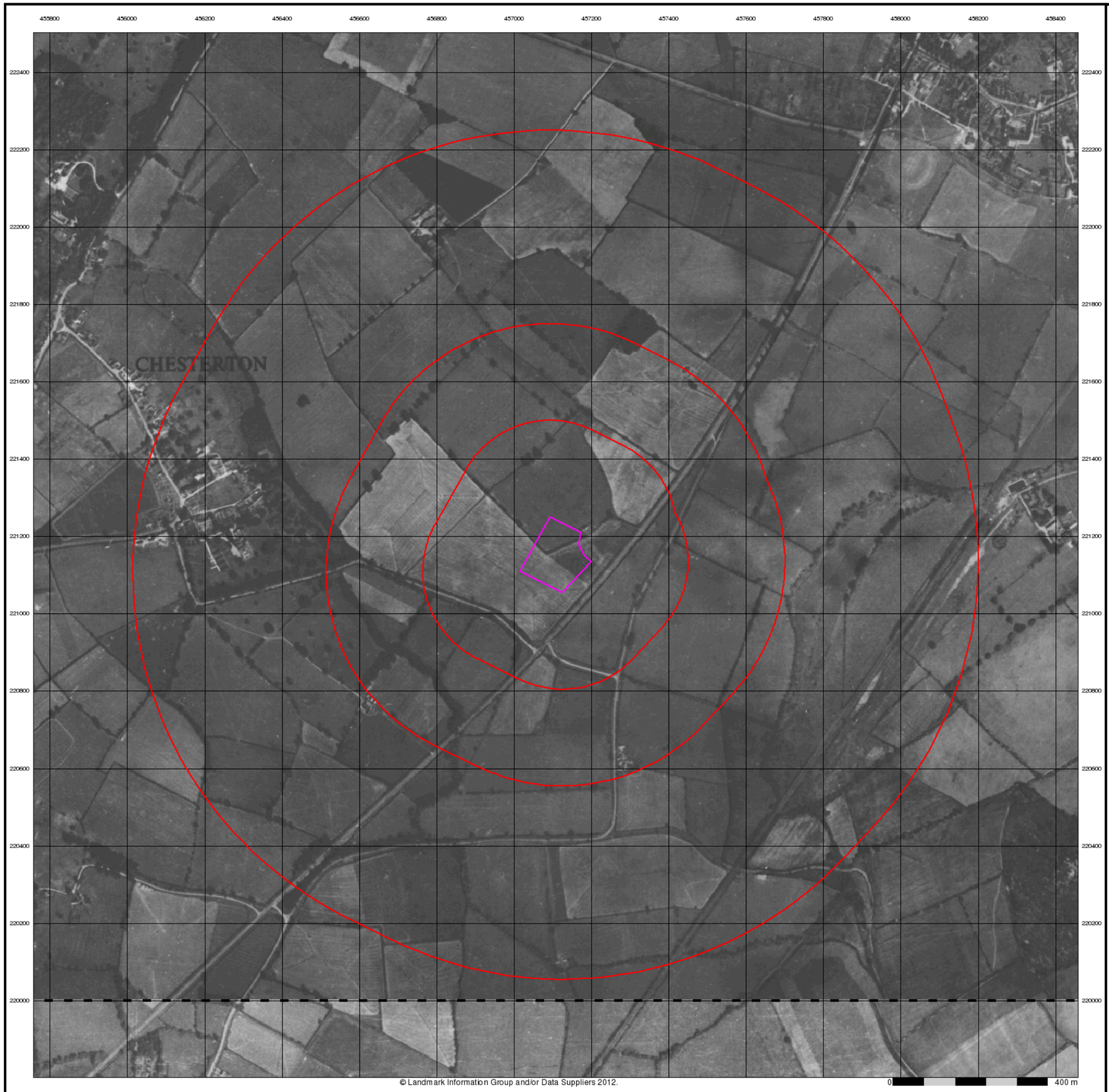


Envirocheck®

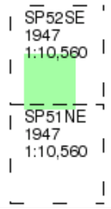
Historical Aerial Photography

Published 1947

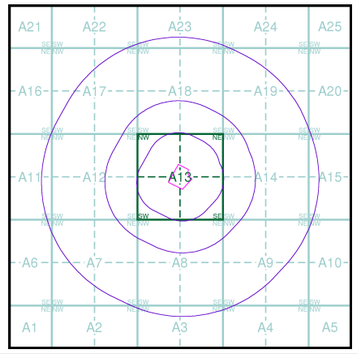
Source map scale - 1:10,560

The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

Map Name(s) and Date(s)



Historical Aerial Photography - Slice A



Order Details

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National Grid Reference:	457110, 221150
Slice:	A
Site Area (Ha):	2.02
Search Buffer (m):	1000

Site Details

Site at 457100, 221100

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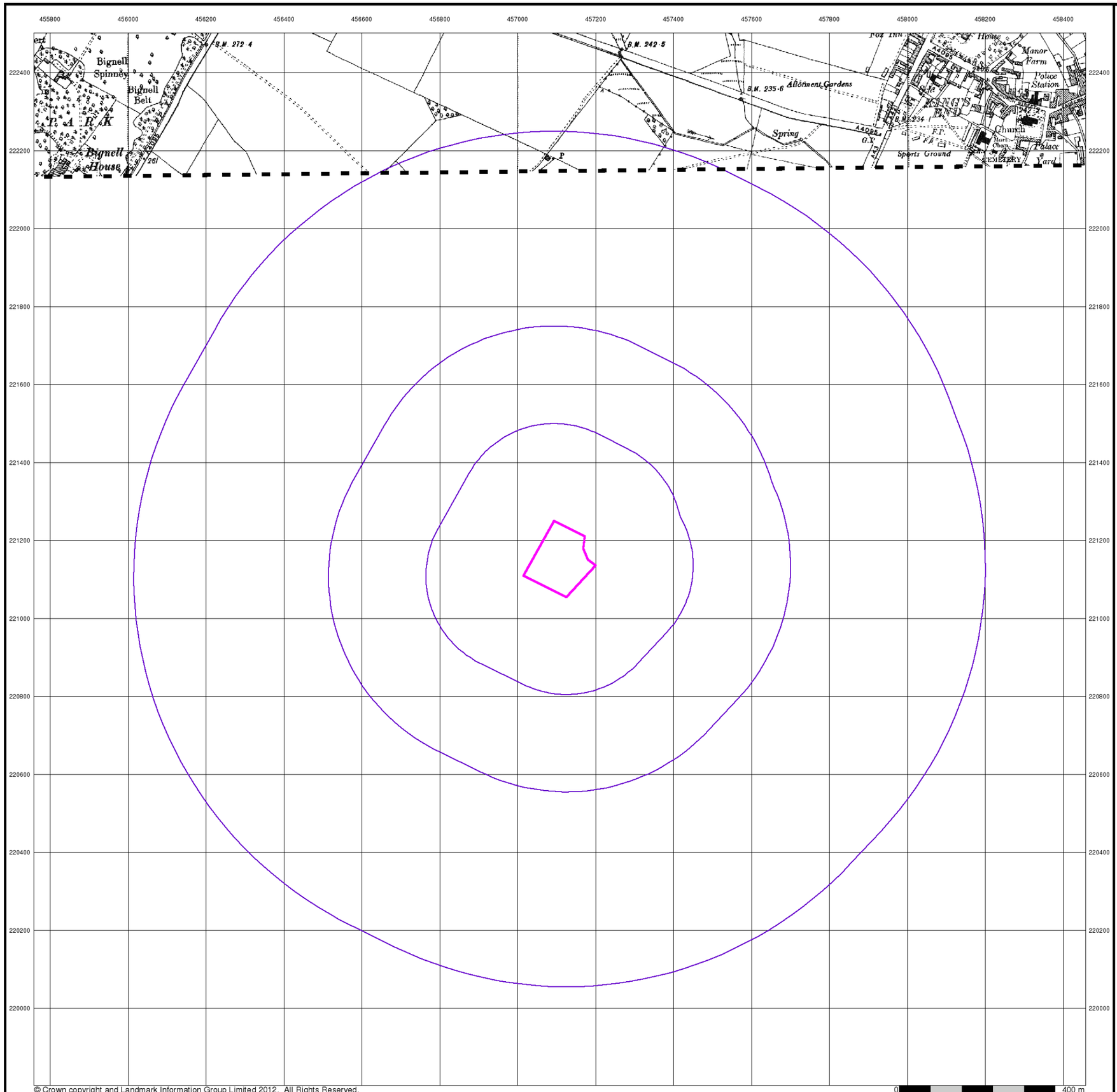


Envirocheck®

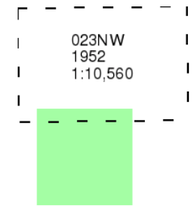
Oxfordshire

Published 1952

Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



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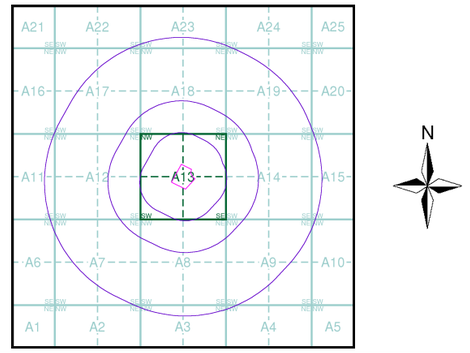

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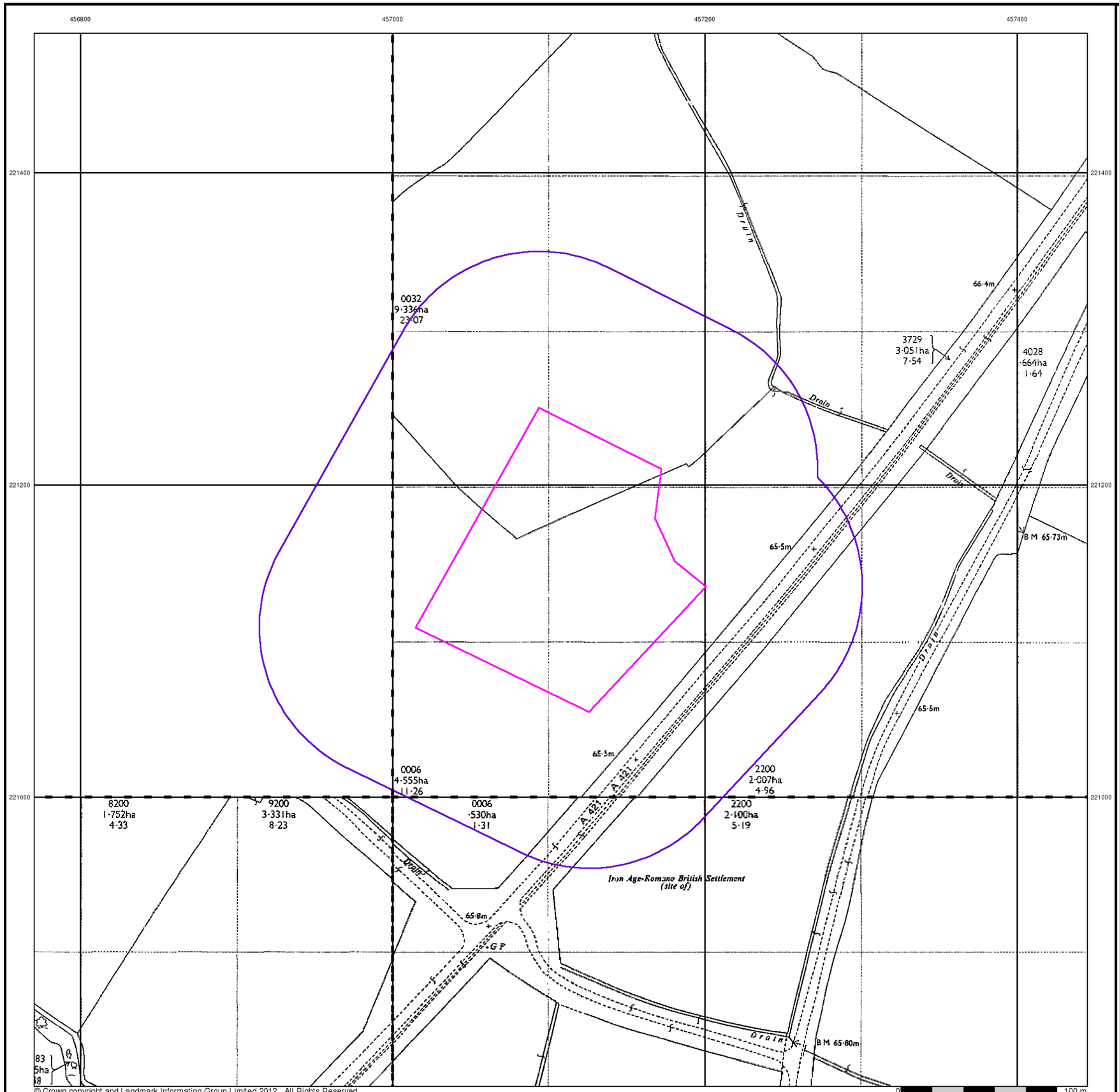

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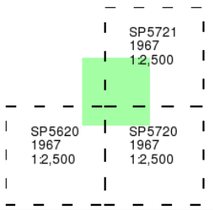
Additional SIMs

Published 1967

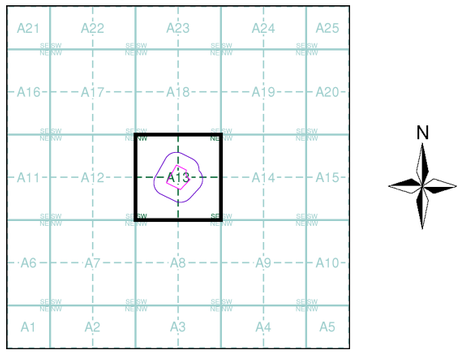
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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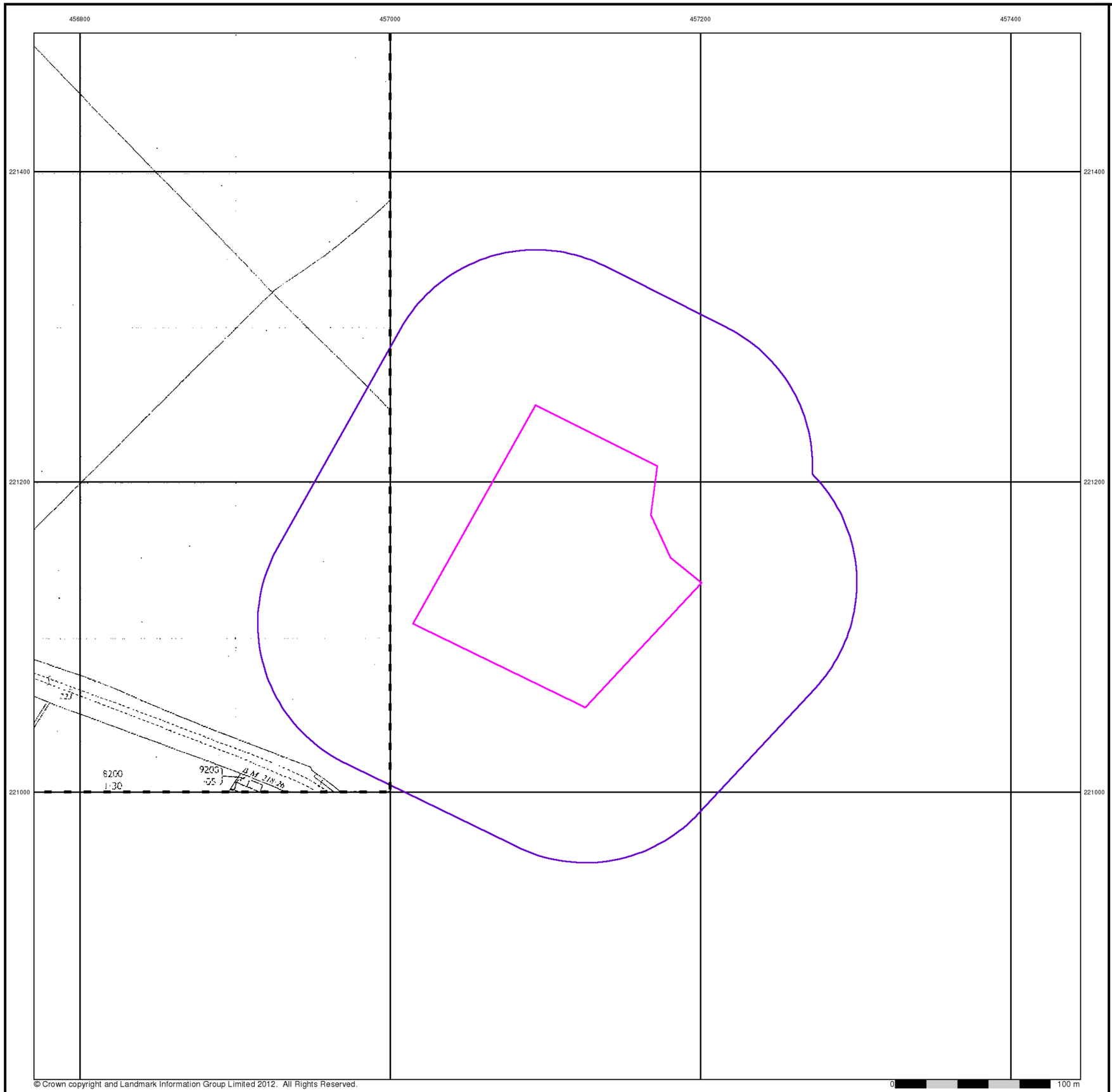
Site Details

Site at 457100, 221100



Envirocheck®

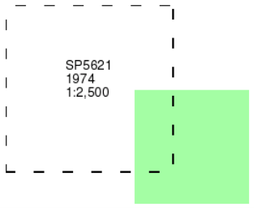
Supply of Unpublished Survey Information

Published 1974

Source map scale - 1:2,500

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a `work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



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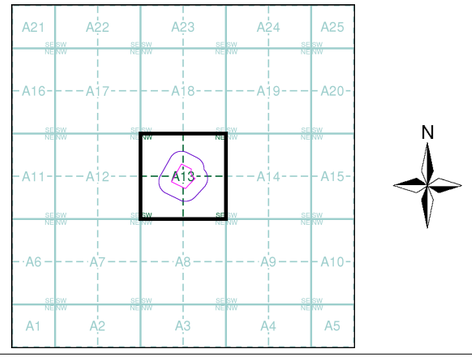

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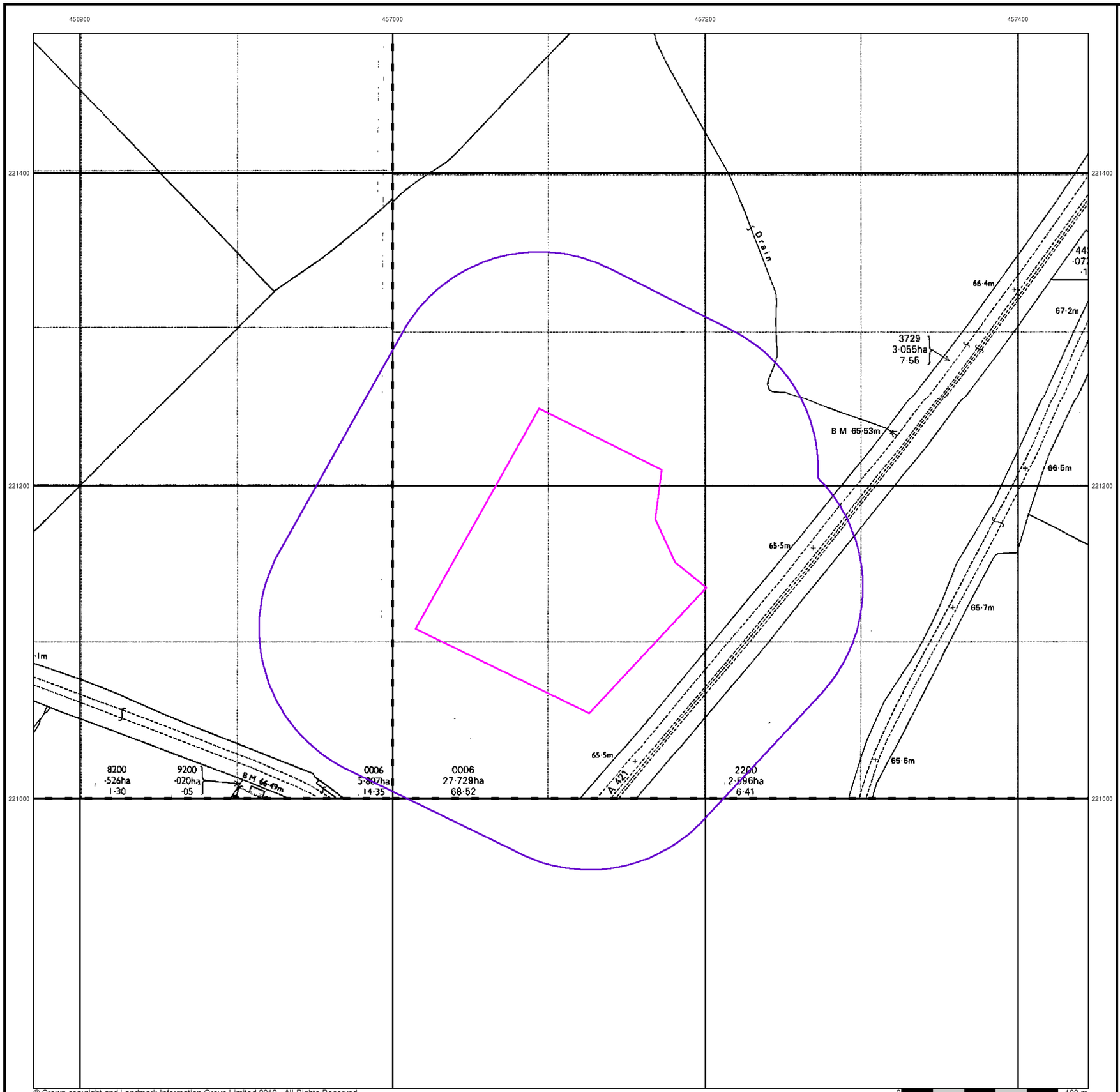

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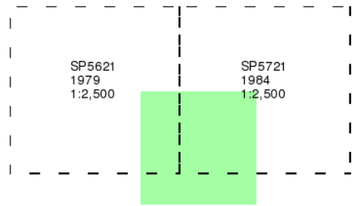
Ordnance Survey Plan

Published 1979 - 1984

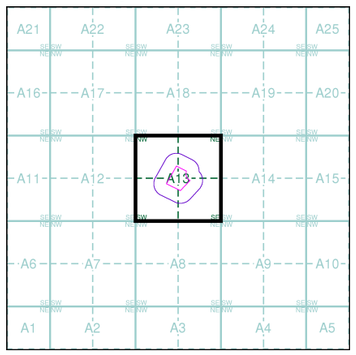
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



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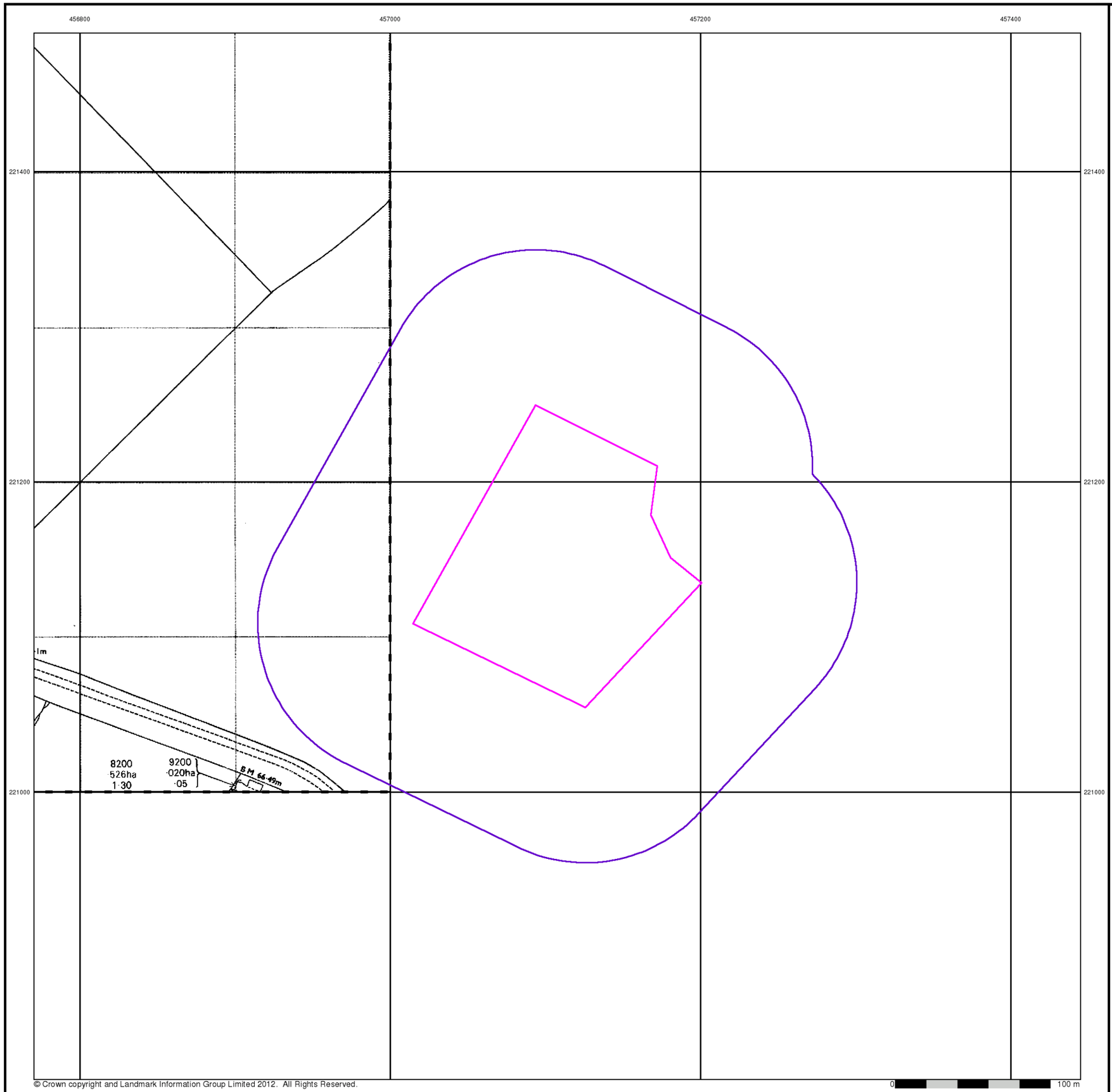


Envirocheck®

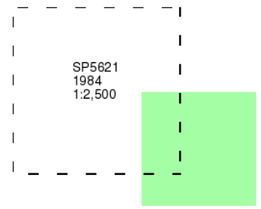
Ordnance Survey Plan

Published 1984

Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



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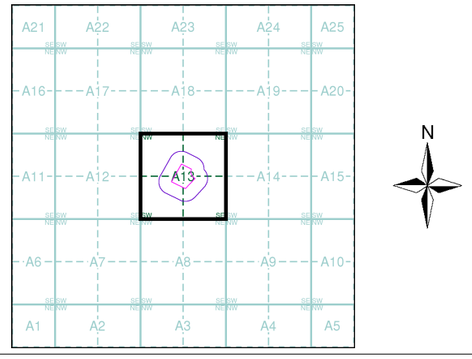

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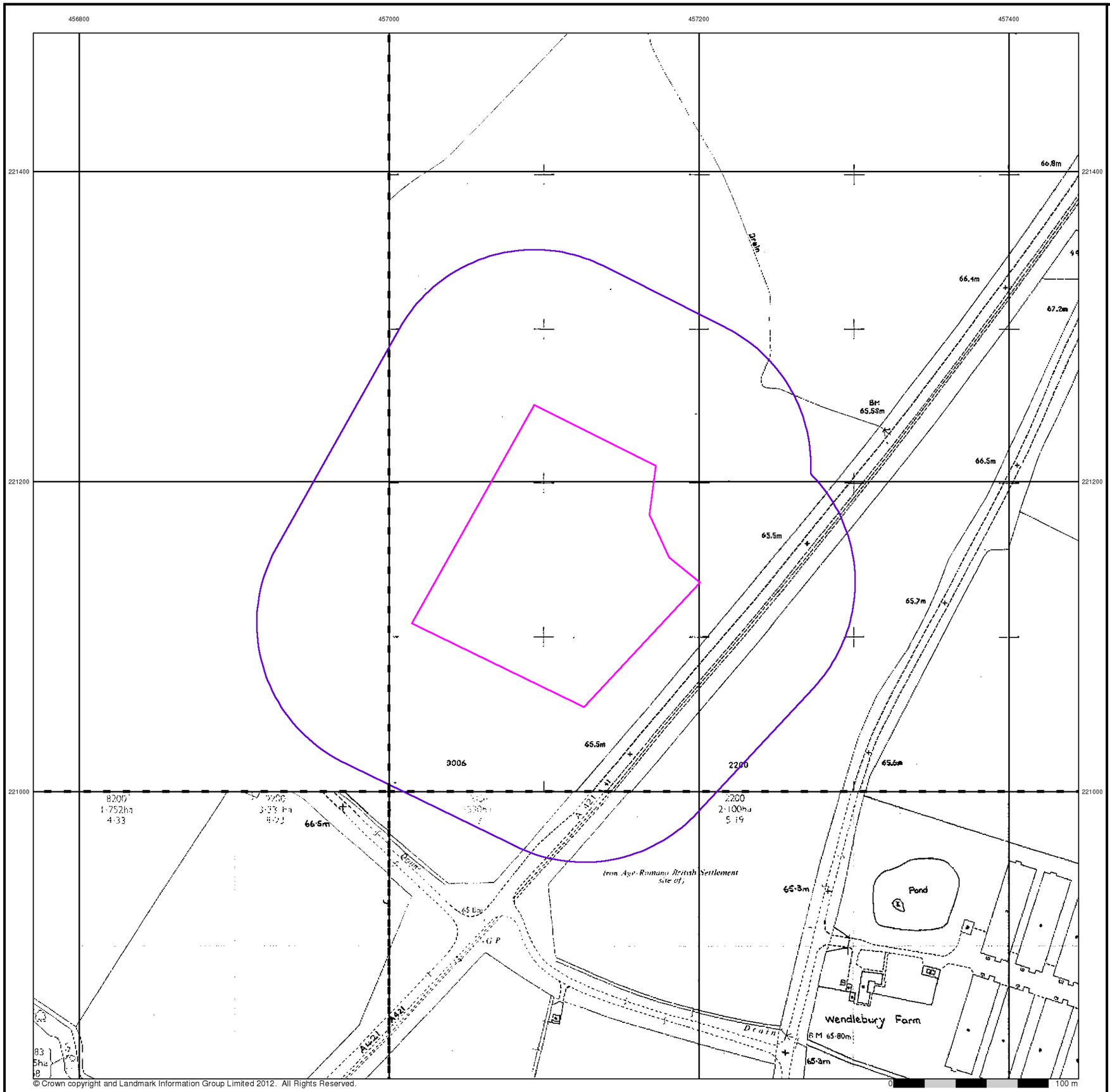


Envirocheck®

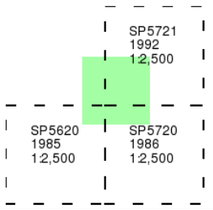
Additional SIMs

Published 1985 - 1992

Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



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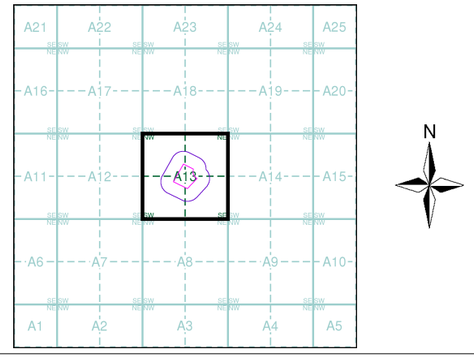

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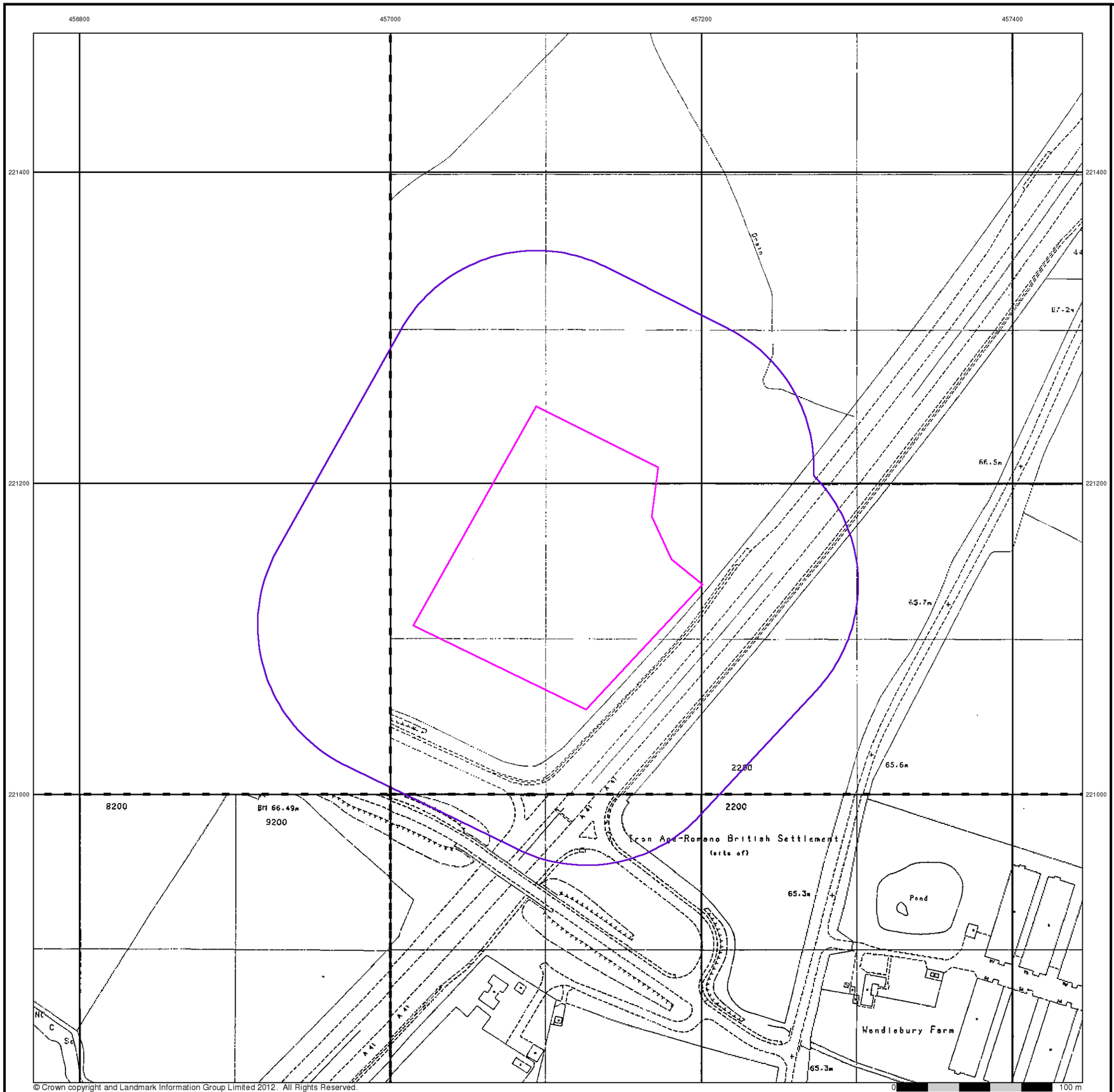

Envirocheck®

Additional SIMs

Published 1993

Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

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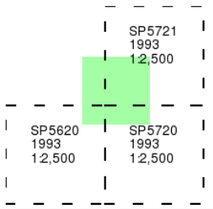

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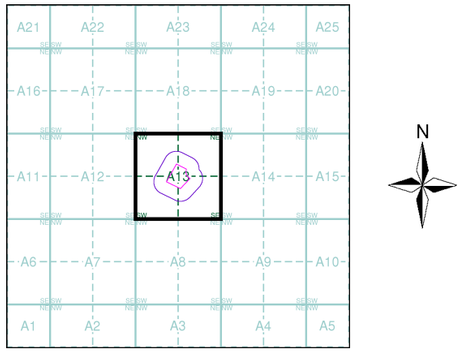

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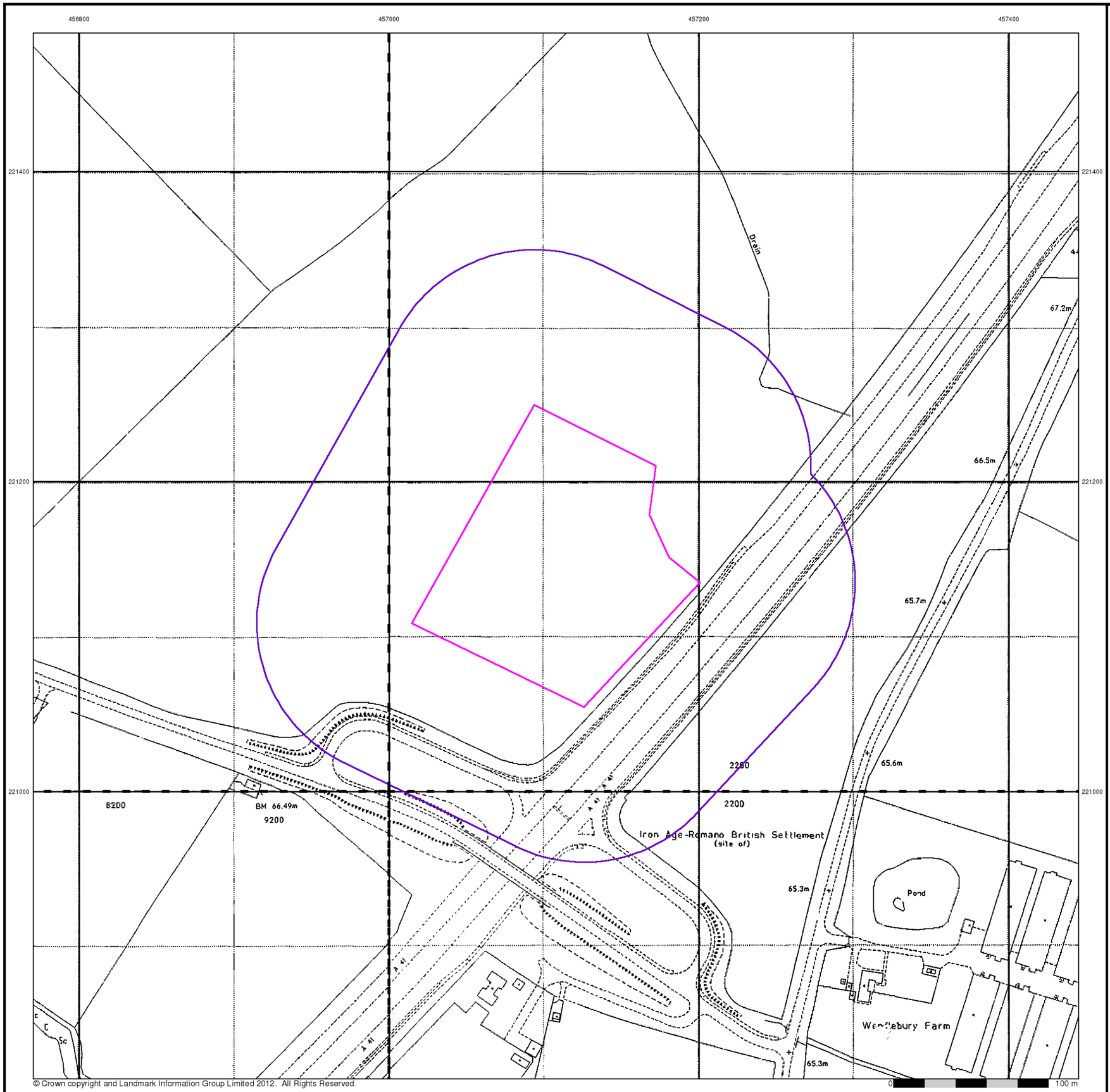


Envirocheck®

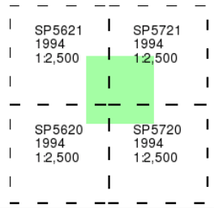
Large-Scale National Grid Data

Published 1994

Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



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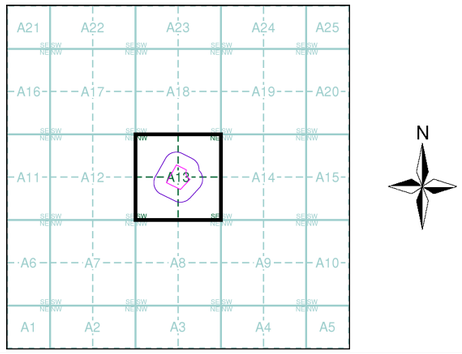

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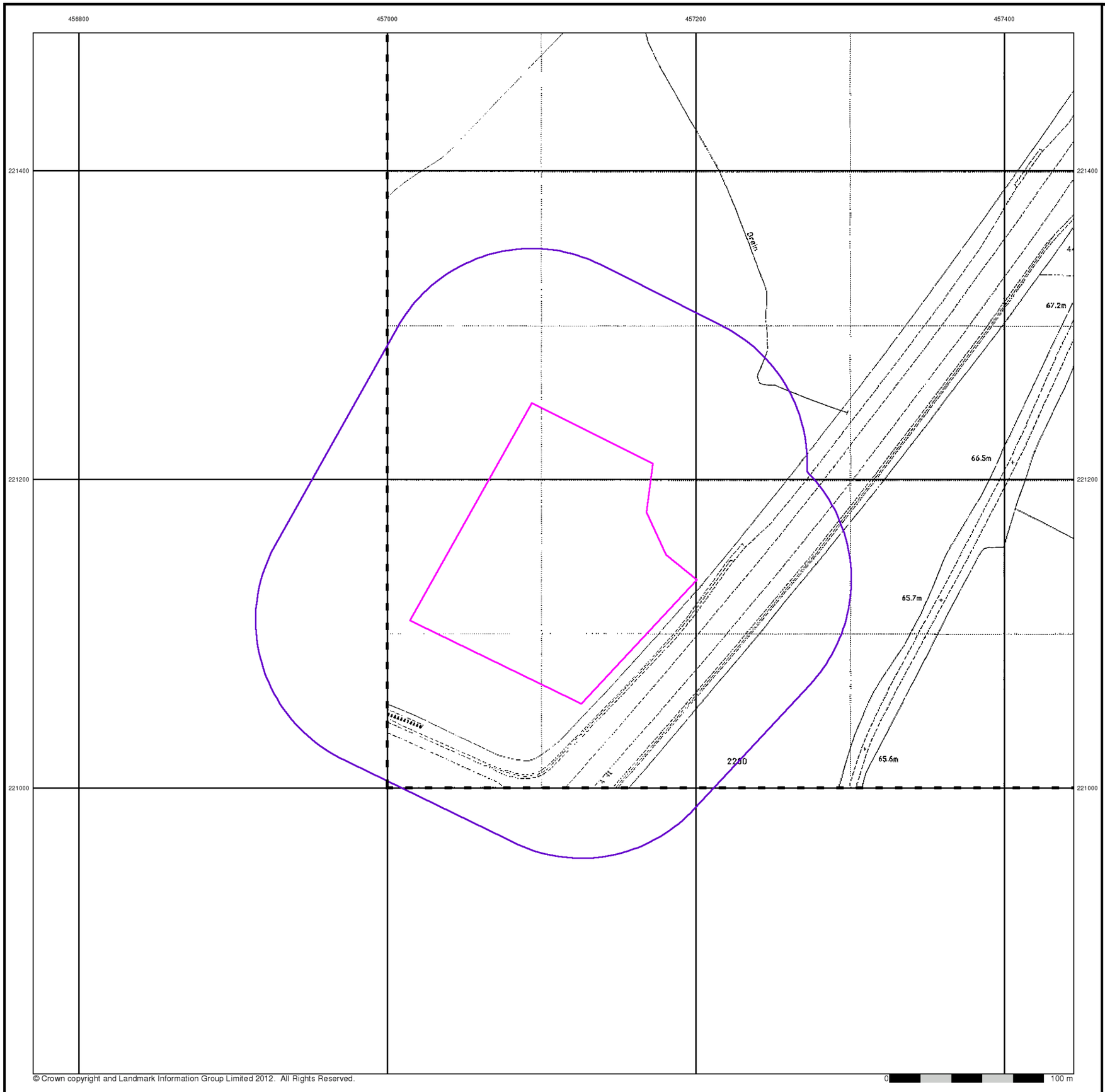


Envirocheck®

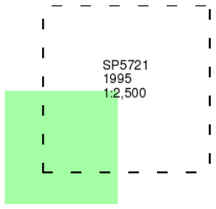
Large-Scale National Grid Data

Published 1995

Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



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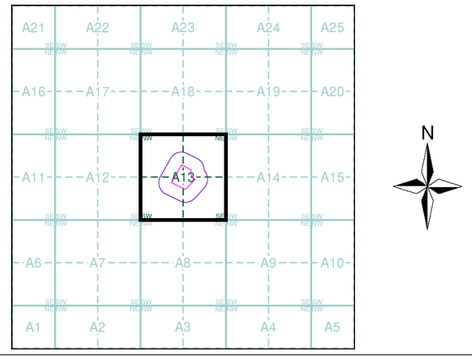

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APPENDIX C

BICESTER PARK & RIDE

FACTUAL REPORT ON GROUND INVESTIGATION

Prepared for ATKINS

Report Ref: 28429

Geotechnical Engineering Ltd
Centurion House, Olympus Park
Quedgeley, Gloucester. GL2 4NF

01452 527743
www.geoeng.co.uk

BICESTER PARK & RIDE

FACTUAL REPORT ON GROUND INVESTIGATION

Prepared for ATKINS

Report Ref: 28429

PROJECT: Ground Investigation

CONSULTANT: Atkins

VOLUME - VERSION	STATUS	ORIGINATOR	CHECKER	APPROVED	DATE
1 of 1 – A	DRAFT	JW	CT	-	4/10/2013
1 of 1 – A	FINAL	JW		CT	8/10/2013

ORIGINATOR	APPROVER
	
JUSTINE WALKER Senior Geoenvironmental Engineer	Colin Thomas Geotechnical Consultant

The report is not to be used for contractual or engineering purposes unless this sheet is signed and the report designated "Final".
The report has been prepared for the sole use and reliance by Atkins. GEL accepts no liability as a result of the use or reliance of this report by any other parties.

2718

CONTENTS

REPORT **PAGE**

APPENDICES

1. INTRODUCTION

It is proposed to develop a Park & Ride at a site just outside of Bicester, Oxfordshire. Geotechnical Engineering Limited (GEL) was instructed by Atkins to carry out an investigation to determine the ground conditions.

The scope of works and terms and conditions of appointment were specified by the Client and GEL correspondence reference T17604. The investigation was carried out under the direction and supervision of the Client.

This report describes the investigation and presents the findings.

2. SITE LOCATION AND GEOLOGY

The site is situated west of the A41, south-west of the centre of Bicester and may be located by its National Grid co-ordinates SP ^{4}56805 ^{2}20905.

British Geological Survey (BGS) England and Wales (Sheet No. 219, 1:50 000) and the BGS online geology (1:50,000) indicate the site is underlain by Alluvium – clay, silt, sand and gravel over the Kellaways Clay Member.

3. GROUND INVESTIGATION

3.1 Fieldwork

The fieldwork was carried out in general accordance with BS5930:1999+A2:2010 on 3rd September 2013 and comprised three boreholes and five trial pits.

The exploratory hole locations were selected by the Client and set out by this Company.

The boreholes, referenced BH01 to BH03 (Appendix A), were formed using a Terrier 2000 rig. Initially, an inspection pit was hand excavated at each borehole location to a maximum depth of 1.20m to check for buried services. Disturbed samples were taken and retained in a combination of plastic tubs, bag and glass jars. Dynamic sampling techniques were then employed to produce a continuous disturbed sample of 97mm and 83mm diameter in BH01 and BH02 respectively. The samples were recovered in semi-rigid plastic liner. BH03 met refusal in the SPT at 1.20m.

The samples were extracted horizontally from the sampler, labelled and taped up at each end to retain moisture.

Standard penetration tests (SPT) were carried out in general accordance with BS EN ISO 22476-3:2005+A1:2011. A split barrel was used and the split barrel samples retained in airtight jars. The SPT N value was taken as the number of blows to penetrate the 300mm test drive following a 150mm seating drive. Where low penetration was recorded the seating drive was terminated at 25 blows and the test drive completed after a further 50 blows. Detailed SPT results, together with the energy ratio (E_r), are presented in Appendix A and summarised as uncorrected N values on the borehole logs.

Boreholes were monitored for groundwater ingress as dynamic sampling proceeded. Water levels were also recorded on completion of the borehole and are presented on the relevant log.

On completion gas/water monitoring standpipes were installed in all boreholes. Each installation consisted of a 50mm ID HDPE slotted tube set in a filter response zone of non-calcareous pea gravel. The installation was sealed above with a bentonite plug and accessed

via a valve assembly. The installations were protected at the surface by a lockable stopcock cover set in concrete. Installation details are given on the relevant borehole log.

The trial pits, referenced TP01 to TP05 (Appendix A), were formed by a wheeled excavator with a 0.60m wide backactor bucket.

Representative disturbed samples were taken and retained in sealed plastic bags and airtight containers to retain moisture content.

Hand vane tests were carried out on suitable samples. The results are presented on the trial pit log in Appendix A.

Photographs of the trial pit profile and spoil heap were taken and are presented in Appendix B.

On completion all trial pits were backfilled with arisings compacted in suitable layers by the excavator bucket. The ground surface was left slightly proud to accommodate the future inevitable settlement of the backfill.

3.2 Logging

The logging of soils and rocks was carried out by an Engineering Geologist in general accordance with BS5930:1999+A2:2010. A key to the exploratory hole logs is presented in Appendix A.

Detailed descriptions of the samples are given in the borehole logs, Appendix A, along with details of sampling, in situ testing, groundwater ingress and relevant comments on drilling techniques.

The trial pits were logged in situ to a depth of approximately 1.20m and thereafter from the surface. Detailed descriptions are given in the trial pit logs, Appendix A, along with details of sampling and in situ testing, groundwater ingress and relevant comments on stability.

3.3 Laboratory Testing

A schedule of laboratory tests was prepared by the Client, the following tests being carried out in accordance with BS1377:1990, unless stated otherwise. The number in brackets refers to the test number given in that standard. The results are presented in Appendix B.

The natural moisture content [Part 2:3.2] was determined on seven selected samples.

Liquid limit, plastic limit and plasticity index tests [Part 2:4.3, 5.3 and 5.4] were carried out on seven selected samples. An Atterberg line plot has also been presented.

Particle size distributions were determined for two samples by wet sieving [Part 2:9.2]. The fine fractions of these samples were further analysed by sedimentation using the pipette method [Part 2:9.4]. The results are presented as grading curves.

The BRE SD1 (2005) suite of tests was carried out on one sample by Chemtest Laboratories using in-house methods.

Samples for contamination testing were taken from the site by the Client.

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4. REFERENCES

British Standards Institution (1999): Code of practice for site investigations. BS 5930 incorporating Amendments No. 1 & 2. Amendment 1 removes text superseded by BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003, and makes reference to the relevant standard for each affected sub clause. Amendment 2 removes text superseded by BS EN 22475-1:2006 and makes reference to the relevant standard for each affected sub clause.

British Standards Institution (1990): Methods of tests for soils for civil engineering purposes. BS 1377 Parts 1-9.

British Standards Institution (2012): Geotechnical investigation and testing. Field testing. Standard penetration test. BS EN ISO 22476-3:2005+A1:2011.

Building Research Establishment (2005): Concrete in aggressive ground. BRE Special Digest 1. Third Edition.

APPENDIX A

FIELDWORK DATA

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KEY TO EXPLORATORY HOLE LOGS

Sample type

D Small disturbed | D* Contamination | B Bulk disturbed | LB Large bulk disturbed | W Water | Cs Core subsample (prepared)
X Dynamic | C Core | U Undisturbed | UT Undisturbed thin wall | P Piston

Test type

S SPT - Split spoon sampler followed by uncorrected SPT 'N' Value
C SPT - Solid cone followed by uncorrected SPT 'N' Value
(*250 - Where full test drive not completed, linearly extrapolated 'N' value reported, ** - Denotes no effective penetration)

H Hand vane - direct reading in kPa - not corrected for BS1377 (1990). Re* denotes refusal
M Mackintosh probe - number of blows to achieve 100mm penetration
PP Pocket penetrometer - direct reading in kg/sq.cm
Vo Headspace vapour reading, uncorrected peak values in ppm, using a PID (calibrated with Isobutylene, using a 10.6eV bulb)

Sample/core range/I_f

Dynamic sample

Undisturbed sample - open drive including thin wall. Symbol length reflects recovery

x x = Total Core Recovery (TCR) as percentage of core run

y y = Solid Core Recovery (SCR) as percentage of core run. Assessment of core is based on full diameter.

z z = Rock Quality Designation (RQD). The amount of solid core greater than 100mm expressed as percentage of core run.

Where SPT has been carried out at beginning of core run, disturbed section of core excluded from SCR and RQD assessment.

I_f - fracture spacing - the average fracture spacing (mm) over the indicated length of core. Where spacing varies signficantly, the minimum, average and maximum values are given. NI = non-intact core NA = not applicable

Instrumentation

Porous tip | Perforated standpipe | Granular response zone | Bentonite seal | Cement/ bentonite grout | Soil Backfill | Concrete

Stratum boundaries

Estimated boundary | Grading boundary

Logging

The logging of soils and rocks has been carried out in general accordance with BS 5930:1999 incorporating Amendments 1 (2006) & 2 (2010). Amendment 1 removes text superceded by BS ENO ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003, and makes reference to the relevant standard for each affected sub clause. Amendment 2 removes text superceded by BS EN ISO 22475-1:2006 and makes reference to the relevant standard for each affected sub clause.

Chalk is logged in general accordance with Lord et al (2002) CIRIA C574. Where possible, dynamic samples in chalk have been logged in accordance with CIRIA C574; descriptions and gradings should be treated with caution given the potential for sample disturbance.

For rocks the term fracture has been used to identify a mechanical break within the core. Where possible incipient and drilling induced fractures have been excluded from the assessment of fracture state. Where doubt exists, a note has been made in the descriptions. All fractures are considered to be continuous unless otherwise reported.

Made Ground is readily identifiable when, within the material make up, man made constituents are evident. Where Made Ground appears to be reworked natural material the differentiation between in situ natural deposits and Made Ground is much more difficult to ascertain. The interpretation of Made Ground within the logs should therefore be treated with caution.

The descriptors "topsoil" and "tarmacadam" are used as generic terms and do not imply conformation to any particular standard or composition.

General Comments

The process of drilling and sampling will inevitably lead to disturbance, mixing or loss of material in some soil and rocks.

Indicated water levels are those recorded during the process of drilling or excavating exploratory holes and may not represent standing water levels.

Legends are drawn in accordance with BS 5930:1999 incorporating Amendment 2.

All depths are measured along the axis of the borehole and are related to ground level at the point of entry.

Geotechnical Engineering Limited

BOREHOLE LOG

BH01

CLIENT ATKINS

SITE BICESTER PARK AND RIDE

Sheet 1 of 1

Start Date 3 September 2013

Scale 1 : 50

End Date 3 September 2013

Depth 2.29 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
03/09/13 0830hrs	1B	0.00 - 0.50					Grass over stiff light brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular and subrounded fine to coarse limestone.			
	D*	0.50						0.50		
	2B	0.50 - 1.00					Firm orange brown clayeye very sandy GRAVEL with rare slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse limestone.			
	3D	1.20 - 1.65	Nil	S 26				1.20		
	4X	1.20 - 2.00	1.20				Medium dense orangish brown clayey sandy angular to subrounded fine to coarse limestone GRAVEL.			
03/09/13 0930hrs Dry	D*	2.00						2.00		
	5D	2.00 - 2.29	2.00	S* 107			Very dense bluish grey clayey sandy angular and subrounded fine to coarse weak limestone GRAVEL.	2.29		
							Borehole completed at 2.29m.	{8.00}		

EQUIPMENT: Geotechnical Terrier 2000 rig.

METHOD: Hand dug inspection pit 0.00-1.20m. Dynamic sampled (113mm) 1.20-2.00m

CASING: 128mm diam to 2.00m.

BACKFILL: On completion, a slotted standpipe (50mm) was installed to 2.00m, granular response zone 2.29-0.20m, bentonite seal 0.20-0.10m, stopcock cover 0.10-0.00m.

REMARKS: Borehole refused at 2.29m.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered.

AGS

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28429	**CT**

Geotechnical Engineering Limited

BOREHOLE LOG

BH02

CLIENT ATKINS

SITE BICESTER PARK AND RIDE — Sheet 1 of 1

Start Date 3 September 2013 — Scale 1 : 50

End Date 3 September 2013 — Depth 1.55 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
03/09/13 0945hrs	1B	0.00 - 0.50					Grass over stiff light brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular and subrounded fine to coarse limestone.	0.40		
	D*	0.50								
	2B	0.50 - 1.00					Orangish brown clayey very sandy angular to subrounded fine to coarse limestone GRAVEL.	0.70		
03/09/13 1045hrs Dry	3D	1.20 - 1.65	Nil	S 22			Firm becoming stiff bluish grey and orangish brown slightly sandy locally sandy slightly gravelly silty CLAY. Gravel is subangular and subrounded fine to coarse limestone.	1.50		
	4X	1.20 - 1.50								
	D*	1.50					Very dense bluish grey clayey sandy angular to subrounded fine to coarse weak limestone GRAVEL.	1.55		
							Borehole completed at 1.55m.	{8.00}		

EQUIPMENT: Geotechnical Terrier 2000 rig.

METHOD: Hand dug inspection pit 0.00-1.20m. Dynamic sampled (98mm) 1.20-1.50m

CASING: Not used.

BACKFILL: On completion, a slotted standpipe (50mm) was installed to 1.50m, granular response zone 1.55-0.20m, bentonite seal 0.20-0.10m, stopcock cover 0.10-0.00m.

REMARKS: Borehole refused at 1.55m on limestone gravel.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered.

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BOREHOLE LOG

BH03

CLIENT ATKINS

SITE BICESTER PARK AND RIDE

Sheet 1 of 1

Start Date 3 September 2013

Scale 1 : 50

End Date 3 September 2013

Depth 1.39 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range		instru -ment	description	depth (m)	reduced level (m)	legend
03/09/13 1100hrs	1B	0.00 - 0.50						Grass over stiff light brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular and subrounded fine to coarse limestone.			
	D*	0.50							0.50		
	2B	0.50 - 1.00						Stiff brown slightly sandy gravelly CLAY. Gravel is subangular to rounded fine to coarse limestone.			
03/09/13 1200hrs Dry	3D	1.20 - 1.39	Nil	S* 158					1.39		
								Borehole completed at 1.39m.	{8.00}		

EQUIPMENT: Geotechnical Terrier 2000 rig.

METHOD: Hand dug inspection pit 0.00-1.20m.

CASING: Not used.

BACKFILL: On completion, a slotted standpipe (50mm) was installed to 1.20m, granular response zone 1.39-0.20m, bentonite seal 0.20-0.10m, stopcock cover 0.10-0.00m.

REMARKS: Borehole refused at 1.39m.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered.

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STANDARD PENETRATION TEST

CLIENT ATKINS

SITE BICESTER PARK AND RIDE

borehole no.	borehole depth (m)	bottom depth (m)	casing depth (m)	water level (m)	seating drive blows	seating drive pen (mm)	test drive blows	test drive pen (mm)	test type	N	energy ratio (%)
BH01	1.20	1.65	Nil	Dry	4 5	75 75	6 7 7 6	75 75 75 75	S	26	64
BH01	2.00	2.29	2.00	Dry	8 17	75 75	19 31	75 65	S	107	64
BH02	1.20	1.65	Nil	Dry	0 0	75 75	2 4 5 11	75 75 75 75	S	22	64
BH02	1.50	1.55	Nil	Dry	25	10	50	40	S	375	64
BH03	1.20	1.39	Nil	Dry	14 11	75 20	36 14	75 20	S	158	64

notes:

1. Test carried out in general accordance with BS EN ISO 22476-3:2005 + A1:2011
2. N values have not been subjected to any correction.
3. Test carried out using split spoon S, solid cone C.
4. Where full test drive not completed, linearly extrapolated N value reported.
5. <1 Denotes hammer self weight penetration (sank under own weight).
6. ** Denotes no effective penetration.

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TRIAL PIT LOG

TP01

CLIENT	ATKINS		
SITE	BICESTER PARK AND RIDE	Sheet	1 of 1
Start Date	3 September 2013	Scale	1 : 25
End Date	3 September 2013	Depth	3.00 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
	D*		0.30	Grass over stiff light brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular and subrounded fine limestone.			
	1B		0.30		0.35		
	2B		0.50	Firm orangish brown slightly gravelly sandy CLAY. Gravel is subangular to rounded fine to coarse limestone.	0.60		
	D*		1.00	Orangish brown clayey very sandy subangular to rounded fine to coarse limestone GRAVEL.			
	3B		1.00		1.10		
1.80m Moderate inflow.	4B		2.00	Dark bluish grey and brown clayey sandy subangular and subrounded fine to coarse weak limestone GRAVEL with medium cobble content.			
	5B		2.90	Firm and stiff bluish grey silty CLAY with very closely spaced thinly interlaminated very weak fine to coarse siltstone.	2.80		
				Trial pit completed at 3.00m.	3.00		

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater encountered at 1.80m.
Trial pit sides remained stable and vertical.
Trial pit dimensions 3.50x0.60x3.00m.
On completion, the trial pit was backfilled with materials arising.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

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TRIAL PIT LOG

TP02

CLIENT	ATKINS		
SITE	BICESTER PARK AND RIDE	Sheet	1 of 1
Start Date	3 September 2013	Scale	1 : 25
End Date	3 September 2013	Depth	3.00 m

water record	sample/test no/type	result	depth (m)	description	depth (m)	level (m)	legend
	1B		0.30				
	D*		0.50	Firm orangish brown and brown slightly gravelly sandy CLAY with rare rootlets. Gravel is subangular and subrounded fine and medium limestone.	0.40		
	2B		0.50				
				Orangish brown clayey very sandy subangular to rounded fine to coarse limestone GRAVEL with low cobble content.	0.80		
	3B		1.00				
				Dark bluish grey and brown clayey sandy subangular and subrounded fine to coarse weak limestone GRAVEL with medium cobble content.	1.30		
	D*		1.50				
1.80m Slow inflow.	4B		1.80				
				Firm bluish grey silty CLAY with very closely spaced thinly interlaminated very weak fine to coarse siltstone.	2.70		
Standing water at 2.9m	5B		2.90				
				Trial pit completed at 3.00m.	3.00		

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater encountered at 1.80m.
Trial pit sides unstable below 1.30m.
Trial pit dimensions 3.50x0.60x3.00m.
On completion, the trial pit was backfilled with materials arising.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

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TRIAL PIT LOG

TP03

CLIENT	ATKINS		
SITE	BICESTER PARK AND RIDE	Sheet	1 of 1
Start Date	3 September 2013	Scale	1 : 25
End Date	3 September 2013	Depth	1.50 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
	D*		0.10	Grass over stiff light brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular and subrounded fine to coarse limestone.			
	1B		0.30		0.35		
	2B		0.50	Firm orangish brown and brown slightly gravelly sandy CLAY with rare rootlets. Gravel is subangular to rounded fine to coarse limestone.			
	D*		0.60				
		H 62	0.70				
					0.95		
				Grey and orangish brown clayey sandy subangular and subrounded fine to coarse limestone GRAVEL with medium cobble content.			
	3B		1.20				
1.45m Moderate inflow.					1.45		
				Dark bluish grey very clayey very sandy subangular and subrounded tabular weak limestone COBBLES.	1.50		
				Trial pit completed at 1.50m.			

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater encountered at 1.45m.
Trial pit sides remained stable and vertical.
Trial pit dimensions 3.50x0.60x1.50m.
On completion, the trial pit was backfilled with materials arising.
Excavator refused on limestone at 1.50m.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

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TRIAL PIT LOG

TP04

CLIENT	ATKINS		
SITE	BICESTER PARK AND RIDE	Sheet	1 of 1
Start Date	3 September 2013	Scale	1 : 25
End Date	3 September 2013	Depth	2.60 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
				Grass over stiff light brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular and subrounded fine to coarse limestone.			
	1B		0.30		0.40		
				Firm orangish brown and brown slightly sandy slightly gravelly CLAY with rare rootlets. Gravel is subangular to rounded fine to coarse limestone.			
	2D		0.50				
	D*		0.50		0.70		
				Orangish brown slightly sandy CLAY with a little fine to medium gravel. Gravel is subangular to rounded fine to coarse limestone.			
	3B		0.80		0.95		
				Orangish brown and bluish grey clayey sandy subangular to rounded fine to coarse weak limestone GRAVEL with medium cobble content.			
1.50m Rapid inflow.	4B		1.50				
Standing water at 2.3m							
					2.60		
				Trial pit completed at 2.60m.			

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater encountered at 1.50m.
Trial pit sides unstable below 1.50m.
Trial pit dimensions 3.20x0.60x2.60m.
On completion, the trial pit was backfilled with materials arising.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

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TRIAL PIT LOG

TP05

CLIENT	ATKINS		
SITE	BICESTER PARK AND RIDE	Sheet	1 of 1
Start Date	3 September 2013	Scale	1 : 25
End Date	3 September 2013	Depth	1.40 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
				Grass over stiff light brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular and subrounded fine to coarse limestone.			
					0.30		
				Orangish brown clayey very sandy subangular to rounded fine to coarse limestone GRAVEL.			
	D*		0.40				
	1B		0.50		0.65		
				Firm and stiff grey mottled brown slightly sandy locally sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse sandstone and limestone.			
	D*		0.70				
	2B	H 38	1.00				
					1.35		
1.40m Seepage.				Dark bluish grey very clayey very sandy subangular and subrounded tabular weak limestone COBBLES.	1.40		
				Trial pit completed at 1.40m.			

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Trial pit sides remained stable and vertical.
Trial pit dimensions 3.40x0.60x1.40m.
On completion, the trial pit was backfilled with materials arising.
Excavator refused on limestone at 1.40m.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

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APPENDIX B

TRIAL PIT PHOTOGRAPHS

Photograph 1: TP01

Photograph 2: TP01

Photograph 3: TP02

Photograph 4: TP02

Photograph 5: TP03

Photograph 6: TP03

Photograph 7: TP04

Photograph 8: TP04

Photograph 9: TP05

Photograph 10: TP05

APPENDIX C

LABORATORY TESTING

2718

GEOTECHNICAL ENGINEERING LTD

For the attention of Justine Walker

Date of Issue 23 September 2013

TEST REPORT

PROJECT/SITE	Bicester Park and Ride	Samples received	05/09/2013
GEL REPORT NUMBER	28429	Schedule received	05/09/2013
Your ref/PO:		Testing commenced	11/09/2013

SUMMARY OF RESULTS ATTACHED

TEST METHOD & DESCRIPTION	QUANTITY	ACCREDITED TEST
BS1377: Part 2: 1990:3.2, Moisture Content	7	YES
BS1377: Part 2: 1990:4.2-4.4&5.2-5.4, Liquid & Plastic Limits	7	YES
BS1377: Part 2: 1990:9.2, Particle Size Distribution - Wet Sieve	2	YES
BS1377: Part 2: 1990:9.4, Particle Size Distribution - Pipette	2	YES
BRE SD1 Suite (Subcontracted)	1	YES/NO

Remarks

The report should not be reproduced except in full without written permission from this laboratory.

Approved Signatories:

R Ewens (Laboratory Business Manager) R Pratt (Client Manager)
W Jones (Laboratory Supervisor) J Hanson (Director) C Thomas (Consultant)

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LIQUID AND PLASTIC LIMITS

BS.1377 : Part 2 : 1990 : 4 and 5

CLIENT ATKINS

SITE BICESTER PARK AND RIDE

borehole /trial pit no.	sample		specimen depth (m)	natural moisture content (%)	specimen preparation and test method	fraction >0.425 mm (%)	liquid limit (%)	plastic limit (%)	plasticity index (%)	description and remarks
	no./type	depth (m)								
BH01	2B	0.50	0.50	15	BXE	55	34	14	20	Orange-brown clayey very sandy GRAVEL with rare cobbles
BH02	2B	0.50	0.50	40	BXE	4	79	26	53	Orange-brown mottled grey slightly sandy CLAY with a little fine gravel
TP01	2B	0.50	0.50	16	BXE	29	48	20	28	Orange-brown slightly sandy silty CLAY with a little f-m gravel
TP02	1B	0.30	0.30	21	BXE	3	54	24	30	Brown slightly sandy silty CLAY with a little f-m gravel
TP03	2B	0.50	0.50	20	BXE	28	52	22	30	Orange-brown slightly sandy silty CLAY with a little f-c gravel
TP04	3B	0.80	0.80	12	BXE	53	39	16	23	Orange-brown slightly sandy CLAY with a little f-m gravel
TP05	2B	1.00	1.00	24	BXE	40	66	24	42	Grey mottled orange-brown slightly sandy silty CLAY with a little f-c gravel

general remarks:
natural moisture content determined in accordance with BS1377 : Part 2 : 1990 : 3.2 (unless specified)
NP denotes non-plastic
# denotes sample tested is smaller than that which is recommended in accordance with BS1377

specimen preparation:
A - as received
B - washed on 0.425mm sieve
C - air dried
D - oven dried (60°C)
E - oven dried (105°C)
F - not known

test method:
X - cone penetrometer (test 4.3)
Y - one point cone penetrometer (test 4.4)
Z - Casagrande apparatus (test 4.5)

CONTRACT **28429**

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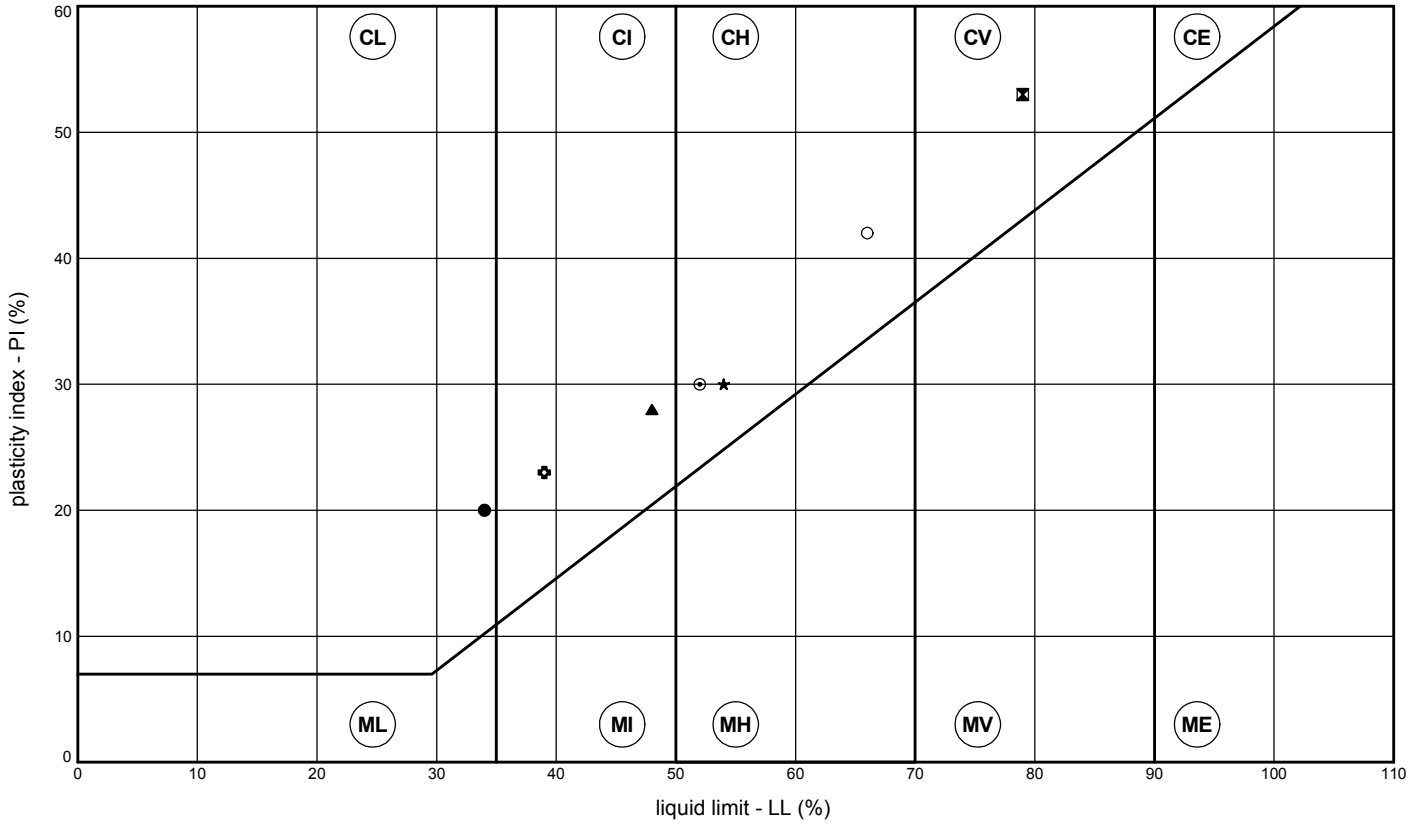
ATTERBERG LINE PLOT

CLIENT ATKINS

SITE BICESTER PARK AND RIDE



	BH/TP No.	depth (m)	LL	PL	PI	remarks
●	BH01	0.50	34	14	20	
⊠	BH02	0.50	79	26	53	
▲	TP01	0.50	48	20	28	
★	TP02	0.30	54	24	30	
⊙	TP03	0.50	52	22	30	
✿	TP04	0.80	39	16	23	
○	TP05	1.00	66	24	42	

CONTRACT	CHECKED
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PARTICLE SIZE DISTRIBUTION

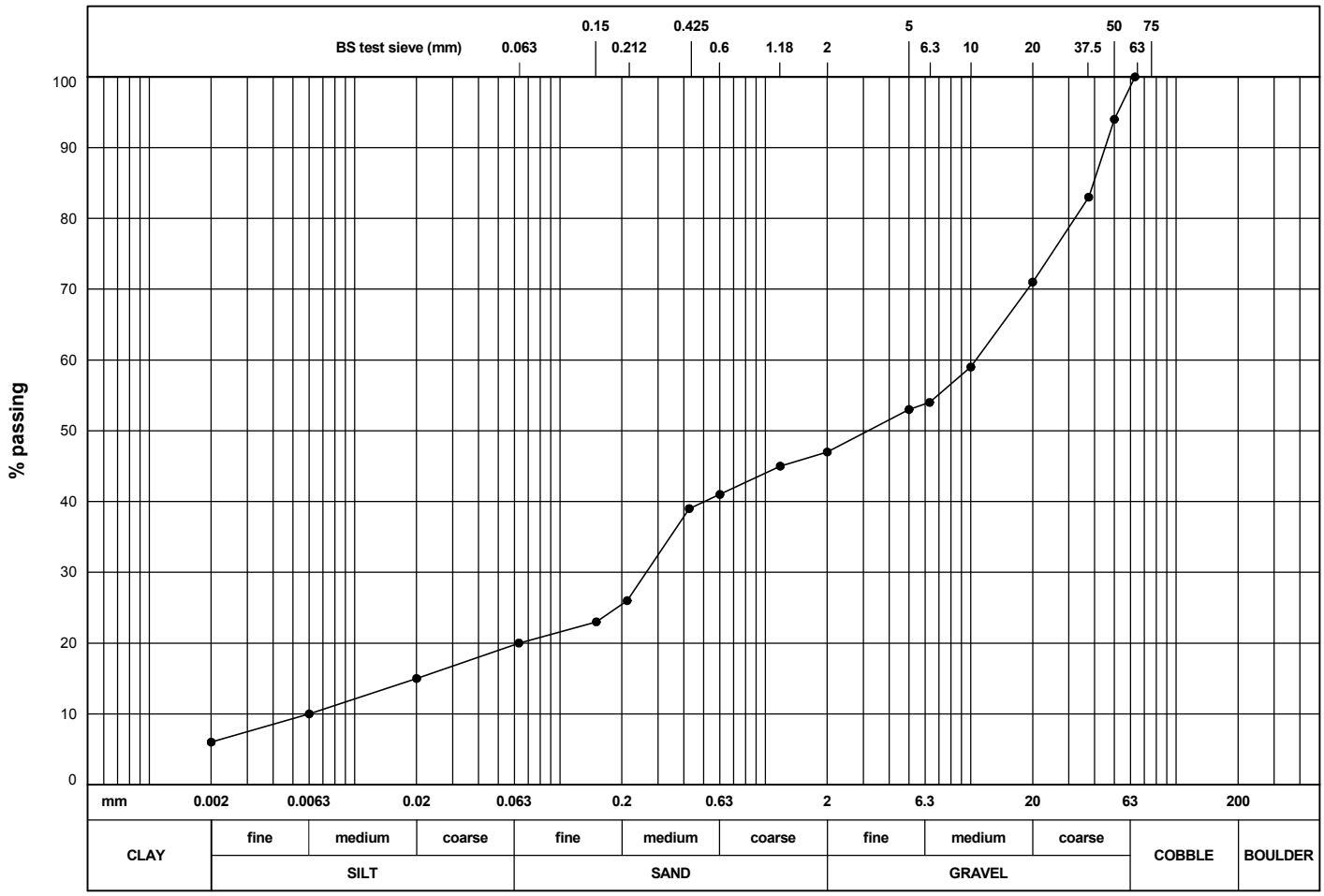
BS.1377 : Part 2 : 1990 : 9

CLIENT ATKINS

SITE BICESTER PARK AND RIDE

DESCRIPTION Orange-brown clayey very sandy GRAVEL with rare cobbles

BH/TP No.	BH01
SAMPLE No./TYPE	2B
SAMPLE DEPTH (m)	0.50
SPECIMEN DEPTH (m)	0.50



soil type	% fraction
CLAY	6
SILT	14
SILT & CLAY	20
SAND	27
GRAVEL	52
COBBLE & BOULDER	1
test method(s)	9.2 & 9.4

BS test sieve (mm)	% passing
150	
75	
63	100
50	94
37.5	83
20	71
10	59
6.3	54

BS test sieve (mm)	% passing
5	53
2	47
1.18	45
0.6	41
0.425	39
0.212	26
0.15	23
0.063	20

particle size (μm)	% finer
20	15
6	10
2	6

test method:
9.2 - wet sieving
9.3 - dry sieving
9.4 - sedimentation by pipette
9.5 - sedimentation by hydrometer

remarks:
# denotes sample tested is smaller than that which is recommended in accordance with BS1377

CONTRACT	CHECKED
28429	**WJ**

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PARTICLE SIZE DISTRIBUTION

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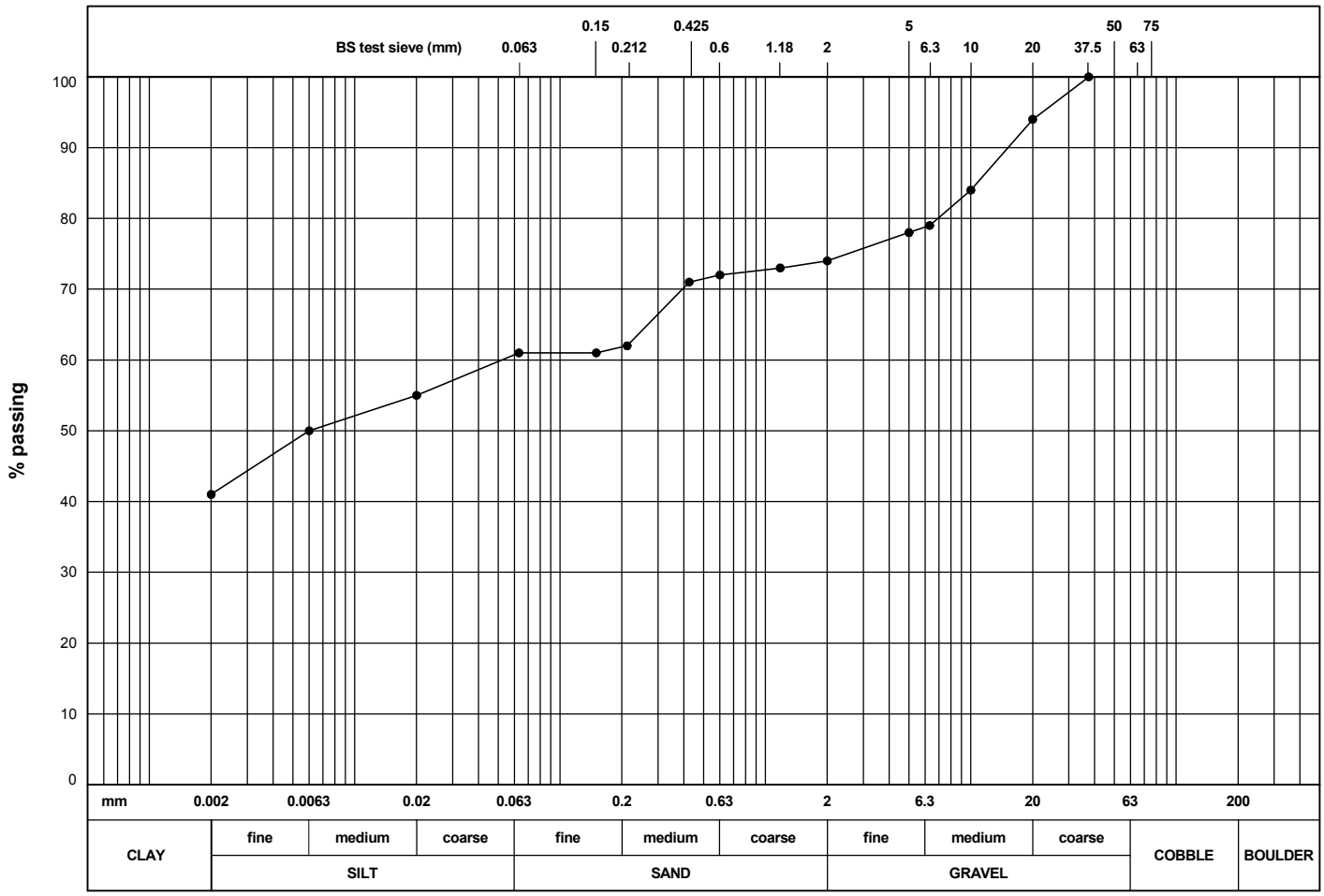
CLIENT ATKINS

SITE BICESTER PARK AND RIDE

DESCRIPTION Grey mottled orange-brown slightly sandy silty CLAY with a little f-c gravel

BH/TP No.	TP05
SAMPLE No./TYPE	2B
SAMPLE DEPTH (m)	1.00
SPECIMEN DEPTH (m)	1.00



soil type	% fraction
CLAY	41
SILT	20
SILT & CLAY	61
SAND	13
GRAVEL	26
COBBLE & BOULDER	0
test method(s)	9.2 & 9.4

BS test sieve (mm)	% passing
150	
75	
63	
50	
37.5	100
20	94
10	84
6.3	79

BS test sieve (mm)	% passing
5	78
2	74
1.18	73
0.6	72
0.425	71
0.212	62
0.15	61
0.063	61

particle size (μm)	% finer
20	55
6	50
2	41

test method:
9.2 - wet sieving
9.3 - dry sieving
9.4 - sedimentation by pipette
9.5 - sedimentation by hydrometer

remarks:
# denotes sample tested is smaller than that which is recommended in accordance with BS1377

CONTRACT	CHECKED
28429	**WJ**

Geotechnical Engineering Ltd, Centurion House, Olympus Park, Quedgeley, Gloucester, GL2 4NF. Tel. 01452 527743 28429.GPJ 23/09/2013 16:48:56

Chemtest
The right chemistry to deliver results

Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070

Geotechnical Engineering Ltd
Centurion House
Olympus Park, Quedgeley
Gloucester
GL2 4NF

FAO Rachel Pratt
12 September 2013

Dear Rachel Pratt

Test Report Number **238086**
Your Project Reference **28429 - Bicester Park and Ride**

Please find enclosed the results of analysis for the samples received 6 September 2013.

All soil samples will be retained for a period of one month and all water samples will be retained for 7 days following the date of the test report. Should you require an extended retention period then please detail your requirements in an email to customerservices@chemtest.co.uk. Please be aware that charges may be applicable for extended sample storage.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely

Keith Jones, Technical Manager

UKAS TESTING
2183

Notes to accompany report:

- *The sign < means 'less than'*
- *Tests marked 'U' hold UKAS accreditation*
- *Tests marked 'M' hold MCertS (and UKAS) accreditation*
- *Tests marked 'N' do not currently hold UKAS accreditation*
- *Tests marked 'S' were subcontracted to an approved laboratory*
- *n/e means 'not evaluated'*
- *i/s means 'insufficient sample'*
- *u/s means 'unsuitable sample'*
- *Comments or interpretations are beyond the scope of UKAS accreditation*
- *The results relate only to the items tested*
- *All results are expressed on a dry weight basis*
- *The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, phenols*
- *For all other tests the samples were dried at < 37°C prior to analysis*
- *Uncertainties of measurement for the determinands tested are available upon request*
- *None of the test results included in this report have been recovery corrected*

Geotechnical Engineering Ltd
Centurion House
Olympus Park, Quedgeley
Gloucester
GL2 4NF

FAO Rachel Pratt

LABORATORY TEST REPORT

Results of analysis of 1 sample
received 6 September 2013

28429 - Bicester Park and Ride

Report Date
12 September 2013

Login Batch No					**238086**
Chemtest LIMS ID					AJ13590
Sample ID					BH01
Sample No					2B
Sampling Date					5/9/2013
Depth					0.50m
Matrix					*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*	
2010	pH			M	8.3
2175	Sulfur (total TRL report 447)		%	M	0.034
2220	Chloride (extractable)	16887006	g l-¹	M	<0.010
	Nitrate (extractable)	14797558	g l-¹	N	<0.010
2120	Sulfate (2:1 water soluble) as SO4	14808798	g l-¹	M	0.08
2420	Magnesium (soluble)	7439954	g l-¹	N	<0.01
2430	Sulfate (total BS1377 HCl extract)	14808798	%	M	0.02

All tests undertaken between 09/06/2013 and 09/11/2013

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

APPENDIX D

Alex Mann
Atkins Ltd
The Axis
6th Floor West
10 Holliday Street
Birmingham
B1 1TF

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f: 0121 473 5858
e: alex.mann@atkinsglobal.com

i2 Analytical Ltd.
Building 19,
BRE,
Garston,
Watford,
WD25 9XX

t: 01923 67 00 20
f: 01923 67 00 30
e: reception@i2analytical.com

Analytical Report Number : 13-45768

Project / Site name:	Bicester	**Samples received on:**	04/09/2013
Your job number:		**Samples instructed on:**	04/09/2013
Your order number:		**Analysis completed by:**	12/09/2013
Report Issue Number:	1	**Report issued on:**	12/09/2013
Samples Analysed:	12 soil samples		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Customer Services Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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.

Analytical Report Number: 13-45768

Project / Site name: Bicester

Lab Sample Number				283791	283792	283793	283794	283795
Sample Reference				BPRBH1	BPRBH2	BPRBH3	BPRTP1	BPRTP1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.50	0.30	1.00
Date Sampled				03/09/2013	03/09/2013	03/09/2013	03/09/2013	03/09/2013
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	48	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	10	13	9.9	11	9.7
Total mass of sample received	kg	0.001	NONE	1.1	1.1	0.93	0.97	1.1
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	Not-detected	-
General Inorganics								
pH	pH Units	N/A	MCERTS	7.1	7.3	6.6	6.5	7.1
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Complex Cyanide	mg/kg	1	NONE	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	NONE	< 1	< 1	< 1	< 1	< 1
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.043	0.044	0.024	0.022	0.029
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.022	0.022	0.012	0.011	0.015
Sulphide	mg/kg	1	MCERTS	7.2	< 1.0	< 1.0	< 1.0	< 1.0
Elemental Sulphur	mg/kg	20	NONE	< 20	< 20	< 20	< 20	< 20
Ammonium as NH_4	mg/kg	5	MCERTS	5.0	< 5.0	< 5.0	5.3	< 5.0
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.2	0.8	3.0	1.1	0.7
Total Phenols								
Total Phenols (monohydric)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenanthrene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Pyrene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(a)anthracene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Dibenz(a,h)anthracene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	23	18	16	33
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	0.6	1.3	1.1	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.2	0.6
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	12	27	30	29	33
Copper (aqua regia extractable)	mg/kg	1	MCERTS	7.6	8.8	18	18	23
Lead (aqua regia extractable)	mg/kg	2	MCERTS	8.2	13	24	26	23
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	21	26	25	23	55
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	39	67	83	79	80

Analytical Report Number: 13-45768

Project / Site name: Bicester

Lab Sample Number				283791	283792	283793	283794	283795
Sample Reference				BPRBH1	BPRBH2	BPRBH3	BPRTP1	BPRTP1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.50	0.30	1.00
Date Sampled				03/09/2013	03/09/2013	03/09/2013	03/09/2013	03/09/2013
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

Analytical Report Number: 13-45768

Project / Site name: Bicester

Lab Sample Number				283796	283797	283798	283799	283800
Sample Reference				BPRTP2	BPRTP2	BPRTP3	BPRTP3	BPRTP4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50	0.10	0.60	0.50
Date Sampled				03/09/2013	03/09/2013	03/09/2013	03/09/2013	03/09/2013
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	%	N/A	NONE	11	12	15	11	10
Total mass of sample received	kg	0.001	NONE	1.0	1.3	0.94	1.2	1.2
Asbestos in Soil	Type	N/A	ISO 17025	-	-	Not-detected	-	-
General Inorganics								
pH	pH Units	N/A	MCERTS	7.4	8.1	7.9	8.1	8.2
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Complex Cyanide	mg/kg	1	NONE	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	NONE	< 1	< 1	< 1	< 1	< 1
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.026	0.033	0.030	0.048	0.032
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.013	0.017	0.015	0.024	0.016
Sulphide	mg/kg	1	MCERTS	1.4	26	< 1.0	2.9	3.9
Elemental Sulphur	mg/kg	20	NONE	< 20	< 20	< 20	< 20	< 20
Ammonium as NH_4	mg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.5	0.2	2.1	< 0.1	0.2
Total Phenols								
Total Phenols (monohydric)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenanthrene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Pyrene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(a)anthracene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Dibenz(a,h)anthracene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	9.0	17	36	28
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	< 0.2	2.2	< 0.2	0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	31	11	36	16	15
Copper (aqua regia extractable)	mg/kg	1	MCERTS	14	6.2	18	9.1	8.7
Lead (aqua regia extractable)	mg/kg	2	MCERTS	15	5.6	30	10	10
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	28	13	22	29	26
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	68	18	85	36	39

Analytical Report Number: 13-45768

Project / Site name: Bicester

Lab Sample Number				283796	283797	283798	283799	283800
Sample Reference				BPRTP2	BPRTP2	BPRTP3	BPRTP3	BPRTP4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50	0.10	0.60	0.50
Date Sampled				03/09/2013	03/09/2013	03/09/2013	03/09/2013	03/09/2013
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

Analytical Report Number: 13-45768

Project / Site name: Bicester

Lab Sample Number				283801	283802			
Sample Reference				BPRTP5	BPRTP5			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.40	0.70			
Date Sampled				03/09/2013	03/09/2013			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	6.5	14			
Total mass of sample received	kg	0.001	NONE	1.1	1.2			
Asbestos in Soil	Type	N/A	ISO 17025	-	-			
General Inorganics								
pH	pH Units	N/A	MCERTS	8.1	8.3			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Complex Cyanide	mg/kg	1	NONE	< 1	< 1			
Free Cyanide	mg/kg	1	NONE	< 1	< 1			
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.026	0.023			
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.013	0.012			
Sulphide	mg/kg	1	MCERTS	2.7	< 1.0			
Elemental Sulphur	mg/kg	20	NONE	< 20	< 20			
Ammonium as NH_4	mg/kg	5	MCERTS	< 5.0	< 5.0			
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.5	0.3			
Total Phenols								
Total Phenols (monohydric)	mg/kg	2	MCERTS	< 2.0	< 2.0			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.2	MCERTS	< 0.20	< 0.20			
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluorene	mg/kg	0.2	MCERTS	< 0.20	< 0.20			
Phenanthrene	mg/kg	0.2	MCERTS	< 0.20	< 0.20			
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluoranthene	mg/kg	0.2	MCERTS	< 0.20	< 0.20			
Pyrene	mg/kg	0.2	MCERTS	< 0.20	< 0.20			
Benzo(a)anthracene	mg/kg	0.2	MCERTS	< 0.20	< 0.20			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(k)fluoranthene	mg/kg	0.2	MCERTS	< 0.20	< 0.20			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	MCERTS	< 0.20	< 0.20			
Dibenz(a,h)anthracene	mg/kg	0.2	MCERTS	< 0.20	< 0.20			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.6	< 1.6			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	22	18			
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	0.6			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	30			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	10	15			
Lead (aqua regia extractable)	mg/kg	2	MCERTS	13	13			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	26	35			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	52	68			

Analytical Report Number: 13-45768

Project / Site name: Bicester

Lab Sample Number				283801	283802			
Sample Reference				BPRTP5	BPRTP5			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.40	0.70			
Date Sampled				03/09/2013	03/09/2013			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			

Analytical Report Number : 13-45768

Project / Site name: Bicester

* 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 topsoil/loam 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 2 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
283791	BPRBH1	None Supplied	0.50	Light brown sandy clay with stones.
283792	BPRBH2	None Supplied	0.50	Brown topsoil and clay with vegetation.
283793	BPRBH3	None Supplied	0.50	Brown clay and topsoil with vegetation.
283794	BPRTP1	None Supplied	0.30	Brown clay and topsoil with vegetation.
283795	BPRTP1	None Supplied	1.00	Brown clay and topsoil with gravel and vegetation.
283796	BPRTP2	None Supplied	0.50	Brown sandy clay.
283797	BPRTP2	None Supplied	1.50	Light brown clay and gravel.
283798	BPRTP3	None Supplied	0.10	Brown clay and topsoil with vegetation.
283799	BPRTP3	None Supplied	0.60	Light brown gravelly clay.
283800	BPRTP4	None Supplied	0.50	Light brown topsoil and clay with gravel and vegetation.
283801	BPRTP5	None Supplied	0.40	Light brown topsoil and clay with gravel and vegetation.
283802	BPRTP5	None Supplied	0.70	Brown clay and sand with vegetation.

Analytical Report Number : 13-45768

Project / Site name: Bicester

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH4 in soil	Determination of ammonium in soil by extraction with potassium chloride followed by addition of buffer solution followed by ion selective electrode.	In-house method	L035-PL	W	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-UK	D	ISO 17025
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	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Complex cyanide in soil	Determination of complex cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	NONE
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in dichloromethane followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	D	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	D	MCERTS
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.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
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 (skalar)	L080-PL	W	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	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 (Skalar)	L080-PL	W	MCERTS

Analytical Report Number : 13-45768

Project / Site name: Bicester

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' 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.

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Analytical Report Number : 13-46063

Project / Site name:	Bicester	**Samples received on:**	12/09/2013
Your job number:		**Samples instructed on:**	12/09/2013
Your order number:		**Analysis completed by:**	20/09/2013
Report Issue Number:	1	**Report issued on:**	20/09/2013
Samples Analysed:	2 water samples		

Signed:

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Customer Services Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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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Analytical Report Number: 13-46063

Project / Site name: Bicester

Lab Sample Number				285395	285396			
Sample Reference				BPRBH1	BPRBH2			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				11/09/2013	11/09/2013			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH	pH Units	N/A	ISO 17025	7.5	7.4			
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10			
Complex Cyanide	µg/l	10	NONE	< 10	< 10			
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10			
Sulphate as SO_4	ug/l	45	ISO 17025	105000	107000			
Sulphide	µg/l	5	NONE	< 5.0	< 5.0			
Ammonium as NH_4	µg/l	15	ISO 17025	< 15	< 15			
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	4.4	8.6			
Total Phenols								
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10			
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Total PAH								
Total EPA-16 PAHs	µg/l	0.2	ISO 17025	< 0.20	< 0.20			
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	1	ISO 17025	5.6	16			
Boron (dissolved)	µg/l	10	ISO 17025	100	140			
Cadmium (dissolved)	µg/l	0.1	ISO 17025	< 0.10	< 0.10			
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0			
Chromium (dissolved)	µg/l	0.4	ISO 17025	< 0.4	< 0.4			
Copper (dissolved)	µg/l	0.7	ISO 17025	1.7	< 0.7			
Lead (dissolved)	µg/l	1	ISO 17025	< 1.0	< 1.0			
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5			
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.3	5.0			
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0			
Zinc (dissolved)	µg/l	0.4	ISO 17025	< 0.4	4.7			

Analytical Report Number: 13-46063

Project / Site name: Bicester

Lab Sample Number				285395	285396			
Sample Reference				BPRBH1	BPRBH2			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				11/09/2013	11/09/2013			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10			

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 13-46063

Project / Site name: Bicester

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH4 in water	Determination of ammonium in water by addition of buffer solution followed by ion selective electrode. Results for ammonia species are calculated from raw ammoniacal nitrogen data,	In-house method	L035-PL	W	ISO 17025
Boron in water	Determination of boron by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073S-PL	W	ISO 17025
Complex cyanide in water	Determination of complex cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	NONE
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L010-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of total organic carbon in water by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPH7 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' 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.

APPENDIX E

Author Atkins
Revision 3
Date 31/03/2011

Title **SSVs derived using CLEA for 1% SOM and sand soil type, Commercial land use**

PLEASE NOTE
These values are provided exclusively for the use of subscribers to www.atrisksoil.co.uk. In accordance with the terms and conditions of the atrisksoil website the information is for the sole use of the user and by receiving or obtaining any information contained herein the user agrees that at all times they will keep secret and confidential and shall procure and safeguard that their directors and employees keep secret and confidential all business and trade secrets and any information of a confidential nature relating to the processes, affairs, methods, and data belonging to Atkins Limited which they may have received or obtained in the performance of or otherwise as a direct or indirect result of entering into any agreement with Atkins Limited.

Compound	SSV mg/kg	Notes
1,1,1-Trichloroethane	325	
1,1,1,2-Tetrachloroethane	52.4	
1,1,2,2-Tetrachloroethane	131	
1,1,2-Trichloroethane	42.5	
1,1-Dichloroethane	122	
1,1-Dichloroethene	12.6	
1,2-Dichloroethane	0.294	
1,2,4-Trimethylbenzene	175	
1,2-Dichloropropane	1.43	
2,4-Dichloro-o-cresol	55000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 861 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,4-Dimethylphenol	35600	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 1330 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,4-Dinitrotoluene	3740	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 132 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,6-bis(1,1-dimethyl)-4-(1-methylpropyl)-phenol	2170	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 18.7 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,6-Dinitrotoluene	1850	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 271 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2-Chloronaphthalene	60200	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 113 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2-Methylphenol	187000	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. Users must consider total exposure from all methylphenol isomers and not consider them in isolation. In line with the approach published by EIC when assessing total cresols, the lowest SSV of each methylphenol isomer may be chosen to compare to the total methylphenol concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 14200 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
3-Methylphenol	187000	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. Users must consider total exposure from all methylphenol isomers and not consider them in isolation. In line with the approach published by EIC when assessing total cresols, the lowest SSV of each methylphenol isomer may be chosen to compare to the total methylphenol concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 25300 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.

Author Atkins
Revision 3
Date 31/03/2011

Title **SSVs derived using CLEA for 1% SOM and sand soil type, Commercial land use**

Compound	SSV mg/kg	Notes
4-Methylphenol	185000	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. Users must consider total exposure from all methylphenol isomers and not consider them in isolation. In line with the approach published by EIC when assessing total cresols, the lowest SSV of each methylphenol isomer may be chosen to compare to the total methylphenol concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 25800 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Acenaphthene	109000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 157 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Anthracene	536000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 3.48 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Antimony	4830	
Arsenic	640	Value presented is the Environment Agency Arsenic SGV published in May 2009. The commercial assessment criterion will not change with soil type or SOM. The SGV is the lower of the oral or inhalation assessment criteria.
Barium	22100	
Benzene	13.1	Based on information within the Environment Agency Benzene SGV report published in March 2009.
Benzo(a)anthracene	131	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 1.71 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(a)pyrene	14.3	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.911 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(b)fluoranthene	142	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 1.22 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(g,h,i)perylene	1440	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.0187 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(k)fluoranthene	1430	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.686 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Beryllium	1010	
Biphenyl	71900	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 34.1 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Bis (2-ethylhexyl) phthalate	85200	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 8.66 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Bromobenzene	44.7	
Bromodichloromethane	0.907	
Bromoform	347	

Author Atkins
Revision 3
Date 31/03/2011

Title **SSVs derived using CLEA for 1% SOM and sand soil type, Commercial land use**

Compound	SSV mg/kg	Notes
Butyl benzyl phthalate	941000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 26.1 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Cadmium	230	Value presented is the Environment Agency Cadmium SGV published in July 2009. The commercial assessment criterion will not change with soil type or SOM.
Carbon disulphide	11.6	
Carbon tetrachloride	1.44	
Chlorobenzene	533	
Chloroethane	463	
Chloroform / Trichloromethane	48.0	
Chloromethane	0.480	
Chromium III	213000	
Chromium VI	330	
Chrysene	14000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.44 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Cis-1,2-dichloroethene	6.37	
Copper	109000	
Cyanide	34.0	Based on acute exposure for a 0-6 year old child, using 5th percentile bodyweight from CLR10. Information is not available in SR3 and supporting documents regarding the 5th percentile bodyweight of SR3 bodyweight data. It is not considered likely that new data would significantly affect the SSV.
DDD	984	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 49.9 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Dibenz(a,h)anthracene	14.3	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.00393 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Dibromochloromethane	9.83	
Dichloromethane	116	
Diethyl phthalate	377000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 12.8 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Di-n-butyl phthalate	15400	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 4.62 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the approach published by the EIC, the lower of the oral and inhalation assessment criteria has been selected. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Di-n-octyl phthalate	89100	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 32.6 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Dinoseb	7.53	

Author Atkins
Revision 3
Date 31/03/2011

Title **SSVs derived using CLEA for 1% SOM and sand soil type, Commercial land use**

Compound	SSV mg/kg	Notes
Ethylbenzene	180000	Based on information within the Environment Agency Ethylbenzene SGV report published in March 2009. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 508 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Fluoranthene	72300	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 18.9 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Fluorene	66800	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 125 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Formaldehyde	463	
Hexachloroethane	510	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 8.13 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Indeno(1,2,3-c,d)pyrene	142	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.0614 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Iso-propylbenzene	180000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 388 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Lead	6490	
Mercury (elemental)	4.30	Based on information in the Environment Agency Mercury SGV report published in March 2009. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the lower of the aqueous and the vapour saturation based limit as calculations are based on inhalation exposure only.
Mercury (inorganic)	3600	Value presented is the Environment Agency inorganic mercury SGV published in March 2009. The commercial assessment criterion will not change with soil type or SOM.
Mercury (methyl)	414	Based on information in the Environment Agency Mercury SGV report published in March 2009. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 66.4 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Methyl tert-butyl ether	3340	
Molybdenum	17700	
m-Xylene	276000	Based on information within the Environment Agency Xylene SGV report published in March 2009. Users must consider total exposure from all xylene isomers and not consider them in isolation. The lowest SSV of each xylene isomer may be chosen to compare to the total xylene concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 613 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Naphthalene	8180	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 75 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Nickel	1800	Value presented is the Environment Agency Nickel SGV published in May 2009. The commercial assessment criterion will not change with soil type or SOM. The oral and inhalation assessment criteria are derived independently and the SGV is the lower value of the two.
Nicotine	857	
o-Xylene	296000	Based on information within the Environment Agency Xylene SGV report published in March 2009. Users must consider total exposure from all xylene isomers and not consider them in isolation. The lowest SSV of each xylene isomer may be chosen to compare to the total xylene concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 467 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.

Author Atkins
Revision 3
Date 31/03/2011

Title **SSVs derived using CLEA for 1% SOM and sand soil type, Commercial land use**

Compound	SSV mg/kg	Notes
Phenol	686	Based on information within the Environment Agency Phenol SGV report published in July 2009. The SSV presented assumes 1% soil organic matter and uses the linear media partitioning model within the CLEA software which estimates the corresponding soil water concentration for phenol to be 1% by weight. The value presented is based on a threshold protective of direct skin contact with phenol. A long term exposure value of 28900 mg/kg was derived by the CLEA v.1.04 model and is provided for illustration only. Derived by comparing oral exposure to the oral HCV, and dermal and inhalation exposure to the inhalation HCV.
Prochloraz	12500	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.116 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Propylbenzene	187000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 399 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
p-Xylene	279000	Based on information within the Environment Agency Xylene SGV report published in March 2009. Users must consider total exposure from all xylene isomers and not consider them in isolation. The lowest SSV of each xylene isomer may be chosen to compare to the total xylene concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 564 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Pyrene	54200	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 2.20 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Selenium	13000	Value presented is the Environment Agency selenium SGV published in March 2009. The commercial assessment criterion will not change with soil type or SOM.
Styrene	22200	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 607 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Sum of PCDDs, PCDFs and dioxin-like PCBs	No SSV. Due to publication of the Dioxins, Furans and Dioxin-like PCB SGVs in September 2009, please see the Frequently Asked Questions for more information.	
Tetrachloroethene	75.8	
Toluene	414000	Based on information within the Environment Agency Toluene SGV report published in March 2009. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 835 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aliphatic C10-C12	171000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 49.9 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aliphatic C12-C16	171000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 21.0 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aliphatic C16-C35	≤ 1 kg/kg	This fraction is not considered volatile and the inhalation of vapour pathways have not been considered (TPHCWG, 1997). Modelling indicates that a chronic long term risk would not be present at concentrations above this. However at >1 kg/kg free product would be anticipated and further assessment may be required (e.g. this value is unlikely to be protective of dermal contact). Please see the Frequently Asked Questions for more information on free product.
TPH aliphatic C5-C6	≤ 1 kg/kg	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Modelling indicates that a chronic long term risk would not be present at concentrations above this. However at >1 kg/kg free product would be anticipated and further assessment may be required (e.g. this value is unlikely to be protective of dermal contact). Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 327 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aliphatic C6-C8	≤ 1 kg/kg	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Modelling indicates that a chronic long term risk would not be present at concentrations above this. However at >1 kg/kg free product would be anticipated and further assessment may be required (e.g. this value is unlikely to be protective of dermal contact). Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 158 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.

Author Atkins
Revision 3
Date 31/03/2011

Title **SSVs derived using CLEA for 1% SOM and sand soil type, Commercial land use**

Compound	SSV mg/kg	Notes
TPH aliphatic C8-C10	167000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 82.5 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aromatic C10-C12	68300	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 370 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aromatic C12-C16	68400	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 155 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aromatic C16-C21	28400	This fraction is not considered volatile and the inhalation of vapour pathways have not been considered (TPHCWG, 1997).
TPH aromatic C21-C35	28400	This fraction is not considered volatile and the inhalation of vapour pathways have not been considered (TPHCWG, 1997).
TPH aromatic C5-C7	13.1	Benzene is the only consituent of this fraction (TPHCWG 1997). Based on information within the Environment Agency Benzene SGV report published in March 2009.
TPH aromatic C7-C8	414000	Toluene is the only consituent of this fraction (TPHCWG 1997). Based on information in the Environment Agency Toluene SGV report published in March 2009. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 835 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aromatic C8-C10	58600	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 614 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Trans-1,2-dichloroethene	10.1	
Tributyl tin oxide	123	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 40.9 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Trichloroethene	5.48	
Trichloromethylbenzene	0.0266	
Vanadium	7530	
Vinyl chloride	0.0329	
Zinc	≤1 kg/kg	

Note:
All values provided are rounded to 3 significant figures.
It is noted for some compounds that the SSV is sufficiently high that free product is likely to be encountered. Please see the Frequently Asked Questions for more advice.
In some instances the risk based value may be lower than the laboratory detection limit. Please see the Frequently Asked Questions for more advice.

Author Atkins
Revision 1
Date 31/03/2011

Title **WSVs derived using CLEA for a Commercial land use**

Name	Commercial WSV (mg/L)		Notes
1,1,2 Trichloroethane	208	d	
1,1 Dichloroethane	1110	c	
1,1 Dichloroethene	65.6	d	
1,2,4 Trimethylbenzene	9.83	d	
1,2 Dichloropropane	11.1	b	
2,4 Dimethylphenol	30900	a	
2,4 Dinitrotoluene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
2,6 Dinitrotoluene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
2 Chloronaphthalene	62.7	a	
Total Methylphenols	1620000	a	The value presented is the lowest risk based number for the three methylphenol isomers. Users must consider total exposure from all methylphenol isomers and not consider them in isolation. In line with the approach published by EIC when assessing total cresols, the lowest WSV of each methylphenol isomer may be chosen to compare to the total methylphenol concentration.
Biphenyl	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Bis (2 ethylhexyl) phthalate	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the WSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Bromobenzene	87.7	c	
Bromodichloromethane	6.82	b	
Bromoform	1770	c	
Butyl benzyl phthalate	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the WSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Chloroethane	4180	c	
Chloromethane	5.50	b	
Cis 1,2 Dichloroethene	54.6	b	
Dichloromethane	1500	d	
Diethyl Phthalate	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the WSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Di n butyl phthalate	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the WSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Di n octyl phthalate	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the WSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Hexachloroethane	>50	f	The saturation limit has been exceeded in the calculation. The WSV presented is the aqueous solubility limit.
Iso propylbenzene	389	a	
Methyl tert butyl ether	33800	c	
Propylbenzene	1100	a	
Styrene	3530	a	
Trans 1,2 Dichloroethene	65.7	b	
Tributyl tin oxide	54.5	a	
Acenaphthene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Anthracene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Benzo(a)anthracene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Benzo(a)pyrene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Benzo(b)fluoranthene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Benzo(g,h,i)perylene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Benzo(k)fluoranthene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.

Author Atkins
Revision 1
Date 31/03/2011

Title **WSVs derived using CLEA for a Commercial land use**

Name	Commercial WSV (mg/L)		Notes
Chrysene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Dibenz(ah)anthracene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Fluoranthene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Fluorene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Indeno(1,2,3 cd)pyrene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Pyrene	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Benzene	8.46	b	
Toluene	9090	a	
Ethylbenzene	1250	a	
o xylene	503	a	Based on information in the Environment Agency Xylene SGV report published in March 2009. Users must consider exposure from all xylene isomers and not consider them in isolation. The lowest xylene WSV could be chosen to compare to the sum of xylene concentrations.
m xylene	413	a	Based on information in the Environment Agency Xylene SGV report published in March 2009. Users must consider exposure from all xylene isomers and not consider them in isolation. The lowest xylene WSV could be chosen to compare to the sum of xylene concentrations.
p xylene	432	a	Based on information in the Environment Agency Xylene SGV report published in March 2009. Users must consider exposure from all xylene isomers and not consider them in isolation. The lowest xylene WSV could be chosen to compare to the sum of xylene concentrations.
Phenol	269000	a	
Mercury (methyl)	5660	a	
Mercury (elemental)	0.428	a	
TPH aromatic C5-C7	8.46	b	Benzene is the only constituent of this fraction (TPHCWG 1997). Based on information within the Environment Agency Benzene SGV report published in March 2009
TPH aromatic C7-C8	9090	a	Toluene is the only constituent of this fraction (TPHCWG 1997). Based on information within the Environment Agency Toluene SGV report published in March 2009.
TPH aromatic C8-C10	96.5	a	
TPH aromatic C10-C12	380	a	
TPH aromatic C12-C16	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
TPH aliphatic C5-C6	198	a	
TPH aliphatic C6-C8	144	a	
TPH aliphatic C8-C10	2.90	a	
TPH aliphatic C10-C12	2.23	a	
TPH aliphatic C12-C16	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
1,2 dichloroethane	3.54	b	
1,1,1 Trichloroethane	1270	c	
1,1,1,2 Tetrachloroethane	96.7	d	
1,1,2,2 Tetrachloroethane	650	c	
Carbon tetrachloride	3.31	b	
Chlorobenzene (mono)	1300	a	
Tetrachloroethene	174	c	
Trichloroethene	20.7	b	
Vinyl chloride	0.249	b	
Naphthalene	99.8	a	
Chloroform/Trichloromethane	369	d	
Dinoseb	>52	f	The saturation limit has been exceeded in the calculation. The WSV presented is the aqueous solubility limit.
Trichloromethylbenzene	0.0609	b	
Nicotine	58900	b	
Formaldehyde	2360	b	
Prochloraz	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
2,6-bis(1,1-dimethyl)-4-(1-meth	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
2,4-Dichloro-o-cresol	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.
Dibromochloromethane	38.7	b	
DDD	No WSV	e	The saturation limit has been exceeded in the calculation. At the aqueous solubility limit the hazard quotient for both indoor and outdoor pathways was less than 0.01 and therefore no risk based number is considered appropriate.

Notes:

a	Where both indoor and outdoor values derived by RBCA were greater than the saturation limit, the hazard quotient for the indoor pathway was considered. If the hazard quotient was greater than 0.01, the hazard quotients were used to calculate a risk based value (not limited by the saturation limit). The calculated indoor and calculated outdoor values have been integrated in line with SNIFFER (2003).
b	Where indoor and outdoor values were presented by RBCA, these have been integrated in line with SNIFFER (2003).
c	Where indoor values were presented by RBCA, and the outdoor values were greater than the saturation limit, the hazard quotient for the outdoor pathway was considered. If the hazard quotient for the outdoor pathway was less than 0.1, the indoor values have been presented as the WSV.

Author Atkins
Revision 1
Date 31/03/2011

Title **WSVs derived using CLEA for a Commercial land use**

PLEASE NOTE

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Name		Commercial WSV (mg/L)	Notes
d			Where indoor values were presented by RBCA, and the outdoor values were greater than the saturation limit, the hazard quotient for the outdoor pathway was considered. If the hazard quotient for the outdoor pathway was greater than 0.1 but less than 1, the hazard quotient was used to calculate a risk based value (not limited by the saturation limit). The indoor and calculated outdoor values were integrated in line with SNIFFER (2003).
e			Where the indoor and outdoor values derived by RBCA were greater than the saturation limit, the hazard quotient for the indoor pathway was considered. The hazard quotient was less than 0.01 and no risk based number is considered appropriate. In this case 'no WSV' is presented.
f			Due to the limitations in the RBCA software, a hazard quotient could not be calculated for the inhalation of indoor air. The WSV presented is the aqueous solubility limit. Further assessment is recommended should the aqueous solubility limit be exceeded.

Only inhalation exposure pathways are considered as presented within the input parameters.
The potential presence of free product should be assessed to ensure no further risk assessment is required.
TPH >C16 are not considered to be volatile according to TPHCWG. Consequently no WSV have been derived.
All values provided are rounded to 3 significant figures.
In some instances the risk based value may be lower than the laboratory detection limit or the drinking water standard. Please see the Frequently Asked Questions for more advice.

	Units	UK DWS	Freshwater EQS AA	Freshwater EQS Max	Freshwater EQS Class 1	Freshwater EQS Class 2	Freshwater EQS Class 3	Freshwater EQS Class 4	Freshwater EQS Class 5	Saltwater EQS	Saltwater EQS	WHO Drinking Water Guideline
Hydrocarbons (General)												
Hydrocarbons (TPH or EPH fractions)	µg/l	10										
PAHs												
Acenaphthene	µg/l	0.1										
Acenaphthylene	µg/l	0.1										
Anthracene	µg/l	0.1	0.1	0.4						0.1	0.4	
Benzo(a)anthracene	µg/l	0.1										
Benzo(a)pyrene	µg/l	0.01	0.05	0.1						0.05	0.1	0.7
Benzo(b)fluoranthene	µg/l	0.1	Σ 0.03							Σ 0.03		
Benzo(k)fluoranthene	µg/l	0.1										
Chrysene	µg/l	0.1										
Dibenzo(a,h)anthracene	µg/l	0.1										
Fluoranthene	µg/l	0.1	0.1	1						0.1	1	
Fluorene	µg/l	0.1										
Benzo(g,h,i)perylene	µg/l	0.1	Σ 0.002							Σ 0.002		
Indeno(1,2,3-cd)pyrene	µg/l	0.1										
Naphthalene	µg/l	0.1	2.4							1.2		
Phenanthrene	µg/l	0.1										
Pyrene	µg/l	0.1										
BTEX												
Benzene	µg/l	1	10	50						8	50	10
Toluene	µg/l		50	380						40	370	700
Ethylbenzene	µg/l		20	200						20	200	300
Xylenes	µg/l		30							30		500
VOCs and SVOCs												
1,1,1-Trichloroethane	µg/l		100							100		
1,1,2-Trichloroethane	µg/l		400							300		
Trichloroethene (TCE)	µg/l	Σ 10	10							10		20
Tetrachloroethene (PCE)	µg/l		10							10		40
1,1-Dichloroethene	µg/l											30
1,2-Dichloroethene	µg/l											50
1,3-Dichloropropene	µg/l											20
Dichloromethane	µg/l		20							20		20
Trichlorobenzene	µg/l		0.4							0.4		
1,2-Dibromoethane	µg/l											0.4
Dichlorobenzene	µg/l		20	200						20	200	
1,2-Dichlorobenzene	µg/l											1000
1,2-Dichloroethane	µg/l	3	10							10		30
1,2-Dichloropropane	µg/l											40
Bromodichloromethane	µg/l											60
Bromoform	µg/l											100
Carbon tetrachloride (Tetrachloromethane)	µg/l	3	12							12		4
Chloroform (Trichloromethane)	µg/l		2.5							2.5		300
Trihalomethanes (Trichloromethane, Tribromomethane +)	µg/l	Σ 100										
Chlorodibromomethane or Dibromochloromethane	µg/l											100
Hexachlorobutadiene	µg/l		0.1	0.6						0.1	0.6	0.6
Styrene	µg/l		50	500						50	500	20
Vinyl chloride	µg/l	0.5										0.3
Phenol	µg/l		7.7	4.6						7.7	4.6	
2-Chlorophenol	µg/l		50							50		
3-Chlorophenol	µg/l		50	250						50	250	
4-Chlorophenol	µg/l		50	250						50	250	
Methyl phenols	µg/l		100	300						100	300	
2,4,6-Trichlorophenol	µg/l											200
2,4-Dichlorophenol	µg/l		20							20		
Chloronitrotoluenes	µg/l		10							10		
Bis (2-ethylhexyl)phthalate	µg/l		1.3							1.3		8
Butyl benzylphthalate	µg/l		20	100						20	100	
Diethyl phthalate	µg/l		200	1000						200	1000	
Dimethyl phthalate	µg/l		800	4000						800	4000	
Di-n-butylphthalate	µg/l		8	40						8	40	
Di-n-octylphthalate	µg/l		20	40						20	40	
Hexachlorobenzene	µg/l		0.01	0.05						0.01	0.05	
Pentachlorophenol	µg/l		0.4	1						0.4	1	9
Pesticides, Herbicides and other Hydrocarbons												
Acrylamide	µg/l	0.1										
Epichlorohydrin	µg/l	0.1										
Pesticides total	µg/l	0.5										
Other pesticides	µg/l	0.01										
Dieldrin	µg/l	0.03										0.03
Aldrin	µg/l	0.03										0.03
Cyclodiene pesticides (Aldrin, Dieldrin, Endrin, Isodrin)	µg/l		Σ 0.01							Σ 0.005		
Heptachlor	µg/l	0.03										
Helptachlor epoxide	µg/l	0.03										
Mecoprop	µg/l		18	187						18	187	10
MCPA	µg/l		12^	120^						80	800	2
DDT	µg/l		0.025							0.025		1
para-para-DDT	µg/l		0.01							0.01		
Bentazone	µg/l		500							500		
Simazine	µg/l		1	4						1	4	2
Trifluralin	µg/l		0.03							0.03		20
Atrazine	µg/l		0.6	2						0.6	2	2
2,4-D	µg/l		0.3	1.3						0.3	1.3	30
2,4-DB	µg/l											90
2,4,5-T	µg/l											9
Permethrin	µg/l		0.01							0.01		300
Linuron	µg/l		0.5	0.9						0.5	0.9	
Dimethoate	µg/l		0.48	4						0.48	4	
Diazinon	µg/l		0.01	0.02						0.01	0.1	
Cypermethrin	µg/l		0.1	0.4						0.1	0.4	
Pentachlorobenzene	µg/l		0.007							0.0007		
Octylphenol	µg/l		0.1							0.01		
Nonylphenol	µg/l		0.3	2						0.3	2	
Isoproturon	µg/l		0.3	1						0.3	1	9
C10-C13 Chloroalkanes	µg/l		0.4	1.4						0.4	1.4	
Chloropyrifos (Chloropyrifos-ethyl)	µg/l		0.03	0.1						0.03	0.1	
Alachlor	µg/l		0.3	0.7						0.3	0.7	20
Brominated diphenylether	µg/l		0.0005							0.0002		
Chlorfenvinphos	µg/l		0.1	0.3						0.1	0.3	
Tribuytl tin compounds	µg/l		0.0002	0.0015						0.0002	0.0015	
Diuron	µg/l		0.2	1.8						0.2	1.8	
Endosulfan	µg/l		0.005	0.01						0.0005	0.004	
Metals and anions												
Antimony	µg/l	5										20
Arsenic	µg/l	10	50							25		
Boron	µg/l	1000										700
Bromate	µg/l	10										10
Cadmium	µg/l	5			0.08 (0.45)	0.08 (0.45)	0.09 (0.6)	0.15 (0.9)	0.25 (1.5)	0.2	Brackets	
Chromium	µg/l	50										
Chromium III	µg/l		4.7	32								
Chromium VI	µg/l		3.4							0.6	3.2	
Copper	µg/l	2000			1	6	10	28		5		
Cyanide	µg/l	50	1	5						1	5	70
Flouride	mg/l	1.5			1 (3)	5 (15)	5 (15)	5 (15)		5	15	1.5
Lead	µg/l	25	7.2							7.2		10
Mercury	µg/l	1	0.05	0.07						0.05	0.07	6
Nickel	µg/l	20	20							20		70
Nitrate	mg/l	50										50
Nitrite	mg/l	0.5										0.2 (3)
Selenium	µg/l	10										
Iron	µg/l	200	1000							1000		
Manganese	µg/l	50										400
Sodium	mg/l	200										
Ammonia	mg/l				0.3	0.6	0.6	0.6			0.021	
Ammonium	mg/l	0.5										
Ammoniacal nitrogen	mg/l	0.39										
Chloride	mg/l	250	250									
Sulphate	mg/l	250										
Conductivity	µS/cm	2500										
Hydrogen Ion (pH)	pH	9.5										
		6.5										
Tritium	Bq/l	100										
Radioactivity (Total indicative dose)	mSv/year	0.1										

^ pH dependents
values in brackets are max values for hardness bands.

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