on/ Analysis started on:**	04/04/2024
Your order number:	GWPR5909	**Analysis completed by:**	10/04/2024
Report Issue Number:	1	**Report issued on:**	10/04/2024
Samples Analysed:	10:1 WAC sample		

Signed:

Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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Waste Acceptance Criteria Analytical Results

Report No:	**24-012288**						
					Client:	**GANDW**	
Location	**34 Nassau Road SW13 9QE**						
Lab Reference (Sample Number)	161662				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	12/03/2024				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS02						
Depth (m)	0.20						
Solid Waste Analysis							
TOC (%)**	1.3				3%	5%	6%
Loss on Ignition (%) **	3.4				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	6.35				100	--	--
pH (units)**	7.5				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	0.76				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00742			0.0742	0.5	2	25
Barium *	0.00316			0.0316	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	< 0.00040			< 0.0040	0.5	10	70
Copper *	0.025			0.25	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	< 0.000400			< 0.00400	0.5	10	30
Nickel *	0.0014			0.014	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0051			0.051	4	50	200
Chloride *	0.67			6.7	800	15000	25000
Fluoride*	0.30			3.0	10	150	500
Sulphate *	1.6			16	1000	20000	50000
TDS*	27			270	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	15.8			158	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.7						
Dry Matter (%)	85						
Moisture (%)	15						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 24-012288
Project / Site name: 34 Nassau Road SW13 9QE

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
161662	WS02	None Supplied	0.2	Brown clay and loam with gravel and vegetation

Analytical Report Number : 24-012288
Project / Site name: 34 Nassau Road SW13 9QE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	ISO 17025

Analytical Report Number : 24-012288
Project / Site name: 34 Nassau Road SW13 9QE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025
WAC Leachate 10:1		In-house method	L043B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report

Analytical Report Number : 24-012288
Project / Site name: 34 Nassau Road SW13 9QE

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS02	N/A	S	161662	c	BTEX and/or Volatile organic compounds in soil	L073B	c
WS02	N/A	S	161662	c	PCB's By GC-MS in soil	L027B	c
WS02	N/A	S	161662	c	Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	L064B	c
WS02	N/A	S	161662	c	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088	c

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Analytical Report Number : 24-018427

Project / Site name:		**Samples received on:**	08/05/2024
Your job number:	GWPR5986	**Samples instructed on/ Analysis started on:**	08/05/2024
Your order number:	GWPR5986	**Analysis completed by:**	15/05/2024
Report Issue Number:	1	**Report issued on:**	15/05/2024
Samples Analysed:	4 soil samples - 1 leachate sample		

Signed:

Adam Fenwick
Key Account Executive
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-018427

Your Order No: GWPR5986

Lab Sample Number				192705	192707	192708
Sample Reference				TP1	TP3	TP5
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.80	1.20
Date Sampled				06/05/2024	06/05/2024	06/05/2024
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	11.7	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	12	13
Total mass of sample received	kg	0.1	NONE	1.4	1.4	1.3
Asbestos						
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Detected	Detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KWB	KWB	KWB
Actinolite detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-
Amosite detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-
Anthophyllite detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-
Chrysotile detected	Type	N/A	ISO 17025	Detected	Detected	-
Crocidolite detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-
Tremolite detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	Loose Fibres	Loose Fibres	-
General Inorganics						
pH (L099)	pH Units	N/A	MCERTS	8	8.1	8.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	21	33	52
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	10.6	16.7	26.1
Organic Matter (automated)	%	0.1	MCERTS	3.4	3.2	2.8
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	1.9	1.8	1.6
Total Phenols						
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Speciated PAHs						
Naphthalene	mg/kg	0.05	MCERTS	0.16	1.2	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.09	2.3	0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.49	0.09
Fluorene	mg/kg	0.05	MCERTS	0.06	2.6	0.07
Phenanthrene	mg/kg	0.05	MCERTS	1.1	27	1
Anthracene	mg/kg	0.05	MCERTS	0.24	10	0.2
Fluoranthene	mg/kg	0.05	MCERTS	2.7	42	2.1
Pyrene	mg/kg	0.05	MCERTS	2.4	34	1.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.4	18	0.98
Chrysene	mg/kg	0.05	MCERTS	1.7	18	1.2
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2	23	1.5
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.86	8	0.57
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.6	18	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.91	8.6	0.72
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.21	2.1	0.16
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1	9.1	0.82
Coronene	mg/kg	0.05	NONE	-	-	-
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	16.3	227	12.5
Heavy Metals / Metalloids						

Analytical Report Number: 24-018427

Your Order No: GWPR5986

Lab Sample Number				192705	192707	192708
Sample Reference				TP1	TP3	TP5
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.80	1.20
Date Sampled				06/05/2024	06/05/2024	06/05/2024
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	22	19	17
Boron (water soluble)	mg/kg	0.2	MCERTS	1.1	< 0.2	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	22	24
Copper (aqua regia extractable)	mg/kg	1	MCERTS	68	47	49
Lead (aqua regia extractable)	mg/kg	1	MCERTS	330	240	180
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.6	0.6	0.7
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21	20	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	50	46	49
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	120	86
Petroleum Hydrocarbons						
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	-	< 0.020
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	-	< 0.020
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	< 0.050	-	< 0.050
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	-	< 1.0
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	-	3.1
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	< 8.0
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	17
TPHCWG - Aliphatic >C35 - C40 EH_CU_1D_AL	mg/kg	10	NONE	< 10	-	< 10
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	-	20
TPHCWG - Aliphatic >C5 - C40 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	-	20
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	-	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	-	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	< 0.050	-	< 0.050
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	-	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	-	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	-	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	-	26
TPHCWG - Aromatic >EC35 - EC40 EH_CU_1D_AR	mg/kg	10	NONE	< 10	-	11
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	-	26
TPHCWG - Aromatic >EC5 - EC40 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	-	36
TPH Total >C5 - C40 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	< 10	-	56
VOCs						
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	-	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	-	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	-	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Waste Acceptance Criteria Analytical Results

Report No:	**24-018427**						
					Client: GANDW		
Location							
Lab Reference (Sample Number)	192706				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	06/05/2024				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP2						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	3.0				3%	5%	6%
Loss on Ignition (%) **	7.0				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	56				500	--	--
Total PAH (WAC-17) (mg/kg)	22.2				100	--	--
pH (units)**	7.3				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	0.63				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00313			0.0313	0.5	2	25
Barium *	0.0183			0.183	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.00054			0.0054	0.5	10	70
Copper *	0.016			0.16	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	< 0.000400			< 0.00400	0.5	10	30
Nickel *	0.0015			0.015	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.012			0.12	4	50	200
Chloride *	0.54			5.4	800	15000	25000
Fluoride*	0.41			4.1	10	150	500
Sulphate *	1.1			11	1000	20000	50000
TDS*	46			460	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	7.31			73.1	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.5						
Dry Matter (%)	86						
Moisture (%)	14						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 24-018427
Project / Site name:

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
192705	TP1	None Supplied	0.2	Brown sand with vegetation and stones
192706	TP2	None Supplied	0.5	Brown loam and sand with gravel and vegetation
192707	TP3	None Supplied	0.8	Brown loam and sand with gravel and vegetation
192708	TP5	None Supplied	1.2	Brown sand with gravel and vegetation

Analytical Report Number : 24-018427
Project / Site name:

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE

Analytical Report Number : 24-018427
Project / Site name:

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS
WAC Leachate 10:1		In-house method	L043B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector

Analytical Report Number : 24-018427
Project / Site name:

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
GC	Gas Chromatography				
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))				
CU	Clean-up - e.g. by Florisil®, silica gel				
1D	GC - Single coil/column gas chromatography				
2D	GC-GC - Double coil/column gas chromatography				
Total	Aliphatics & Aromatics				
AL	Aliphatics				
AR	Aromatics				
#1	EH_2D_Total but with humics mathematically subtracted				
#2	EH_2D_Total but with fatty acids mathematically subtracted				
_	Operator - understore to separate acronyms (exception for +)				
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total				

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Analytical Report Number : 24-018427

Replaces Analytical Report Number: 24-018427, issue no. 1
Additional analysis undertaken.
Asbestos quantification added as per clients request

Project / Site name:		**Samples received on:**	08/05/2024
Your job number:	GWPR5986	**Samples instructed on/ Analysis started on:**	08/05/2024
Your order number:	GWPR5986	**Analysis completed by:**	27/05/2024
Report Issue Number:	2	**Report issued on:**	03/06/2024
Samples Analysed:	4 soil samples - 1 leachate sample		

Signed:

Joanna Szwagrzak
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-018427

Your Order No: GWPR5986

Lab Sample Number				192705	192706	192707	192708
Sample Reference				TP1	TP2	TP3	TP5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.50	0.80	1.20
Date Sampled				06/05/2024	06/05/2024	06/05/2024	06/05/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	11.7	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	14	12	13
Total mass of sample received	kg	0.1	NONE	1.4	1.5	1.4	1.3
Asbestos							
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Detected	-	Detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	EWS	-	EWS	KWB
Actinolite detected	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-
Amosite detected	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-
Anthophyllite detected	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-
Chrysotile detected	Type	N/A	ISO 17025	Detected	-	Detected	-
Crocidolite detected	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-
Tremolite detected	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-
Asbestos % by hand picking/weighing	%	0.001	ISO 17025	< 0.001	-	< 0.001	-
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	Loose Fibres	-	Loose Fibres	-
General Inorganics							
pH (L005B)	pH Units	N/A	MCERTS	-	7.3	-	-
pH (L099)	pH Units	N/A	MCERTS	8	-	8.1	8.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	21	-	33	52
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	10.6	-	16.7	26.1
Organic Matter (automated)	%	0.1	MCERTS	3.4	-	3.2	2.8
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	1.9	3	1.8	1.6
Loss on Ignition @ 450°C	%	0.2	MCERTS	-	7	-	-
Acid Neutralisation Capacity	+/- mmol/kg	-9999	NONE	-	0.63	-	-
Total Phenols							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	0.16	0.08	1.2	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.09	0.15	2.3	0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.49	0.09
Fluorene	mg/kg	0.05	MCERTS	0.06	0.07	2.6	0.07
Phenanthrene	mg/kg	0.05	MCERTS	1.1	1.5	27	1
Anthracene	mg/kg	0.05	MCERTS	0.24	0.3	10	0.2
Fluoranthene	mg/kg	0.05	MCERTS	2.7	3.9	42	2.1
Pyrene	mg/kg	0.05	MCERTS	2.4	3.3	34	1.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.4	1.8	18	0.98
Chrysene	mg/kg	0.05	MCERTS	1.7	2.4	18	1.2
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2	2.4	23	1.5
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.86	1.3	8	0.57
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.6	2.5	18	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.91	1.1	8.6	0.72
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.21	0.26	2.1	0.16
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1	1.3	9.1	0.82
Coronene	mg/kg	0.05	NONE	-	< 0.05	-	-

Analytical Report Number: 24-018427

Your Order No: GWPR5986

Lab Sample Number				192705	192706	192707	192708
Sample Reference				TP1	TP2	TP3	TP5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.50	0.80	1.20
Date Sampled				06/05/2024	06/05/2024	06/05/2024	06/05/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	16.3	-	227	12.5
Total WAC-17 PAHs	mg/kg	0.85	NONE	-	22.2	-	-
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	22	-	19	17
Boron (water soluble)	mg/kg	0.2	MCERTS	1.1	-	< 0.2	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	-	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	-	22	24
Copper (aqua regia extractable)	mg/kg	1	MCERTS	68	-	47	49
Lead (aqua regia extractable)	mg/kg	1	MCERTS	330	-	240	180
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.6	-	0.6	0.7
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21	-	20	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	50	-	46	49
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	-	120	86
Petroleum Hydrocarbons							
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	-	-	< 0.020
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	-	-	< 0.020
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	< 0.050	-	-	< 0.050
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	-	-	3.1
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	-	< 8.0
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	-	17
TPHCWG - Aliphatic >C35 - C40 EH_CU_1D_AL	mg/kg	10	NONE	< 10	-	-	< 10
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	-	-	20
TPHCWG - Aliphatic >C5 - C40 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	-	-	20
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	-	-	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	-	-	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	< 0.050	-	-	< 0.050
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	-	-	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	-	-	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	-	-	26
TPHCWG - Aromatic >EC35 - EC40 EH_CU_1D_AR	mg/kg	10	NONE	< 10	-	-	11
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	-	-	26
TPHCWG - Aromatic >EC5 - EC40 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	-	-	36
TPH Total >C5 - C40 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	< 10	-	-	56
Mineral Oil (C10 - C40) EH_CU_1D_AL	mg/kg	10	NONE	-	56	-	-

Analytical Report Number: 24-018427

Your Order No: GWPR5986

Lab Sample Number				192705	192706	192707	192708
Sample Reference				TP1	TP2	TP3	TP5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.50	0.80	1.20
Date Sampled				06/05/2024	06/05/2024	06/05/2024	06/05/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
VOCs							
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	-	-	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0
Total BTEX	µg/kg	5	MCERTS	-	< 5.0	-	-
PCBs by GC-MS							
PCB Congener 28	mg/kg	0.001	MCERTS	-	< 0.001	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	< 0.001	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	< 0.001	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	< 0.001	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	< 0.001	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	< 0.001	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	< 0.001	-	-
Total PCBs	mg/kg	0.007	MCERTS	-	< 0.007	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Waste Acceptance Criteria Analytical Results

Report No:	**24-018427**						
					Client:	**GANDW**	
Location							
Lab Reference (Sample Number)	192706				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	06/05/2024				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP2						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	3.0				3%	5%	6%
Loss on Ignition (%) **	7.0				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	56				500	--	--
Total PAH (WAC-17) (mg/kg)	22.2				100	--	--
pH (units)**	7.3				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	0.63				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00313			0.0313	0.5	2	25
Barium *	0.0183			0.183	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.00054			0.0054	0.5	10	70
Copper *	0.016			0.16	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	< 0.000400			< 0.00400	0.5	10	30
Nickel *	0.0015			0.015	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.012			0.12	4	50	200
Chloride *	0.54			5.4	800	15000	25000
Fluoride*	0.41			4.1	10	150	500
Sulphate *	1.1			11	1000	20000	50000
TDS*	46			460	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	7.31			73.1	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.5						
Dry Matter (%)	86						
Moisture (%)	14						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number: 24-018427
Project / Site name:
Your Order No: GWPR5986

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
192705	TP1	0.20	126	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
192707	TP3	0.80	129	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 24-018427
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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
192705	TP1	None Supplied	0.2	Brown sand with vegetation and stones
192706	TP2	None Supplied	0.5	Brown loam and sand with gravel and vegetation
192707	TP3	None Supplied	0.8	Brown loam and sand with gravel and vegetation
192708	TP5	None Supplied	1.2	Brown sand with gravel and vegetation

Analytical Report Number : 24-018427
Project / Site name:

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references	HSE Report No: 83/1996, HSG 248 (2021), HSG 264 (2012) & SCA Blue Book (draft)	A006B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE

Analytical Report Number : 24-018427
Project / Site name:

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

Analytical Report Number : 24-018427
Project / Site name:

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
WAC Leachate 10:1		In-house method	L043B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

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APPENDIX F: Soil Assessment Criteria

Ground and Water Limited

Soil Guideline Values and Generic Assessment Criteria

The Contaminated Land Regime reflects the UK Government's stated objectives of achieving sustainable development through the 'suitable for use approach'. At preliminary risk assessment stage, risks are evaluated qualitatively. As the site investigation progresses to a generic or detailed quantitative risk assessment, data is collected and assessment criteria are utilised to evaluate whether the contaminants represent an unacceptable risk to the identified receptors.

1. Contaminated Land Exposure Assessment Model (CLEA)

Current United Kingdom risk assessment practice is based on the Contaminated Land Exposure Assessment Model (CLEA).

The CLEA Guidance comprises the following documents:

1) EA Science Report SC050021/SR2: Human health toxicological assessment of contaminants in soil.
2) EA Science Report SC050021/SR3: Updated technical background to the CLEA model.
3) EA CLEA Bulletin (2009).
4) CLEA software version 1.07 (2015)
5) Toxicological reports and SGV technical notes.

The CLEA guidance and tools:

- Do not cover other types of risk to humans, such as fire, suffocation or explosion, or short-term and acute exposures;
- Do not cover risks to the environment, such as groundwater, ecosystems or buildings;
- Do not provide a definitive test for telling when human health risks are significant; and
- Are not a legal requirement in assessing land contamination risks. They are not part of the legal regime for Part 2A of the Environmental Protection Act 1990.

The CLEA guidance derives soil concentrations of contaminants above which (in the opinion of the EA) there may be a concern that warrants further investigation. It does not provide a definitive test for establishing that the risk is significant.

1.1. Land-use Scenarios

The CLEA model uses a range of standard land-use scenarios to develop conceptual exposure models outlined in the following sections.

1.1.1. Residential (with home grown produce) (RwHP)

Generic scenario assumes a typical two-storey house built on a ground bearing slab with a private garden having a lawn, flowerbeds and a small fruit and vegetable patch.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil and indoor dust ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours.
- Building type is a two-storey small-terraced house.

A sub-set of this land-use is residential apartments with communal landscaped gardens where the consumption of home grown vegetables will not occur. (Residential without homegrown produce (RwoHP)).

1.1.2. Allotments

Provision of open space (about 250sq.m) commonly made available to tenants by the local authority to grow fruit and vegetable for their own consumption. Typically, there are a number of plots to a site which may have a total area of up to 1 hectare. The tenants are assumed to be adults and that young children make occasional accompanied visits.

Although some allotment holders may choose to keep animals including rabbits, hens, and ducks, potential exposure to contaminated meat and eggs is not considered.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and inhalation of outdoor dust and vapours.
- There is no building.

1.1.3. Commercial/Industrial

The generic scenario assumes a typical commercial or light industrial property comprising a three-storey building at which employees spend most time indoors and are involved in office-based or relatively light physical work.

- Critical receptor is a working female adult (aged 16 to 65 years old).
- Exposure duration is a working lifetime of 49 years.
- Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts and inhalation of dust and vapours.
- Building type is a three-storey office (pre 1970).

2. LQM/CIEH Suitable 4 Use Levels (S4UL)

For derivation of these S4UL reference must be made to:

Nathanial, P., McCaffrey, C., Gillet, A., Ogden, R., Nathanial, J., *The LQM/CIEH S4UL's for Human Health Risk Assessment*. **Land Quality Press**. 2015

2.1. S4UL Background

The Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) S4UL for a given land use is the concentration of the contaminant in soil at which the predicted daily exposure,

as calculated by the CLEA software, equals the Health Criteria Value. The S4ULs have been derived for substances based on various generic land use and soil organic matter contents.

The final output for each contaminant represents a synthesis of new toxicological (and fate and transport) reviews published since the preparation of the 2nd edition LQM/CIEH GAC's (Nathanial et al., 2009).

In the derivation of LQM/CIEH S4UL's the principles of 'minimal' or 'tolerable' risk enshrined in SR2, which has not been withdrawn, has been maintained.

2.2. S4UL Land-use

S4UL's have been derived for the basic CLEA land-uses, as described in section 1.2, and for two new land uses:

- Public Open Spaces near Residential Housing (POSresi).
- Public Park (POSpark).

2.2.1. Public Open Spaces near Residential Housing (POSresi)

Includes the predominantly grassed areas adjacent to high density housing, the central green area on many 1930's – 1970's housing estates, and smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soils with planting. It is assumed that the close proximity to the place of residence will allow tracking back of soil to occur.

2.2.2. Public Park (POSpark)

An area of open space, usually owned and maintained by the local authority, provided for recreational uses including family visists and picnics, children's play area, informal sporting activities (not a dedicated sports pitch), and dog walking. It is assumed that tracking back of soils into places of residence will be negligible.

The following LQM/CIEH S4Uls (Copyright Land Quality Management Limited) have been reproduced with permission, to the publication number S4UL3072.

3. Category 4 Screening Levels (C4SLs)

In the case of Lead, no SGV or GAC has been published to date. This is likely to be due to the toxicity review that is currently being undertaken by the Environment Agency. In the absence of updated toxicity information the SGV derived using CLEA 1.07 methodology and related toxicity will be used.

The overall objective of the C4SLs research project was to assist the provision of technical guidance in support of Defra's revised Statutory Guidance (SG) for Part 2A of the Environmental Protection Act 1990 (Part 2A) (Defra, 2012a). Specifically, the project aimed to deliver:

- A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and
- A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

To help achieve a more targeted approach to identifying and managing contaminated land in relation to the risk (or possibility) of harm to human health, the revised SG presented a new four category

system for considering land under Part 2A, ranging from Category 4, where there is no risk that land poses a significant possibility of significant harm (SPOSH), or the level of risk is low, to Category 1, where the risk that land poses a significant possibility of significant harm (SPOSH) is unacceptably high. More specific guidance on what type of land should be considered as Category 4 (Human Health) is provided in Paragraphs 4.21 and 4.22 of the revised SG, as follows:

> *"4.21 The local authority should consider that the following types of land should be placed into Category 4: Human Health:*
> *(a) Land where no relevant contaminant linkage has been established.*
> *(b) Land where there are only normal levels of contaminants in soil, as explained in Section 3 of this Guidance.*
> *(c) Land that has been excluded from the need for further inspection and assessment because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of this Guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of this Guidance.*
> *(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed in the normal course of their lives).*
>
> *4.22 The local authority may consider that land other than the types described in paragraph 4.21 should be placed into Category 4: Human Health if following a detailed quantitative risk assessment it is satisfied that the level of risk posed is sufficiently low."*

The C4SLs are intended as "relevant technical tools" (in relation to Paragraph 4.21(c)) to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

> *"The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land."*

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to human health."*

The implication of Paragraph 47(h) of the IA is that minimal risk is well within Category 4 and that the C4SLs should describe a higher level of risk which, whilst not minimal, can still be considered low enough to allow a judgement to be made that land containing substances at, or below, the C4SLs would typically fall within Category 4. This reflects Paragraph 4.20 of the revised SG, which states:

> *"4.20 The local authority should not assume that land poses a significant possibility of significant harm if it considers that there is no risk or that the level of risk posed is low. For the purposes of this Guidance, such land is referred to as a "Category 4: Human Health" case. The authority may decide that the land is a Category 4: Human Health case as soon as it considers it has evidence to this effect, and this may happen at any stage during risk assessment including the early stages."*

C4SLs, therefore, should not be viewed as "SPOSH levels" and they should not be used as a legal trigger for the determination of land under Part 2A.

The generic screening values referred to before usually take the form of risk-based Soil Guideline Values (SGVs) or other Generic Assessment Criteria (GACs) that are most typically derived using the Environment Agency's Contaminated Land Exposure Assessment (CLEA) model, as described in the Environment Agency's SR2, SR3 and SR7 reports (EA, 2009b & c; EA, 2008). It is anticipated that C4SLs will be used in a similar manner; as generic screening criteria that can be used within a GQRA, albeit describing a higher level of risk than the SGVs.

The suggested approach to the development of C4SLs consists of the retention and use of the CLEA framework, modified according to considerations of the underlying science within the context of Defra's policy objectives relating to the revised SG. Within this context, it is suggested that the development of C4SLs may be achieved in one of three ways, namely:

- By modifying the toxicological parameters used within CLEA (while maintaining current exposure parameters);
- By modifying the exposure parameters embedded within CLEA (while maintaining current toxicological "minimal risk" interpretations); and
- By modifying both toxicological and exposure parameters.

There is also a suggested check on "other considerations" (e.g., background levels, epidemiological data, sources of uncertainty) within the approach, applicable to all three options.

It is suggested that a new term is defined for the toxicological guidance values associated with the derivation of C4SLs – a Low Level of Toxicological Concern (LLTC). A LLTC should represent an intake of low concern that remains suitably protective of health, and definitely does not approach an intake level that could be defined as SPOSH.

4. CL:AIRE Generic Assessment Criteria (GAC)

For derivation of the CL:AIRE Generic Assessment Criteria (GAC) reference should be made to the following report:

> CL:AIRE, *The Soil Generic Assessment Criteria for Human Health Risk Assessment.* **Contaminated Land: Applications in the Real Environment**. 2009.

Within this report, Contaminated Land: Applications in Real Environments (CL:AIRE) provided Generic Assessment Criteria (GAC) in accordance with the CLEA software and the principles outlined previously for a further 35 contaminants sometimes encountered on land affected by contamination.

5. SoBRA Acute GAC

The Society of Brownfield Risk Assessment (SoBRA) identified that most human health risk assessments focus on the chronic risks arising from long-term exposure to specific substances. As chronic risks often occur at lower doses than acute risks, they are often the key drivers, however, in some instances the acute dose may also be an important consideration within risk assessments.

The methodology for deriving the acute GAC were related to two distinct receptor groups:

- Members of the public, where the 'critical' receptor for this group will typically be a female child, which is consistent with CLEA residential and Public Open Space/allotments land-uses;
- Workers involved with excavations. The critical receptor for this group is assumed to be a female working adult, without the use of PPE.

The acute GACs relate to short term exposure of high concentrations of a substance that lead to acute effects. They are not considered to be average exposures across a specific / defined area. As a result, the GACs should be normally be compared with the maximum likely concentration that the individual may be exposed to, and not the average concentration within a specific area.

The SoBRA acute GAC will primarily be used for contaminants that do not currently have any GAC, most notably Cyanide.

6. Detailed Quantitative Risk Assessments (DQRA)

Where the adoption of a GAC is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses, then a DQRA may be undertaken to develop site specific values for relevant soil contaminants.

- Establishing the plausibility that generic exposure pathways exist in practice by measurement and observation.
- Developing more accurate parameters using site data.

7. Phytotoxicity

CLEA guidance only addresses human health toxicity; assessment of plant toxicity (phytotoxicity) is based on threshold trigger values obtained from the following source:

- BS3882:2015 – *Specification for Topsoil*

The trigger values are relevant only to those contaminants, where present in excess, have the potential to inhibit plant growth, or kill plants (Cu, Ni and Zn). The criteria have been based on a wide range of planting that are common within a multi-purpose topsoil.

8. Statistical Tests

DEFRA R&D Publication CLR 7 (DOE 1994) addressed the statistical treatment of test results and their comparison to Soil Guideline Values.

Consideration must be given to the appropriate area of land to be considered termed the critical averaging area.

For a communal open space or commercial land-use, the critical averaging area will depend on the proposed layout. For a residential use with private gardens the averaging area is the individual plot.

It may be appropriate to compare the upper 95th percentile concentration with the Soil Guideline Value, subject to applying a statistical test to establish that the range of concentrations are reasonably consistent and belonging to the same underlying distribution of data.

CL:AIRE published guidance in 2020, *Guidance in comparing soil contamination data with a critical concentration,* superseding the CL:AIRE/CIEH 2008 report of the same name. The guidance provides ways to assist land contamination stakeholders to apply statistical methods to their data to enable decisions under the legislative framework; either planning system or Part 2A of the Environmental Protection Act 1990.

The use of the statistical tests should only be applied if the following statements are valid for the datasets:

- Averaging areas, as well as the smallest area of concern have been identified on the basis of the CSM, including the desk study and/or the site walkover;
- The sample locations were chosen using a simple random, stratified random or stratified systematic (square, herringbone or triangular grid) sampling pattern, rather than being targeted to locations suspected of being contaminated;
- The sample locations are relatively evenly spread across the area and are not clustered, to avoid giving undue weight to some parts of the site over others in the calculated statistics;
- The analyses do not suggest a hotspot or outlier of contamination that should be treated as a separate zone. This has been established by a histogram and/or a names statistical test;
- The sample locations are all taken from one population (i.e. the same material);
- Where an averaging zone encompasses several averaging areas, analyses do not show a spatial trend or other spatial pattern across that zone; and
- The number of samples has been shown to be sufficient for a statistical analysis.

Any included statistical spreadsheet is based on an in-house method of statistical analysis, in line with those outlined within the CL:AIRE guidance (2020).

Treatment of Hot-Spots

- A statistical test is applied to establish whether the data is a part of a single set, or whether data outliers are present.
- Provided that the data is based on random sampling and no distinct contamination source was present at the sampling location, the hot-spot(s) may be excluded and the mean of the remaining data assessed.

9. Ground and Water Limited Soil Assessment Criteria

The Soil Assessment Criteria used in the preparation of the Generic Quantitative Risk Assessment are tabulated in the following pages, where the source of each has been outlined in the previous sections.

9.1. Inorganics

SoBRA – Acute Generic Assessment Criteria						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Cyanide	24	24	24	1400	24	24

9.2. Metals

C4SL Low Level of Toxicological Concern						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Lead	< 200	< 310	< 80	< 2300	< 630	< 1300

LQM/CIEH Suitable 4 Use Levels – Metals and Semi-metals						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Arsenic	37	40	43	640	79	170
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11000	45	240000	21000	46000
Cadmium	11	85	1.9	190	120	532
Chromium (III)	910	910	18000	8600	1500	33000
Chromium (VI)	6	6	1.8	33	7.7	220
Copper	2400	7100	520	68000	12000	44000
Elemental Mercury	1.2	1.2	21	58	16	30
Inorganic Mercury	40	56	19	1100	120	240
Methylmercury	11	15	6	320	40	68
Nickel	130	180	53	980	230	800
Selenium	250	430	88	12000	1100	1800
Vanadium	410	1200	91	9000	2000	5000
Zinc	3700	40000	620	730000	81000	170000

Phytotoxicity (Harmful to Plants) Threshold Trigger Values			
Determinand	**Soil pH < 6.0 (mg/kg)**	**Soil pH 6.0 – 7.0 (mg/kg)**	**Soil pH > 7.0 (mg/kg)**
Copper	100	135	200
Nickel	60	75	110
Zinc	200	200	300
Notes: BS3882:2015 – *Specification for Topsoil*. Based on a wide range of common plants that will be exposed to multi-purpose topsoil. Toxicity of contaminant may also be impacted by pH of soils. Site observation of plant vitality may give additional guidance.			

CL:AIRE Soil Generic Assessment Criteria				
Determinand	**Residential (mg/kg)**	**Residential without plant uptake (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Antimony	ND	550	ND	7500
Barium	ND	1300	ND	22000
Molybdenum	ND	670	ND	17000
ND – Not derived				

9.3. Total Petroleum Hydrocarbons (TPHs)

9.3.1. BTEX Compounds

LQM/CIEH Suitable 4 Use Levels – BTEX Compounds							
Determinand	**Soil Organic Matter**	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Benzene	1.0% SOM	0.087	0.38	0.017	27	72	90
	2.5% SOM	0.170	0.70	0.034	47	72	100
	6.0% SOM	0.370	1.40	0.075	90	73	110
Toluene	1.0% SOM	130	880	22	56000	56000	87000
	2.5% SOM	290	1900	51	110000	56000	95000
	6.0% SOM	660	3900	120	180000	56000	100000
Ethylbenzene	1.0% SOM	47	83	16	5700	24000	17000
	2.5% SOM	110	190	39	13000	24000	22000
	6.0% SOM	260	440	91	27000	25000	27000
o-Xylene	1.0% SOM	60	88	28	6600	41000	17000
	2.5% SOM	140	210	67	15000	42000	24000
	6.0% SOM	330	480	160	33000	43000	33000
m-Xylene	1.0% SOM	59	82	31	6200	41000	17000
	2.5% SOM	140	190	74	14000	42000	24000
	6.0% SOM	320	450	170	31000	43000	33000
p-Xylene	1.0% SOM	56	79	29	5900	41000	17000
	2.5% SOM	130	180	69	14000	42000	23000
	6.0% SOM	310	430	160	30000	43000	31000
SOM = Soil Organic Matter Content (%)							

9.3.2. Total Petroleum Hydrocarbons – Aliphatic

LQM/CIEH Suitable 4 Use Levels For TPH							
Aliphatic		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
EC 5-6	1.0% SOM	42	42	730	3,200 (304) [sol]	570,000 (304) [sol]	95,000 (304) [sol]
	2.5% SOM	78	78	1,700	5,900 (558) [sol]	590,000	130,000 (558) [sol]
	6.0% SOM	160	160	3,900	12,000 (1150) [sol]	600,000 (1150)[sol]	180,000 (1150) [sol]
EC >6-8	1.0% SOM	100	100	2,300	7,800 (144) [sol]	600,000	150,000 (144) [sol]
	2.5% SOM	230	230	5,600	17,000 (322) [sol]	610,000	220,000 (322) [sol]
	6.0% SOM	530	530	13,000	40,000 (736) [sol]	620,000	320,000 (736) [sol]
EC >8-10	1.0% SOM	27	27	320	2,000 (78) [sol]	13,000	14,000 (78) [sol]
	2.5% SOM	65	65	770	4,800 (118) [vap]	13,000	18,000 (118) [vap]
	6.0% SOM	150	150	1,700	11,000 (451) [vap]	13,000	21,000 (451) [vap]
EC >10-12	1.0% SOM	130 (48) [vap]	130 (48) [vap]	2,200	9,700 (48) [sol]	13,000	21,000 (48) [sol]
	2.5% SOM	330 (118) [vap]	330 (118) [vap]	4,400	23,000 (118) [vap]	13,000	23,000 (118) [vap]
	6.0% SOM	760 (283) [vap]	760 (283) [vap]	7,300	47,000 (283) [vap]	13,000	24,000 (283) [vap]
EC >12-16	1.0% SOM	1,100 (24) [sol]	1,100 (24) [sol]	11,000	59,000 (24) [sol]	13,000	25,000 (24) [sol]
	2.5% SOM	2,400 (59) [sol]	2,400 (59) [sol]	13,000	82,000 (59) [sol]	13,000	25,000 (59) [sol]
	6.0% SOM	4,300 (142) [sol]	4,400 (142) [sol]	13,000	90,000 (142) [sol]	13,000	26,000 (142) [sol]
EC >16-35	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000
EC >35-44	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.3.3. Total Petroleum Hydrocarbons – Aromatic

LQM/CIEH Suitable 4 Use Levels For TPH							
Aromatic		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
EC 5-7 (Benzene)	1.0% SOM	70	370	13	26,000 (1220) [sol]	56,000	76,000 (1220 [sol]
	2.5% SOM	140	690	27	46,000 (2260) [sol]	56,000	84,000 (2260) [sol]
	6.0% SOM	300	1,400	57	86,000 (4710) [sol]	56,000	92,000 (4710) [sol]
EC >7-8 (Toluene)	1.0% SOM	130	860	22	56,000 (869) [vap]	56,000	87,000 (869) [sol]
	2.5% SOM	290	1,800	51	110,000 (1920) [sol]	56,000	95,000 (1920) [sol]
	6.0% SOM	660	3,900	120	180,000 (4360) [vap]	56,000	100,000 (4360) [vap]
EC >8-10	1.0% SOM	34	47	8.6	3,500 (613) [vap]	5,000	7,200 (613) [vap]
	2.5% SOM	83	110	21	8,100 (1500) [vap]	5,000	8,500 (1500) [vap]
	6.0% SOM	190	270	51	17,000 (3850) [vap]	5,000	9,300 (3580) [vap]
EC >10-12	1.0% SOM	74	250	13	16,000 (364) [sol]	5,000	9,200 (364) [sol]
	2.5% SOM	180	590	31	28,000 (899) [sol]	5,000	9,700 (889) [sol]
	6.0% SOM	380	1,200	74	34,000 (2150) [sol]	5,000	10,000
EC >12-16	1.0% SOM	140	1,800	23	36,000 (169) [sol]	5,100	10,000
	2.5% SOM	330	2,300 (419) [sol]	57	37,000	5,100	10,000
	6.0% SOM	660	2,500	130	38,000	5,000	10,000
EC >16-21	1.0% SOM	260	1,900	46	28,000	3,800	7,600
	2.5% SOM	540	1,900	110	28,000	3,800	7,700
	6.0% SOM	930	1,900	260	28,000	3,800	7,800
EC >21-35	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >35-44	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >44-70	1.0% SOM	1,600	1,900	1,200	28,000	3,800	7,800
	2.5% SOM	1,800	1,900	2,100	28,000	3,800	7,800
	6.0% SOM	1,900	1,900	3,000	28,000	3,800	7,900

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.4. Polycyclic Aromatic Hydrocarbons (PAHs)

LQM/CIEH Suitable 4 Use Levels For Polycyclic Aromatic Hydrocarbons (PAHs)							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Acenapthene	1.0% SOM	210	3,000 (57.0) [sol]	34	84,000(57.0) [sol]	15,000	29,000
	2.5% SOM	510	4,700(141) [sol]	85	97,000(141) [sol]	15,000	30,000
	6.0% SOM	1100	6,000(336) [sol]	200	100,000	15,000	30,000
Acenapthylene	1.0% SOM	170	2,900(86.1) [sol]	28	83,000(86.1) [sol]	15,000	29,000
	2.5% SOM	420	4,600(212) [sol]	69	97,000(212) [sol]	15,000	30,000
	6.0% SOM	920	6,000(506) [sol]	160	100,000	15,000	30,000
Anthracene	1.0% SOM	2,400	31,000(1.17) [vap]	380	520,000	74,000	150,000
	2.5% SOM	5,400	35,000	950	540,000	74,000	150,000
	6.0% SOM	11,000	37,000	2,200	540,000	74,000	150,000
Benzo(a)anthracene	1.0% SOM	7.20	11	2.90	170	29	49
	2.5% SOM	11	14	6.50	170	29	56
	6.0% SOM	13	15	13	180	29	62
Benzo(a)pyrene	1.0% SOM	2.20	3.20	0.97	35	5.70	11
	2.5% SOM	2.70	3.20	2.00	35	5.70	12
	6.0% SOM	3.00	3.20	3.50	36	5.70	13
Benzo(b)flouranthene	1.0% SOM	2.60	3.90	0.99	44	7.10	13
	2.5% SOM	3.30	4.00	2.10	44	7.20	15
	6.0% SOM	3.70	4.00	3.90	45	7.20	16
Benzo(ghi)perylene	1.0% SOM	320	360	290	3,900	640	1,400
	2.5% SOM	340	360	470	4,000	640	1,500
	6.0% SOM	350	360	640	4,000	640	1,600
Benzo(k)flouranthene	1.0% SOM	77	110	37	1,200	190	370
	2.5% SOM	93	110	75	1,200	190	410
	6.0% SOM	100	110	130	1,200	190	440
Chrysene	1.0% SOM	15	30	4.10	350	57	93
	2.5% SOM	22	31	9.40	350	57	110
	6.0% SOM	27	32	19	350	57	120
Dibenzo(ah)anthracene	1.0% SOM	0.24	0.31	0.14	3.50	0.57	1.10
	2.5% SOM	0.28	0.32	0.27	3.50	0.57	1.30
	6.0% SOM	0.30	0.32	0.43	3.60	0.58	1.40
Flouranthene	1.0% SOM	280	1,500	52	23,000	3,100	6,300
	2.5% SOM	560	1,600	130	23,000	3,100	6,300
	6.0% SOM	890	1,600	290	23,000	3,100	6,300
Flourene	1.0% SOM	170	2,800 (30.9) [sol]	27	63,000(30.9) [sol]	9,900	20,000
	2.5% SOM	400	3,800(76.5) [sol]	67	68,000	9,900	20,000
	6.0% SOM	860	4,500(183) [sol]	160	71,000	9,900	20,000
Indeno(123-cd)pyrene	1.0% SOM	27	45	9.50	500	82	150
	2.5% SOM	36	46	21	510	82	170
	6.0% SOM	41	46	39	510	82	180
Napthalene	1.0% SOM	15	36	65	1,600	11,000	800
	2.5% SOM	36	36	130	3,700	15,000	1,200
	6.0% SOM	85	85	200	8,400	17,000	1,900
Phenanthrene	1.0% SOM	95	1,300(183) [sol]	15	22,000	3,100	6,200
	2.5% SOM	220	1,500	38	22,000	3,100	6,200
	6.0% SOM	440	1,500	90	23,000	3,100	6,300
Pyrene	1.0% SOM	620	3,700	110	54,000	7,400	15,000
	2.5% SOM	1200	3,800	270	54,000	7,400	15,000
	6.0% SOM	2000	3,800	620	54,000	7,400	15,000
Coal Tar (Benzo(a)pyrene used as marker compound)	1.0% SOM	0.79	1.2	0.32	15	2.20	4.40
	2.5% SOM	0.98	1.2	0.67	15	2.20	4.70
	6.0% SOM	1.10	1.2	1.20	15	2.20	4.80

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.5. Volatile and Semi-volatile Organic Compounds

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Chloroalkanes & alkenes							
1,2 Dichloroethane	1.0% SOM	0.0071	0.0092	0.0046	0.67	29	21
	2.5% SOM	0.011	0.013	0.0083	0.97	29	24
	6.0% SOM	0.019	0.023	0.016	1.70	29	28
1,1,2,2 Tetrachloroethane	1.0% SOM	1.60	3.90	0.41	270	1,400	1,800
	2.5% SOM	3.40	8.00	0.89	550	1,400	2,100
	6.0% SOM	7.50	17	2.00	1,100	1,400	2,300
1,1,1,2 Tetrachloroethane	1.0% SOM	1.20	1.50	0.79	110	1,400	1,500
	2.5% SOM	2.80	3.50	1.90	250	1,400	1,800
	6.0% SOM	6.40	8.20	4.40	560	1,400	2,100
Tetrachloroethene	1.0% SOM	0.18	0.18	0.65	19	1,400	810 [sol](424)
	2.5% SOM	0.39	0.40	1.50	42	1,400	1,100 [sol](951)
	6.0% SOM	0.90	0.92	3.60	95	1,400	1,500
1,1,1 Trichloroethane	1.0% SOM	8.80	9.00	48	660	140,000	57,000 [vap](1425)
	2.5% SOM	18	18	110	1,300	140,000	76,000 [vap](2915)
	6.0% SOM	39	40	240	3,000	140,000	100,000 [vap] (6392)
Tetrachloromethene	1.0% SOM	0.026	0.026	0.45	2.90	890	190
	2.5% SOM	0.056	0.056	1.00	6.30	920	270
	6.0% SOM	0.130	0.130	2.40	14	950	400
Trichloroethene	1.0% SOM	0.016	0.017	0.041	1.20	120	70
	2.5% SOM	0.034	0.036	0.091	2.60	120	91
	6.0% SOM	0.075	0.080	0.210	5.70	120	120
Trichloromethane	1.0% SOM	0.91	1.20	0.42	99	2,500	2,600
	2.5% SOM	1.70	2.10	0.83	170	2,500	2,800
	6.0% SOM	3.40	4.20	1.70	350	2,500	3,100
Vinyl Chloride	1.0% SOM	0.00064	0.00077	0.00055	0.059	3.50	4.80
	2.5% SOM	0.00087	0.00100	0.00100	0.077	3.50	5.00
	6.0% SOM	0.00014	0.00150	0.00180	0.120	3.50	5.40
Explosives							
2,4,6 Trinitrotoluene	1.0% SOM	1.60	65	0.24	1,000	130	260
	2.5% SOM	3.70	66	0.58	1,000	130	270
	6.0% SOM	8.10	66	1.40	1,000	130	270
RDX (Hexogen/Cyclonite/1,3,5-trinitro-1,3,5-triazacyclohexane)	1.0% SOM	120	13,000	17	210,000	26,000	49,000(18.7)[sol]
	2.5% SOM	250	13,000	38	210,000	26,000	51,000
	6.0% SOM	540	13,000	85	210,000	27,000	53,000
HMX (Octogen/1,3,5,7-tetrenitro-1,3,5,7-tetrazacyclo-octane)	1.0% SOM	5.70	67,00	0.86	110,000	13,000	23,000(0.35)[vap]
	2.5% SOM	13	67,00	1.90	110,000	13,000	23,000(0.39)[vap]
	6.0% SOM	26	67,00	3.90	110,000	13,000	24,000(0.48)[vap]
Atrazine	1.0% SOM	3.30	610	0.50	9,300	1,200	2,300
	2.5% SOM	7.60	620	1.20	9,400	1,200	2,400
	6.0% SOM	17.40	620	2.70	9,400	1,200	2,400
[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.							
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.							

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Pesticides							
Aldrin	1.0% SOM	5.70	7.30	3.20	170	18	30
	2.5% SOM	6.60	7.40	6.10	170	18	31
	6.0% SOM	7.10	7.50	9.60	170	18	31
Dieldrin	1.0% SOM	0.97	7.00	0.17	170	18	30
	2.5% SOM	2.00	7.30	0.41	170	18	30
	6.0% SOM	3.50	7.40	0.96	170	18	31
Dichlorvos	1.0% SOM	0.032	6.40	0.0049	140	16	26
	2.5% SOM	0.066	6.50	0.0100	140	16	26
	6.0% SOM	0.140	6.60	0.0220	140	16	27
Alpha - Endosulfan	1.0% SOM	7.40	160(0.003)[vap]	1.20	5,600(0.003)[vap]	1,200	2,400
	2.5% SOM	18	280(0.007)[vap]	2.90	7,400(0.007)[vap]	1,200	2,400
	6.0% SOM	41	410(0.016)[vap]	6.80	8,400(0.016)[vap]	1,200	2,400
Beta - Endosulfan	1.0% SOM	7.00	190(0.00007)[vap]	1.10	6,300(0.00007)[vap]	1,200	2,400
	2.5% SOM	17	320(0.0002)[vap]	2.70	7,800(0.0002)[vap]	1,200	2,400
	6.0% SOM	39	440(0.0004)[vap]	6.40	8700	1,200	2,500
Alpha - Hexachlorocyclohexanes	1.0% SOM	0.23	6.90	0.035	170	24	47
	2.5% SOM	0.55	9.20	0.087	180	24	48
	6.0% SOM	1.20	11	0.210	180	24	48
Beta - Hexachlorocyclohexanes	1.0% SOM	0.085	3.70	0.013	65	8.10	15
	2.5% SOM	0.200	3.80	0.032	65	8.10	15
	6.0% SOM	0.460	3.80	0.077	65	8.10	16
Gamma - Hexachlorocyclohexanes	1.0% SOM	0.06	2.90	0.0092	67	8.2	14
	2.5% SOM	0.14	3.30	0.0230	69	8.2	15
	6.0% SOM	0.33	3.50	0.0540	70	8.2	15
Chlorobenzenes							
Chlorobenzene	1.0% SOM	0.46	0.46	5.90	56	11,000	1,300(675)[sol]
	2.5% SOM	1.00	1.00	14	130	13,000	2,000(1520)[sol]
	6.0% SOM	2.40	2.40	32	290	14,000	2,900
1,2-Dichlorobenzene	1.0% SOM	23	24	94	2,000 (571) [sol]	90,000	24,000(571)[sol]
	2.5% SOM	55	57	230	4,800 (1370) [sol]	95,000	36,000(1370)[sol]
	6.0% SOM	130	130	540	11,000 (3240) [sol]	98,000	51,000(3240)[sol]
1,3-Dichlorobenzene	1.0% SOM	0.40	0.44	0.25	30	300	390
	2.5% SOM	1.00	1.10	0.60	73	300	440
	6.0% SOM	2.30	2.50	1.50	170	300	470
1,4-Dichlorobenzene	1.0% SOM	61	61	15	4,400 (224)[vap]	17,000[g]	36,000 (224)[vap]
	2.5% SOM	150	150	37	10,000 (540)[vap]	17,000[g]	36,000 (540)[vap]
	6.0% SOM	350	350	88[g]	25,000 (1280)[vap]	17,000[g]	36,000 (1280)[vap]
1,2,3,-Trichlorobenzene	1.0% SOM	1.50	1.50	4.70	102	1,800	770(134[vap]
	2.5% SOM	3.60	3.70	12	250	1,800	1,100(330)[vap]
	6.0% SOM	8.60	8.80	28	590	1,800	1,600(789)[vap]
1,2,4,-Trichlorobenzene	1.0% SOM	2.60	2.60	55	220	15,000	1,700(318)[vap]
	2.5% SOM	6.40	6.40	140	530	17,000	2,600(786)[vap]
	6.0% SOM	15	15	320	1,300	19,000	4,000(1880)[vap]
1,3,5,-Trichlorobenzene	1.0% SOM	0.33	0.33	4.70	23	1,700	380(36.7)[vap]
	2.5% SOM	0.81	0.81	12	55	1,700	590(90.8)[vap]
	6.0% SOM	1.90	1.90	140	130	1,800	860(217)[vap]

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Chlorobenzenes (cont.)							
1,2,3,4,- Tetrachlorobenzene	1.0% SOM	15	24	4.40	1,700(122)^{vap}	830	1,500(122)^{vap}
	2.5% SOM	36	56	11	3,080(304)^{vap}	830	1,600
	6.0% SOM	78	120	26	4,400(728)^{vap}	830	1,600
1,2,3,5,- Tetrachlobenzene	1.0% SOM	0.66	0.75	0.38	49(39.4)^{vap}	78	110(39)^{vap}
	2.5% SOM	1.60	1.90	0.90	120(98.1)^{vap}	79	120
	6.0% SOM	3.70	4.30	2.20	240(235)^{vap}	79	130
1,2,4, 5,- Tetrachlobenzene	1.0% SOM	0.33	0.73	0.06	42(19.7)^{sol}	13	25
	2.5% SOM	0.77	1.70	0.16	72(49.1)^{sol}	13	26
	6.0% SOM	1.60	3.50	0.37	96	13	26
Pentachlrobenzene	1.0% SOM	5.80	19	1.20	640(43.0)^{sol}	100	190
	2.5% SOM	12	30	3.10	770(107)^{sol}	100	190
	6.0% SOM	22	38	7.00	830	100	190
Hexachlorobenzene	1.0% SOM	1.80(0.20)^{vap}	4.10 (0.20)^{vap}	0.47	110(0.20)^{vap}	16	30
	2.5% SOM	3.30(0.50)^{vap}	5.70 (0.50)^{vap}	1.10	120	16	30
	6.0% SOM	4.90	6.70 (1.2)^{vap}	2.50	120	16	30
Phenols & Chlorophenols							
BTEX	1.0% SOM	280	750	66	760^{dir}(31,000)	760^{dir}(11,000)	760^{dir}(8,600)
	2.5% SOM	550	1,300	140	1,500^{dir}(35,000)	1,500^{dir}(11,000)	1,500^{dir}(9,700)
	6.0% SOM	1100	2,300	280	3,200^{dir}(37,000)	3,200^{dir}(11,000)	3,200^{dir}(11,000)
Chlorophenols (4 Congeners)	1.0% SOM	0.87	94	0.13	3,500	620	1,100
	2.5% SOM	2.00	150	0.30	4,000	620	1,100
	6.0% SOM	4.50	210	0.70	4,300	620	1,100
Pentachlorophenols	1.0% SOM	0.22	27(16.4)^{vap}	0.03	400	60	110
	2.5% SOM	0.52	29	0.08	400	60	120
	6.0% SOM	1.20	31	0.19	400	60	120
Others							
Carbon Disulphide	1.0% SOM	0.14	0.14	4.80	11	11,000	1,300
	2.5% SOM	0.29	0.29	10	22	11,000	1,900
	6.0% SOM	0.62	0.62	23	47	12,000	2,700
Hexachloro-1,3-Butadiene	1.0% SOM	0.29	0.32	0.25	31	25	48
	2.5% SOM	0.70	0.78	0.61	68	25	50
	6.0% SOM	1.60	1.80	1.40	120	25	51
^{vap} – GAC presented exceeds the vapour saturation limit, which is presented in brackets.							
^{sol} – GAC presented exceeds the soil saturation limit, which is presented in brackets.							

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
1,1,2 Trichloroethane	1.0% SOM	0.60	0.88	0.28	94
	2.5% SOM	1.20	1.8	0.61	190
	6.0% SOM	2.70	3.9	1.40	400
1,1-Dichloroethane	1.0% SOM	2.40	2.50	9.20	280
	2.5% SOM	3.90	4.10	17	450
	6.0% SOM	7.40	7.70	35	850
1,1-Dichloroethene	1.0% SOM	0.23	0.23	2.80	26
	2.5% SOM	0.40	0.41	5.60	46
	6.0% SOM	0.82	0.82	12	92
1,2,4-Trimethylbenzene	1.0% SOM	0.35	0.41	0.38	42
	2.5% SOM	0.85	0.99	0.93	99
	6.0% SOM	2.00	2.30	2.20	220
1,2-Dichloropropane	1.0% SOM	0.024	0.024	0.62	3.3
	2.5% SOM	0.042	0.042	1.20	5.9
	6.0% SOM	0.084	0.085	2.60	12
2,4-Dimethylphenol	1.0% SOM	19	210	3.10	16000*
	2.5% SOM	43	410	7.20	24000*
	6.0% SOM	97	730	17	30000*
2,4-Dinitrotoluene	1.0% SOM	1.50	170*	0.22	3700*
	2.5% SOM	3.20	170	0.49	3700*
	6.0% SOM	7.20	170	1.10	3800*
2,6-Dinitrotoluene	1.0% SOM	0.78	78	0.12	1900*
	2.5% SOM	1.70	84	0.27	1900*
	6.0% SOM	3.90	87	0.61	1900*
2-Chloronapthalene	1.0% SOM	3.70	3.80	40	390*
	2.5% SOM	9.20	9.30	98	960*
	6.0% SOM	22	22	230	2200*
Biphenyl	1.0% SOM	66*	220*	14	18000*
	2.5% SOM	160	500*	35	33000*
	6.0% SOM	360	980*	83	48000*
Bis (2-ethylhexyl) phthalate	1.0% SOM	280*	2700*	47*	85000*
	2.5% SOM	610*	2800*	120*	86000*
	6.0% SOM	1100*	2800*	280*	86000*
Bromobenzene	1.0% SOM	0.87	0.91	3.2	97
	2.5% SOM	2.0	2.1	7.6	220
	6.0% SOM	4.7	4.9	18	520
Bromodichloromethane	1.0% SOM	0.016	0.019	0.016	2.1
	2.5% SOM	0.030	0.034	0.032	3.7
	6.0% SOM	0.061	0.070	0.068	7.6
Bromoform	1.0% SOM	2.8	5.2	0.95	760
	2.5% SOM	5.9	11	2.1	1500
	6.0% SOM	13	23	4.6	3100
Butyl benzyl phthalate	1.0% SOM	1400*	42000*	220*	940000*
	2.5% SOM	3300*	44000*	550*	940000*
	6.0% SOM	7200*	44000*	1300*	950000*

*soil concentration above saturation limit

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Chloroethane	1.0% SOM	8.3	8.4	110	960
	2.5% SOM	11	11	200	1300
	6.0% SOM	18	18	380	2100
Chloromethane	1.0% SOM	0.0083	0.0085	0.066	1.0
	2.5% SOM	0.0098	0.0099	0.13	1.2
	6.0% SOM	0.013	0.013	0.23	1.6
***Cis* 1,2 Dichloroethene**	1.0% SOM	0.11	0.12	0.26	14
	2.5% SOM	0.19	0.20	0.50	24
	6.0% SOM	0.37	0.39	1.0	47
Dichloromethane	1.0% SOM	0.58	2.10	0.10	270
	2.5% SOM	0.98	2.80	0.19	360
	6.0% SOM	1.70	4.50	0.34	560
Diethyl Phthalate	1.0% SOM	120*	1800*	19*	150000*
	2.5% SOM	260*	3500*	41*	220000*
	6.0% SOM	570*	6300*	94*	290000*
Di-*n*-butyl phthalate	1.0% SOM	13*	450*	2.00	15000*
	2.5% SOM	31*	450*	5.00	15000*
	6.0% SOM	67*	450*	12	15000*
Di-*n*-octyl phthalate	1.0% SOM	2300*	3400*	940*	89000*
	2.5% SOM	2800*	3400*	2100*	89000*
	6.0% SOM	3100*	3400*	3900*	89000*
Hexachloroethane	1.0% SOM	0.20	0.22	0.27	22*
	2.5% SOM	0.48	0.54	0.67	53*
	6.0% SOM	1.10	1.30	1.60	120*
Isopropylbenzene	1.0% SOM	11	12	32	1400*
	2.5% SOM	27	28	79	3300*
	6.0% SOM	64	67	190	7700*
Methyl *tert*-butyl ether (MTBE)	1.0% SOM	49	73	23	7900
	2.5% SOM	84	120	44	13000
	6.0% SOM	160	220	90	24000
Propylbenzene	1.0% SOM	34	40	34	4100*
	2.5% SOM	82	97	83	9700*
	6.0% SOM	190	230	200	21000*
Styrene	1.0% SOM	8.10	35	1.60	3300*
	2.5% SOM	19	78	3.70	6500*
	6.0% SOM	43	170	8.70	11000*
Total Cresols (2-, 3-, and 4-methylphenol)	1.0% SOM	80	3700	12	160000
	2.5% SOM	180	5400	27	180000*
	6.0% SOM	400	6900	63	180000*
***Trans* 1,2 Dichloroethene**	1.0% SOM	0.19	0.19	0.93	22
	2.5% SOM	0.34	0.35	1.90	40
	6.0% SOM	0.70	0.71	0.24	81
Tributyl tin oxide	1.0% SOM	0.25	1.40	0.042	130*
	2.5% SOM	0.59	3.10	0.100	180*
	6.0% SOM	1.30	5.70	0.240	200*

*soil concentration above saturation limit

C4SL Low Level of Toxicological Concern							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
1,2-Dichloroethane (Ethylene Dichloride)	1.0% SOM	0.11	0.16	0.054	12	300	300
	2.5% SOM	0.18	0.24	0.10	17	310	330
	6.0% SOM	0.31	0.41	0.19	29	310	380
Cis-1,2-Dichloroethene	1.0% SOM	0.46	0.50	0.89	38	3,800	2,000
	2.5% SOM	0.78	0.84	1.7	64	3,800	2,400
	6.0% SOM	1.5	1.6	3.6	120	3,900	3,100
Tetrachloroethene (PCE)	1.0% SOM	0.31	0.32	2	24	3,200	1,400
	2.5% SOM	0.70	0.71	4.8	55	3,300	1,900
	6.0% SOM	1.60	1.60	11	130	3,400	2,500
Trans-1,2-Dichloroethene	1.0% SOM	0.90	0.93	3.70	69	13,000	5,600
	2.5% SOM	1.60	1.70	7.50	120	13,000	7,000
	6.0% SOM	3.30	3.40	16	260	13,000	9,100
Trichloroethene (TCE)	1.0% SOM	0.0093	0.0097	0.032	0.73	76	41
	2.5% SOM	0.020	0.020	0.072	1.5	78	54
	6.0% SOM	0.043	0.045	0.16	3.4	79	69
Vinyl Chloride (Chloroethene)	1.0% SOM	0.0064	0.015	0.0017	1.1	7.8	18
	2.5% SOM	0.010	0.019	0.0031	1.4	7.8	19
	6.0% SOM	0.017	0.029	0.0058	2.2	7.8	19

9.6. Asbestos

No asbestos or asbestos containing materials (ACM's) are considered acceptable on-site from a human health perspective. Therefore the GAC for asbestos & ACM's within any imported material should be none detected (ND).

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB
0333 600 1221
enquiries@groundandwater.co.uk
groundandwater.co.uk

APPENDIX G: Asbestos Risk Assessment

Asbestos Risk Assessment (CIRIA733)

Site information	Trial Hole	TP1 and TP3								
	Depth (m bgl)	0.2 and 0.80								
Asbestos Type Considerations	Abestos type	Chrysotile			Amosite			Crocidolite		
	Kasbestos	1.3			1.7			2.0		
	Soil Concentration (Quantification Result in %)	0.001								
Soil Type Considerations	Soil Type	Sand	Sandy Clay	Clay	Sand	Sandy Clay	Clay	Sand	Sandy Clay	Clay
	Ksoil	2.9	1.7	0.93	2.9	1.7	0.93	2.9	1.7	0.93
	Enter the relevant from the above	1.7								
Constants	Koverall	1.6			1.6			1.6		
	Dust Concentration (mg/m3)	0.1			0.1			0.1		
	Dry Conditions Exposure (hrs)	750			750			750		
	Occupation hours in a year	1920			1920			1920		
Calculation Results	fibre/ml per mg/m3	0.00138								
	fibre/ml	0.000138								
	fibre/ml.hr	0.104								
	fibre/ml.year	0.000054								
Mesothelioma Accumulated Risk	Age (exposure commences)	0			0			0		
	Risk persists for (Years)	60			60			60		
	Cummulative Age Adjustment Factor	16.8			16.8			16.8		
	fibre/ml.year (cumulative)	0.00091								
Lung Cancer Accumulated Risk	Risk persists for (Years)	60			60			60		
	fibre/ml.year (cumulative)	0.00065								

BACKGROUND

This asbestos risk assessment has been undertaken in accordance with the guidance within CIRIA733.

The fibre concentration within the airborne soil dust (in fibres/ml per mg/m3) was calculated based on the results of Addison et al 1988.

The airborne concentration of soil dust (0.1mg/m3) was based on ambient urban dust levels and ART modelling.

The dry conditions exposure (750hrs) was based upon regional meteorological data suggesting 150hrs of dry conditions per year, when applied over a 5-year segment this equates to 750hours.

The occupational hours per year (1920hrs) is based on a 40-hour working week and 48 working weeks in a year.

A worst-case exposure scenario has been considered for residents, groundworkers or generally end-users. This was based on the risk persisting for a period of 60 years, accumulated in 5-year increments. As the risk of mesothelioma is age dependent, this considered the exposure commencing at age 0 with the relevant age adjustment factor applied for each 5-year increment.

Based on the above considerations, the following equations have been used:

((Kasbestostype x Ksoil) ÷ Koverall) x Soil Concentration = fibre/ml per mg/m3

Fibre/ml per mg/m3 x Dust Concentration = fibre/ml

(f/ml x Dry Conditions Exposure (hrs)) = fibre/ml.hr

Fibre/ml.hr ÷ occupational hours per year = fibre/ml.year

Mesothelioma: fibre/ml.year x 16.8 (cumulative age adjustment factor for 60 years)

Lung Cancer: fibre/ml.year x 12 (60 years in 5-year increments)

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB
0333 600 1221
enquiries@groundandwater.co.uk
groundandwater.co.uk

APPENDIX H: Hazard Waste Assessment

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

50972-04UVQ-2V5JZ

Job name

GWPR5909

Description/Comments

Project

GWPR5909

Site

34 Nassau Road SW13 9QE

Classified by

Name:
Adam Young
Date:
05 Apr 2024 08:04 GMT
Telephone:

Company:
Ground and Water
2 The long Barn, Norton Farm, Selbourne Road,
Alton
GU34 3NB

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: -

Course	Date
Hazardous Waste Classification	-

Purpose of classification

2 - Material Characterisation

Address of the waste

34 Nassau Road **Post Code** SW13 9QE

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Redevelopment of site

Description of the specific process, sub-process and/or activity that created the waste

Waste created during the excavation of soils

Description of the waste

Made Ground

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01--12032024-1.20		Non Hazardous		3
2	WS02--12032024-0.20		Non Hazardous		5
3	WS01--12032024-2.00		Non Hazardous		8
4	WS02--12032024-1.50		Non Hazardous		9
5	WS02--12032024-3.00		Non Hazardous		10

Related documents

#	Name	Description
1	24-009116_HWOL.hwol	i2 Analytical .hwol file used to populate the Job

Report

Created by: Adam Young

Created date: 05 Apr 2024 08:04 GMT

Classification of sample: WS01--12032024-1.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS01--12032024-1.20
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<**LOD**
2	monohydric phenols			P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				2 mg/kg	1.884	3.768 mg/kg	0.000377 %		
4	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		1.7 mg/kg	23.173	32.697 mg/kg	0.00327 %	✓	
5	pH			PH		8 pH		8 pH	8pH		
6	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		18 mg/kg		14.94 mg/kg	0.00149 %	✓	
7	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		67 mg/kg	1.126	62.611 mg/kg	0.00626 %	✓	
9	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.9 mg/kg		0.747 mg/kg	0.0000747 %	✓	
10	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		24 mg/kg	1.579	31.464 mg/kg	0.00315 %	✓	
11	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	220 mg/kg		182.6 mg/kg	0.0183 %	✓	
12	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		55 mg/kg	1.785	81.494 mg/kg	0.00815 %	✓	
14	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		110 mg/kg	2.469	225.447 mg/kg	0.0225 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene				0.38	mg/kg		0.315	mg/kg	0.0000315 %	✓	
			205-917-1	208-96-8									
16		acenaphthene				0.1	mg/kg		0.083	mg/kg	0.0000083 %	✓	
			201-469-6	83-32-9									
17		anthracene				3	mg/kg		2.49	mg/kg	0.000249 %	✓	
			204-371-1	120-12-7									
18		benzo[a]anthracene				5.7	mg/kg		4.731	mg/kg	0.000473 %	✓	
		601-033-00-9	200-280-6	56-55-3									
19		benzo[a]pyrene; benzo[def]chrysene				4.7	mg/kg		3.901	mg/kg	0.00039 %	✓	
		601-032-00-3	200-028-5	50-32-8									
20		benzo[b]fluoranthene				6.1	mg/kg		5.063	mg/kg	0.000506 %	✓	
		601-034-00-4	205-911-9	205-99-2									
21		benzo[k]fluoranthene				2.3	mg/kg		1.909	mg/kg	0.000191 %	✓	
		601-036-00-5	205-916-6	207-08-9									
22		benzo[ghi]perylene				2.6	mg/kg		2.158	mg/kg	0.000216 %	✓	
			205-883-8	191-24-2									
23		chrysene				5.7	mg/kg		4.731	mg/kg	0.000473 %	✓	
		601-048-00-0	205-923-4	218-01-9									
24		dibenz[a,h]anthracene				0.63	mg/kg		0.523	mg/kg	0.0000523 %	✓	
		601-041-00-2	200-181-8	53-70-3									
25		fluoranthene				14	mg/kg		11.62	mg/kg	0.00116 %	✓	
			205-912-4	206-44-0									
26		fluorene				0.43	mg/kg		0.357	mg/kg	0.0000357 %	✓	
			201-695-5	86-73-7									
27		indeno[123-cd]pyrene				2.2	mg/kg		1.826	mg/kg	0.000183 %	✓	
			205-893-2	193-39-5									
28		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
29		phenanthrene				7.2	mg/kg		5.976	mg/kg	0.000598 %	✓	
			201-581-5	85-01-8									
30		pyrene				11	mg/kg		9.13	mg/kg	0.000913 %	✓	
			204-927-3	129-00-0									
31		chromium in chromium(III) compounds { chromium(III) oxide }				25	mg/kg	1.462	36.539	mg/kg	0.00365 %		
			215-160-9	1308-38-9									
										Total:	0.0733 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS02--12032024-0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS02--12032024-0.20
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<**LOD**
2	monohydric phenols			P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<**LOD**
4	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		1.2 mg/kg	23.173	23.636 mg/kg	0.00236 %	✓	
5	pH			PH		7.7 pH		7.7 pH	7.7 pH		
6	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		19 mg/kg		16.15 mg/kg	0.00161 %	✓	
7	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		33 mg/kg	1.126	31.581 mg/kg	0.00316 %	✓	
9	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.6 mg/kg		0.51 mg/kg	0.000051 %	✓	
10	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		21 mg/kg	1.579	28.194 mg/kg	0.00282 %	✓	
11	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	160 mg/kg		136 mg/kg	0.0136 %	✓	
12	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		49 mg/kg	1.785	74.353 mg/kg	0.00744 %	✓	
14	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		74 mg/kg	2.469	155.319 mg/kg	0.0155 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
16		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
17		anthracene		204-371-1	120-12-7		0.16	mg/kg		0.136	mg/kg	0.0000136 %	✓	
18		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1	mg/kg		0.85	mg/kg	0.000085 %	✓	
19		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.84	mg/kg		0.714	mg/kg	0.0000714 %	✓	
20		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.6	mg/kg		1.36	mg/kg	0.000136 %	✓	
21		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.68	mg/kg		0.578	mg/kg	0.0000578 %	✓	
22		benzo[ghi]perylene		205-883-8	191-24-2		0.6	mg/kg		0.51	mg/kg	0.000051 %	✓	
23		chrysene	601-048-00-0	205-923-4	218-01-9		1.3	mg/kg		1.105	mg/kg	0.000111 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.17	mg/kg		0.145	mg/kg	0.0000145 %	✓	
25		fluoranthene		205-912-4	206-44-0		1.7	mg/kg		1.445	mg/kg	0.000145 %	✓	
26		fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
27		indeno[123-cd]pyrene		205-893-2	193-39-5		0.52	mg/kg		0.442	mg/kg	0.0000442 %	✓	
28		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
29		phenanthrene		201-581-5	85-01-8		0.59	mg/kg		0.501	mg/kg	0.0000501 %	✓	
30		pyrene		204-927-3	129-00-0		1.7	mg/kg		1.445	mg/kg	0.000145 %	✓	
31		benzene	601-020-00-8	200-753-7	71-43-2		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
32		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
34		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
35		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
36		toluene	601-021-00-3	203-625-9	108-88-3		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
37		TPH (C6 to C40) petroleum group			TPH		<40	mg/kg		<40	mg/kg	<0.004 %		<LOD
38		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		24	mg/kg	1.462	35.077	mg/kg	0.00351 %		
											Total:	0.0558 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS01--12032024-2.00

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS01--12032024-2.00
Moisture content:
3.4%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 3.4% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH				8.4 pH		8.4 pH	8.4 pH		
				PH							
								Total:	0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS02--12032024-1.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS02--12032024-1.50
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH		PH		8 pH		8 pH	8pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS02--12032024-3.00

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS02--12032024-3.00
Moisture content:
2.4%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 2.4% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH		PH		8.3 pH		8.3 pH	8.3 pH		
								Total:	0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Appendix A: Classifier defined and non GB MCL determinands

monohydric phenols (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)
Data source: CLP combined data
Data source date: 26 Mar 2019
Hazard Statements: Muta. 2; H341 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 2; H373 , Skin Corr. 1B; H314 , Skin Corr. 1B; H314 >= 3 % , Skin Irrit. 2; H315 1 <= conc. < 3 % , Eye Irrit. 2; H319 1 <= conc. < 3 % , Aquatic Chronic 2; H411

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

GB MCL index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

GB MCL index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from ECHA's C&L inventory database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 30 Apr 2020
Hazard Statements: Acute Tox. 4; H302 , Skin Sens. 1; H317 , Eye Irrit. 2; H319

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

chromium in chromium(VI) compounds {chromium(VI) oxide}

Most likely worst case.

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Most likely worst case.

boron {boron tribromide}

Most likely worst case.

arsenic {arsenic}

Most likely worst case.

cadmium {cadmium sulfide}

Most likely worst case.

copper {dicopper oxide; copper (I) oxide}

Most likely worst case.

mercury {mercury}

Most likely worst case.

nickel {nickel dihydroxide}

Most likely worst case.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Worse case

selenium {selenium}

Most likely worst case.

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most likely worst case.

zinc {zinc sulphate}

Most likely worst case.

chromium in chromium(III) compounds {chromium(III) oxide}

Most likely worst case.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2024.96.6000.11109 (05 Apr 2024)
HazWasteOnline Database: 2024.95.5999.11108 (04 Apr 2024)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021
GB MCL List v2.0 - version 2.0 of 20th October 2023
GB MCL List v3.0 - version 3.0 of 11th January 2024
GB MCL List v4.0 - version 4.0 of 2nd March 2024

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

XWGXO-17D24-G9T81

Job name

GWPR5986

Description/Comments

Project

GWPR5986

Site

34 Nassau Road SW13 9QE

Classified by

Name:
Adam Young
Date:
22 May 2024 09:17 GMT
Telephone:

Company:
Ground and Water
2 The long Barn, Norton Farm, Selbourne Road,
Alton
GU34 3NB

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: -

Course	Date
Hazardous Waste Classification	-

Purpose of classification

2 - Material Characterisation

Address of the waste

34 Nassau Road **Post Code** SW13 9QE

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Redevelopment of site

Description of the specific process, sub-process and/or activity that created the waste

Waste created during excavation of soils

Description of the waste

Made Ground

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP1--06052024-0.20		Non Hazardous		3
2	TP2--06052024-0.50		Non Hazardous		6
3	TP3--06052024-0.80		Non Hazardous		8
4	TP5--06052024-1.20		Non Hazardous		10

Related documents

#	Name	Description
1	24-018427_HWOL.hwol	i2 Analytical .hwol file used to populate the Job

Report

Created by: Adam Young

Created date: 22 May 2024 09:17 GMT

Classification of sample: TP1--06052024-0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP1--06052024-0.20
Moisture content:
14%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<**LOD**
2	monohydric phenols			P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<**LOD**
4	pH			PH		8 pH		8 pH	8pH		
5	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		1.1 mg/kg	23.173	21.922 mg/kg	0.00219 %	✓	
6	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		22 mg/kg		18.92 mg/kg	0.00189 %	✓	
7	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		68 mg/kg	1.126	65.842 mg/kg	0.00658 %	✓	
9	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		1.6 mg/kg		1.376 mg/kg	0.000138 %	✓	
10	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		21 mg/kg	1.579	28.526 mg/kg	0.00285 %	✓	
11	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	330 mg/kg		283.8 mg/kg	0.0284 %	✓	
12	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		50 mg/kg	1.785	76.763 mg/kg	0.00768 %	✓	
14	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		110 mg/kg	2.469	233.595 mg/kg	0.0234 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		acenaphthylene		205-917-1	208-96-8		0.09	mg/kg		0.0774	mg/kg	0.00000774 %	✓	
16		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
17		anthracene		204-371-1	120-12-7		0.24	mg/kg		0.206	mg/kg	0.0000206 %	✓	
18		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.4	mg/kg		1.204	mg/kg	0.00012 %	✓	
19		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.6	mg/kg		1.376	mg/kg	0.000138 %	✓	
20		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		2	mg/kg		1.72	mg/kg	0.000172 %	✓	
21		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.86	mg/kg		0.74	mg/kg	0.000074 %	✓	
22		benzo[ghi]perylene		205-883-8	191-24-2		1	mg/kg		0.86	mg/kg	0.000086 %	✓	
23		chrysene	601-048-00-0	205-923-4	218-01-9		1.7	mg/kg		1.462	mg/kg	0.000146 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.21	mg/kg		0.181	mg/kg	0.0000181 %	✓	
25		fluoranthene		205-912-4	206-44-0		2.7	mg/kg		2.322	mg/kg	0.000232 %	✓	
26		fluorene		201-695-5	86-73-7		0.06	mg/kg		0.0516	mg/kg	0.00000516 %	✓	
27		indeno[123-cd]pyrene		205-893-2	193-39-5		0.91	mg/kg		0.783	mg/kg	0.0000783 %	✓	
28		naphthalene	601-052-00-2	202-049-5	91-20-3		0.16	mg/kg		0.138	mg/kg	0.0000138 %	✓	
29		phenanthrene		201-581-5	85-01-8		1.1	mg/kg		0.946	mg/kg	0.0000946 %	✓	
30		pyrene		204-927-3	129-00-0		2.4	mg/kg		2.064	mg/kg	0.000206 %	✓	
31		benzene	601-020-00-8	200-753-7	71-43-2		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
32		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
34		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
35		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
36		toluene	601-021-00-3	203-625-9	108-88-3		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
37		TPH (C6 to C40) petroleum group			TPH		<40	mg/kg		<40	mg/kg	<0.004 %		<LOD
38		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		22	mg/kg	1.462	32.154	mg/kg	0.00322 %		
											Total:	0.0825 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP2--06052024-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP2--06052024-0.50
Moisture content:
14%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	●	pH			PH		7.3	pH		7.3	pH	7.3 pH		
2	●	acenaphthylene		205-917-1	208-96-8		0.15	mg/kg		0.129	mg/kg	0.0000129 %	✓	
3	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
4	●	anthracene		204-371-1	120-12-7		0.3	mg/kg		0.258	mg/kg	0.0000258 %	✓	
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.8	mg/kg		1.548	mg/kg	0.000155 %	✓	
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		2.5	mg/kg		2.15	mg/kg	0.000215 %	✓	
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		2.4	mg/kg		2.064	mg/kg	0.000206 %	✓	
8		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.3	mg/kg		1.118	mg/kg	0.000112 %	✓	
9	●	benzo[ghi]perylene		205-883-8	191-24-2		1.3	mg/kg		1.118	mg/kg	0.000112 %	✓	
10		chrysene	601-048-00-0	205-923-4	218-01-9		2.4	mg/kg		2.064	mg/kg	0.000206 %	✓	
11		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.26	mg/kg		0.224	mg/kg	0.0000224 %	✓	
12	●	fluoranthene		205-912-4	206-44-0		3.9	mg/kg		3.354	mg/kg	0.000335 %	✓	
13	●	fluorene		201-695-5	86-73-7		0.07	mg/kg		0.0602	mg/kg	0.00000602 %	✓	
14	●	indeno[123-cd]pyrene		205-893-2	193-39-5		1.1	mg/kg		0.946	mg/kg	0.0000946 %	✓	
15		naphthalene	601-052-00-2	202-049-5	91-20-3		0.08	mg/kg		0.0688	mg/kg	0.00000688 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		1.5	mg/kg		1.29	mg/kg	0.000129 %	✓	
17	●	pyrene		204-927-3	129-00-0		3.3	mg/kg		2.838	mg/kg	0.000284 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
18		benzene				<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
19	●	ethylbenzene				<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
20		xylene				<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
21		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
22		toluene				<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
23	●	polychlorobiphenyls; PCB				<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
24	●	coronene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-881-7	191-07-1									
										Total:	0.00194 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: TP3--06052024-0.80

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP3--06052024-0.80
Moisture content:
12%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<LOD
2	monohydric phenols			P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
4	pH			PH		8.1 pH		8.1 pH	8.1 pH		
5	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		<0.2 mg/kg	23.173	<4.635 mg/kg	<0.000463 %		<LOD
6	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		19 mg/kg		16.72 mg/kg	0.00167 %	✓	
7	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		47 mg/kg	1.126	46.567 mg/kg	0.00466 %	✓	
9	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.6 mg/kg		0.528 mg/kg	0.0000528 %	✓	
10	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		20 mg/kg	1.579	27.799 mg/kg	0.00278 %	✓	
11	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	240 mg/kg		211.2 mg/kg	0.0211 %	✓	
12	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		46 mg/kg	1.785	72.264 mg/kg	0.00723 %	✓	
14	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		120 mg/kg	2.469	260.758 mg/kg	0.0261 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene				2.3	mg/kg		2.024	mg/kg	0.000202 %	✓	
			205-917-1	208-96-8									
16		acenaphthene				0.49	mg/kg		0.431	mg/kg	0.0000431 %	✓	
			201-469-6	83-32-9									
17		anthracene				10	mg/kg		8.8	mg/kg	0.00088 %	✓	
			204-371-1	120-12-7									
18		benzo[a]anthracene				18	mg/kg		15.84	mg/kg	0.00158 %	✓	
		601-033-00-9	200-280-6	56-55-3									
19		benzo[a]pyrene; benzo[def]chrysene				18	mg/kg		15.84	mg/kg	0.00158 %	✓	
		601-032-00-3	200-028-5	50-32-8									
20		benzo[b]fluoranthene				23	mg/kg		20.24	mg/kg	0.00202 %	✓	
		601-034-00-4	205-911-9	205-99-2									
21		benzo[k]fluoranthene				8	mg/kg		7.04	mg/kg	0.000704 %	✓	
		601-036-00-5	205-916-6	207-08-9									
22		benzo[ghi]perylene				9.1	mg/kg		8.008	mg/kg	0.000801 %	✓	
			205-883-8	191-24-2									
23		chrysene				18	mg/kg		15.84	mg/kg	0.00158 %	✓	
		601-048-00-0	205-923-4	218-01-9									
24		dibenz[a,h]anthracene				2.1	mg/kg		1.848	mg/kg	0.000185 %	✓	
		601-041-00-2	200-181-8	53-70-3									
25		fluoranthene				42	mg/kg		36.96	mg/kg	0.0037 %	✓	
			205-912-4	206-44-0									
26		fluorene				2.6	mg/kg		2.288	mg/kg	0.000229 %	✓	
			201-695-5	86-73-7									
27		indeno[123-cd]pyrene				8.6	mg/kg		7.568	mg/kg	0.000757 %	✓	
			205-893-2	193-39-5									
28		naphthalene				1.2	mg/kg		1.056	mg/kg	0.000106 %	✓	
		601-052-00-2	202-049-5	91-20-3									
29		phenanthrene				27	mg/kg		23.76	mg/kg	0.00238 %	✓	
			201-581-5	85-01-8									
30		pyrene				34	mg/kg		29.92	mg/kg	0.00299 %	✓	
			204-927-3	129-00-0									
31		chromium in chromium(III) compounds { chromium(III) oxide }				22	mg/kg	1.462	32.154	mg/kg	0.00322 %		
			215-160-9	1308-38-9									
										Total:	0.0878 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP5--06052024-1.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP5--06052024-1.20
Moisture content:
13%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<LOD
2	monohydric phenols			P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
4	pH			PH		8.4 pH		8.4 pH	8.4 pH		
5	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		0.6 mg/kg	23.173	12.096 mg/kg	0.00121 %	✓	
6	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		17 mg/kg		14.79 mg/kg	0.00148 %	✓	
7	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		49 mg/kg	1.126	47.997 mg/kg	0.0048 %	✓	
9	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.7 mg/kg		0.609 mg/kg	0.0000609 %	✓	
10	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		20 mg/kg	1.579	27.483 mg/kg	0.00275 %	✓	
11	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	180 mg/kg		156.6 mg/kg	0.0157 %	✓	
12	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		49 mg/kg	1.785	76.102 mg/kg	0.00761 %	✓	
14	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		86 mg/kg	2.469	184.753 mg/kg	0.0185 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		acenaphthylene		205-917-1	208-96-8		0.05	mg/kg		0.0435	mg/kg	0.00000435 %	✓	
16		acenaphthene		201-469-6	83-32-9		0.09	mg/kg		0.0783	mg/kg	0.00000783 %	✓	
17		anthracene		204-371-1	120-12-7		0.2	mg/kg		0.174	mg/kg	0.0000174 %	✓	
18		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.98	mg/kg		0.853	mg/kg	0.0000853 %	✓	
19		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.3	mg/kg		1.131	mg/kg	0.000113 %	✓	
20		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.5	mg/kg		1.305	mg/kg	0.000131 %	✓	
21		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.57	mg/kg		0.496	mg/kg	0.0000496 %	✓	
22		benzo[ghi]perylene		205-883-8	191-24-2		0.82	mg/kg		0.713	mg/kg	0.0000713 %	✓	
23		chrysene	601-048-00-0	205-923-4	218-01-9		1.2	mg/kg		1.044	mg/kg	0.000104 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.16	mg/kg		0.139	mg/kg	0.0000139 %	✓	
25		fluoranthene		205-912-4	206-44-0		2.1	mg/kg		1.827	mg/kg	0.000183 %	✓	
26		fluorene		201-695-5	86-73-7		0.07	mg/kg		0.0609	mg/kg	0.00000609 %	✓	
27		indeno[123-cd]pyrene		205-893-2	193-39-5		0.72	mg/kg		0.626	mg/kg	0.0000626 %	✓	
28		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
29		phenanthrene		201-581-5	85-01-8		1	mg/kg		0.87	mg/kg	0.000087 %	✓	
30		pyrene		204-927-3	129-00-0		1.8	mg/kg		1.566	mg/kg	0.000157 %	✓	
31		benzene	601-020-00-8	200-753-7	71-43-2		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
32		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
34		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
35		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
36		toluene	601-021-00-3	203-625-9	108-88-3		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
37		TPH (C6 to C40) petroleum group			TPH		57	mg/kg		49.59	mg/kg	0.00496 %	✓	
38		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		24	mg/kg	1.462	35.077	mg/kg	0.00351 %		
											Total:	0.0624 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Worst case

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00496%)

Appendix A: Classifier defined and non GB MCL determinands

monohydric phenols (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)
Data source: CLP combined data
Data source date: 26 Mar 2019
Hazard Statements: Muta. 2; H341 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 2; H373 , Skin Corr. 1B; H314 , Skin Corr. 1B; H314 >= 3 % , Skin Irrit. 2; H315 1 <= conc. < 3 % , Eye Irrit. 2; H319 1 <= conc. < 3 % , Aquatic Chronic 2; H411

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

GB MCL index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

GB MCL index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

- **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from ECHA's C&L inventory database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 30 Apr 2020
Hazard Statements: Acute Tox. 4; H302 , Skin Sens. 1; H317 , Eye Irrit. 2; H319

- **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

GB MCL index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2; H371

Appendix B: Rationale for selection of metal species

chromium in chromium(VI) compounds {chromium(VI) oxide}

Most likely worst case.

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Most likely worst case.

boron {boron tribromide}

Most likely worst case.

arsenic {arsenic}

Most likely worst case.

cadmium {cadmium sulfide}

Most likely worst case.

copper {dicopper oxide; copper (I) oxide}

Most likely worst case.

mercury {mercury}

Most likely worst case.

nickel {nickel dihydroxide}

Most likely worst case.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Worst case

selenium {selenium}

Most likely worst case.

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most likely worst case.

zinc {zinc sulphate}

Most likely worst case.

chromium in chromium(III) compounds {chromium(III) oxide}

Most likely worst case.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2024.142.6063.11222 (21 May 2024)
HazWasteOnline Database: 2024.142.6063.11222 (21 May 2024)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021
GB MCL List v2.0 - version 2.0 of 20th October 2023
GB MCL List v3.0 - version 3.0 of 11th January 2024
GB MCL List v4.0 - version 4.0 of 2nd March 2024

APPENDIX D
RISK ASSESSMENT

DESIGNERS RISK ASSESSMENT				**STAGE: Design TW Contract**				**Contract: Temporary Works Design**		
REF NO.	**ACTIVITY / HAZARDS / RISK**	**RISK**		**PERSONS WHO WILL BE AFFECTED**				**RISK CONTROL MEASURES** **COMMENT/DESIGN INTERVENTION**	**RESIDUAL / PARTICULAR RISK / INSTRUCTION**		**INFORMATION / CONTROL OF RESIDUAL RISK TO BE PASSED ON TO AFFECTED PERSONS VIA RISK REGISTER** **CONTRACTOR / OTHER PARTY INTERVENTION**
		YES	**NO**	**Public**	**Const Person**	**Third Parties**	**Others**		**YES**	**NO**	
1.0.	Site Access / Use of mobile plant on site Particular Risk: Work in or adjacent to a live area where contact and interaction with users, staff, public or traffic is possible Hazard: Accident involving vehicles accessing site to or from public road and / or within the delivery area, pedestrian; setting down, unloading and transportation of materials to and from delivery areas	✓		✓	✓	✓		▪ Size of materials and waste components to be considered in delivery and kept within manageable modules. ▪ Timing of deliveries will require to be planned. ▪ Size, weight and practicality of handling of materials specified considered in design and materials capable of ease of manual or mechanical handling selected where feasible. ▪ Existing neighbouring properties and boundaries to be protected during construction of the new development.	✓		▪ Contractor to prepare detailed construction traffic management assessment and method statements. ▪ Contractor to secure immediate site and delivery area access and to provide appropriate warning signage. ▪ Contractor to determine requirements and design scaffolding to suit. ▪ Contractor to implement management restriction on manual handling ▪ Contractor to implement protection measures to the adjacent structures during the construction of the new works.
1.1	Pedestrian Traffic Particular Risk: Work in or adjacent to live area where contact and interaction with users, staff, public or traffic is possible (Hazard: Injury to pedestrians arising from vehicular movement in delivery area, operations and/ or from construction waste or debris).	✓		✓	✓			▪ Material selection considered in design to facilitate smaller lightweight components and assemblies.	✓		▪ Plan to segregate pedestrian and vehicular / plant traffic. ▪ Segregate and protect all waste storage. ▪ Provide signage and warning signs
1.2	Welfare / First Aid Facility. Contractor to provide first aid facilities and management. (Hazard: Impact on general health and wellbeing)	✓			✓			▪ Welfare / First Aid facilities to be provided.	✓		▪ Contractor to assess and provide facilities in accordance with Legislative requirements.
1.3	Access for Emergency Services (Hazard: Delay in access to or for emergency services)	✓			✓			▪ Construct permanent access points	✓		▪ Contractor to assess existing emergency access arrangements and develop site specific Safety Plan for management of this.
1.4	Presence of contaminants /hazardous materials within the existing site.	✓			✓	✓		▪ Contractor to test existing soils in situ and carry out testing.	✓		▪ All findings and reports on cleansing and residual contamination to be passed to client
1.5	Existing/adjoining services (known/unknown)	✓			✓			▪ Not possible to eliminate by design but hazard substantially reduced by review and identification of all services on site prior to construction works commencement ▪ Existing services to be diverted/removed prior to structural works. ▪ CCTV survey to be undertaken to confirm drainage.	✓		▪ Buried services below basement slab and behind walls to be identified on drawings ▪ Contractor to scan for buried/ concealed services prior to any works.

DESIGNERS RISK ASSESSMENT				STAGE: Design TW Contract				Contract: Temporary Works Design		
REF NO.	**ACTIVITY / HAZARDS / RISK**	**RISK**		**PERSONS WHO WILL BE AFFECTED**				**RISK CONTROL MEASURES** **COMMENT/DESIGN INTERVENTION**	**RESIDUAL / PARTICULAR RISK / INSTRUCTION**		**INFORMATION / CONTROL OF RESIDUAL RISK TO BE PASSED ON TO AFFECTED PERSONS VIA RISK REGISTER** **CONTRACTOR / OTHER PARTY INTERVENTION**
		YES	**NO**	**Public**	**Const Person**	**Third Parties**	**Others**		**YES**	**NO**	
1.6	Presence of adjoining buildings becoming unstable during works	✓		✓	✓			▪ Only partially possible to eliminate hazard by design and construction methodology planning. ▪ Topographical survey of the existing buildings undertaken. ▪ Original drawings reviewed where available. ▪ Trial pits and exploratory works to be undertaken to establish existing structural makeup/ foundation layout and develop construction methodology to reduce risk of damage to adjoining structures.	✓		▪ Contractor to undertake pre construction condition survey of all adjoining buildings and provide information on foundation works ▪ Topographical survey of the existing buildings to be provided ▪ Site investigation report to be provided ▪ Contractor to undertake movement monitoring to establish if the buildings are undergoing movement.
1.7	Construction of concrete and Reinforcement steel Particular Risk: Work involving the assembly or dismantling of heavy prefabricated components (Hazard: Manual handling and transportation of pre-cast concrete stair units and erection of same)	✓			✓	✓	✓	▪ Reinforcement cages to be designed so that they are made to manageable lengths and weights.	✓		▪ Contractor to plan work safely and advise on optimum sizes. ▪ Contractor to provide adequate access to site for machinery for delivery of units.
1.8	Accidental Damage Particular Risk: Work in or adjacent to a live area where interface public or traffic is possible (Hazard: Damage to neighbouring buildings, property, persons and/or services, trees)	✓		✓	✓	✓		▪ Dilapidation survey ▪ Design takes Particular care at abutment of new works with neighbouring buildings or services. ▪ Design has identified no basement in adjoining buildings.	✓		▪ Contractor to survey and assess site constraints and plan work safely. ▪ Contractor to carry out pre-construction 'dilapidation' survey of immediate site area and monitor works. ▪ Contractor to carry out pre-construction survey of structures and allow for continuous monitoring during construction. ▪ Contractor to maintain safe working environment during the works with respect to personnel and the existing structures. ▪ Contractor to maintain safe working site and protect scaffolding where used.
1.9	Manual Handling (Hazard: Muscular/ skeletal or abrasive / impact injury to construction operatives, third parties or others	✓			✓		✓	▪ Design allows for mechanical rather than manual lifting where possible.	✓		▪ Contractor to plan site to facilitate mechanical lifting where possible. ▪ Assess risks to third parties and others in proximity to activity.

DESIGNERS RISK ASSESSMENT				STAGE: Design TW Contract				Contract: Temporary Works Design		
REF NO.	ACTIVITY / HAZARDS / RISK	RISK		PERSONS WHO WILL BE AFFECTED				RISK CONTROL MEASURES COMMENT/DESIGN INTERVENTION	RESIDUAL / PARTICULAR RISK / INSTRUCTION		INFORMATION / CONTROL OF RESIDUAL RISK TO BE PASSED ON TO AFFECTED PERSONS VIA RISK REGISTER CONTRACTOR / OTHER PARTY INTERVENTION
		YES	NO	Public	Const Person	Third Parties	Others		YES	NO	
2.0	Noise and Vibration Particular Risk: Work in or adjacent to an area of building and basement where contact and interaction with pile breaking (Hazard: Injury to construction operatives, third parties or others	✓		✓	✓	✓	✓	▪ Process to isolates vibration from mechanical plant.	✓		▪ Contractor to assess noisy activities and provide all operatives with ear protection. ▪ Contractor to monitor and assess noisy activities for compliance with the statutory requirements.
2.1	Work exposing persons at work to risk from unplanned collapse (e.g. temporary loadings of existing floors with materials) (Hazard: Injury to construction operatives)	✓			✓			▪ Temporary floor loading information to be provided to the contractor.	✓		▪ Contractor to prepare appropriate work method statements and temporary works design as necessary.
2.2	Work placing of shuttering and reinforcement and concrete							▪ Operatives to wear ▪ Hi-vis clothing. ▪ Machinery to use hazard beacons and reversing klaxon in operation. ▪ Bend reinforcement off-site	✓		▪ Competent machinery ▪ Operators & Banksmen to be provided. ▪ Operatives to be provided with appropriate PPE
2.3	Activity: Works to or adjacent to sumps and pumps etc. Particular Risk: Work in proximity to live existing services which could harm workers (Hazard: Injury to construction operatives from moving equipment parts and gases)	✓			✓		✓	▪ Design provides adequate installation and maintenance access. ▪ Gas detection equipment to be used prior to maintaining equipment	✓		▪ Works to or adjacent these installations to be carried out or controlled by suitably qualified mechanical fitter or electrician. ▪ Status of installations to be labelled and installations should be secured at all times. Provide for safe maintenance access.