Intégral Géotechnique

General

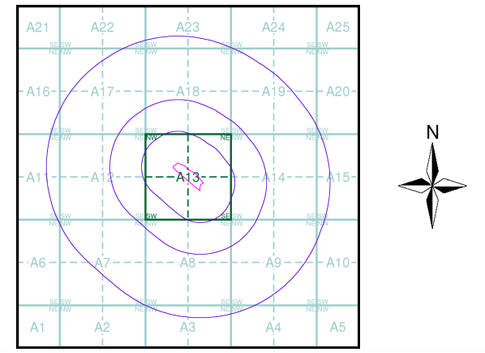
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg

- < 15
- 15 - 25
- 25 - 35
- 35 - 45
- 45 - 60
- 60 - 120
- > 120

Estimated Soil Chemistry Arsenic - Slice A



Order Details

Order Details:	55615989_1_1
Customer Ref:	11344/JJ
National Grid Reference:	298680, 168560
Slice:	A
Site Area (Ha):	1.84
Search Buffer (m):	1000

Site Details

Boverton, Llantwit Major

Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Intégral Géotechnique

General

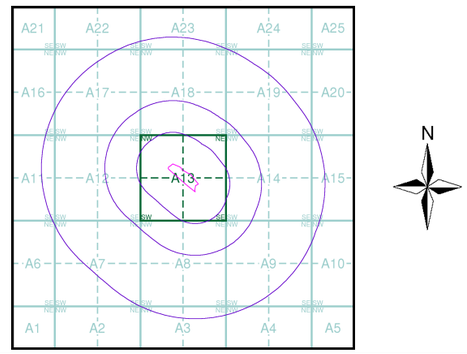
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg

- < 1.8
- 1.8 - 2.2
- 2.2 - 3.0
- > 3.0

Estimated Soil Chemistry Cadmium - Slice A



Order Details

Order Details:	55615989_1_1
Customer Ref:	11344/JJ
National Grid Reference:	298680, 168560
Slice:	A
Site Area (Ha):	1.84
Search Buffer (m):	1000

Site Details

Boverton, Llantwit Major

Landmark Information Group

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Intégral Géotechnique

General

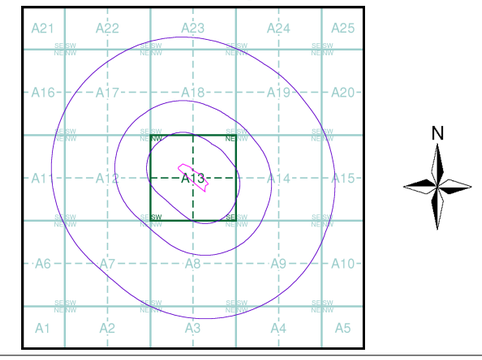
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg

- < 20
- 20 - 40
- 40 - 60
- 60 - 90
- 90 - 120
- 120 - 180
- > 180

Estimated Soil Chemistry Chromium - Slice A



Order Details

Order Details:	55615989_1_1
Customer Ref:	11344/JJ
National Grid Reference:	298680, 168560
Slice:	A
Site Area (Ha):	1.84
Search Buffer (m):	1000

Site Details

Boverton, Llantwit Major

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Intégral Géotechnique

General

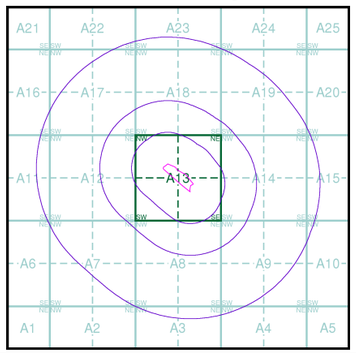
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg

- < 150
- 150 - 300
- 300 - 600
- 600 - 900
- > 900

Estimated Soil Chemistry Lead - Slice A



Order Details

Order Details:	55615989_1_1
Customer Ref:	11344/JJ
National Grid Reference:	298680, 168560
Slice:	A
Site Area (Ha):	1.84
Search Buffer (m):	1000

Site Details

Boverton, Llantwit Major

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Intégral Géotechnique

General

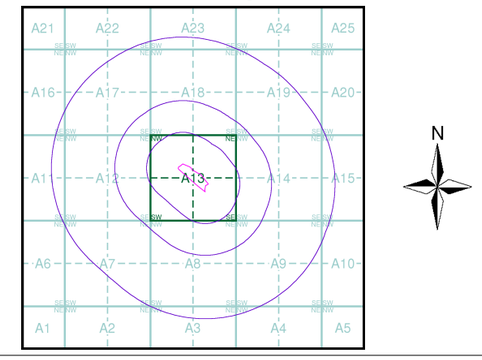
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg

- < 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 80
- 80 - 100
- > 100

Estimated Soil Chemistry Nickel - Slice A



Order Details

Order Details:	55615989_1_1
Customer Ref:	11344/JJ
National Grid Reference:	298680, 168560
Slice:	A
Site Area (Ha):	1.84
Search Buffer (m):	1000

Site Details

Boverton, Llantwit Major

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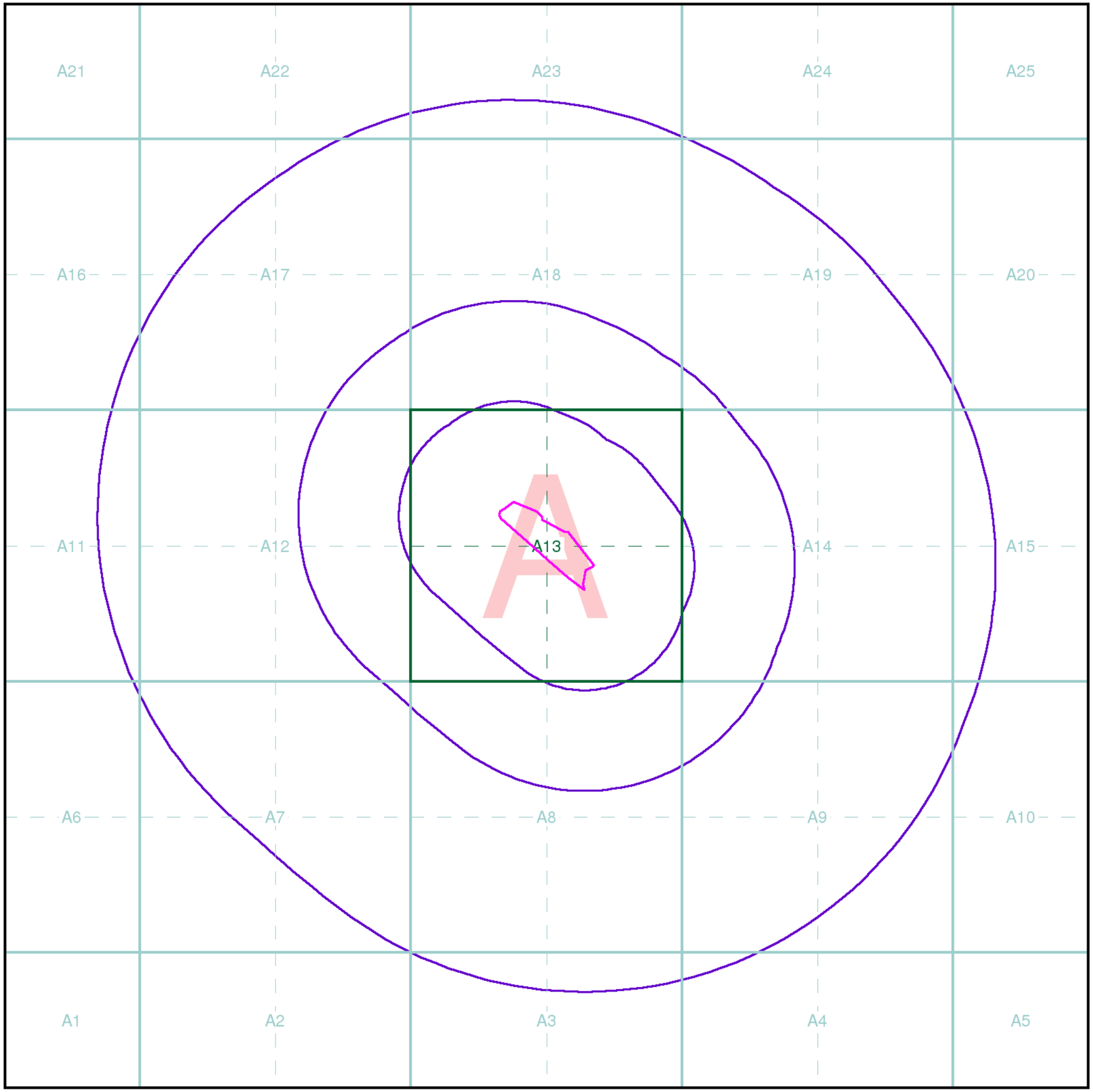


Intégral Géotechnique

Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:

Ordnance Survey Licensed Partner

British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

CYNGOR CEFN GWLAD CYMRU COUNTRYSIDE COUNCIL FOR WALES

Envirocheck reports are compiled from 136 different sources of data.

Client Details

MR H Pritchard, Integral Geotechnique, Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX

Order Details

Order Number:	55615989_1_1
Customer Ref:	11344/JJ
National Grid Reference:	298680, 168570
Site Area (Ha):	1.84
Search Buffer (m):	1000

Site Details

Boverton, Llantwit Major

Full Terms and Conditions can be found on the following link:
http://www.landmarkinfo.co.uk/Terms/Show/515

Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

APPENDIX B

BGS RADON REPORT

Gary Shawley
Integral Geotechnique
Integral House
7 Beddau Way
Caerphilly
CF83 2AX

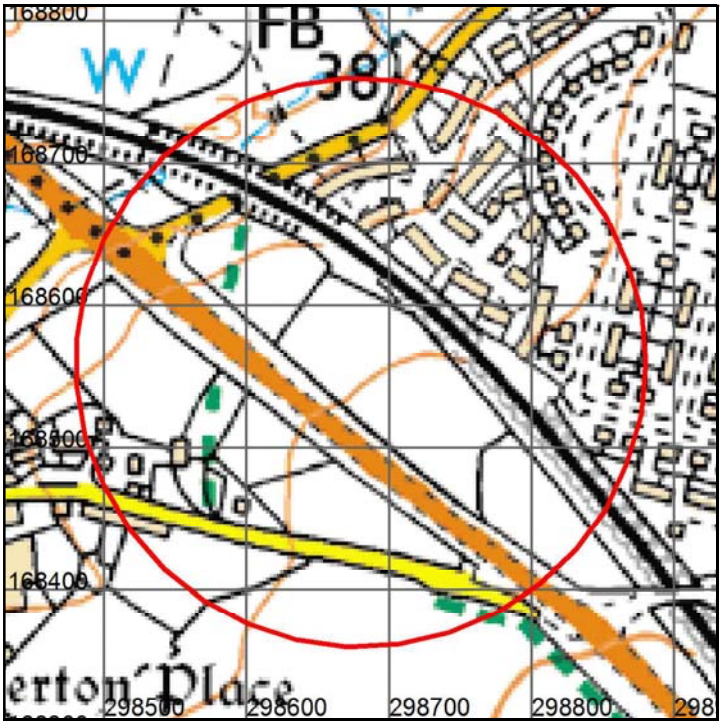
Radon Report: England and Wales

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

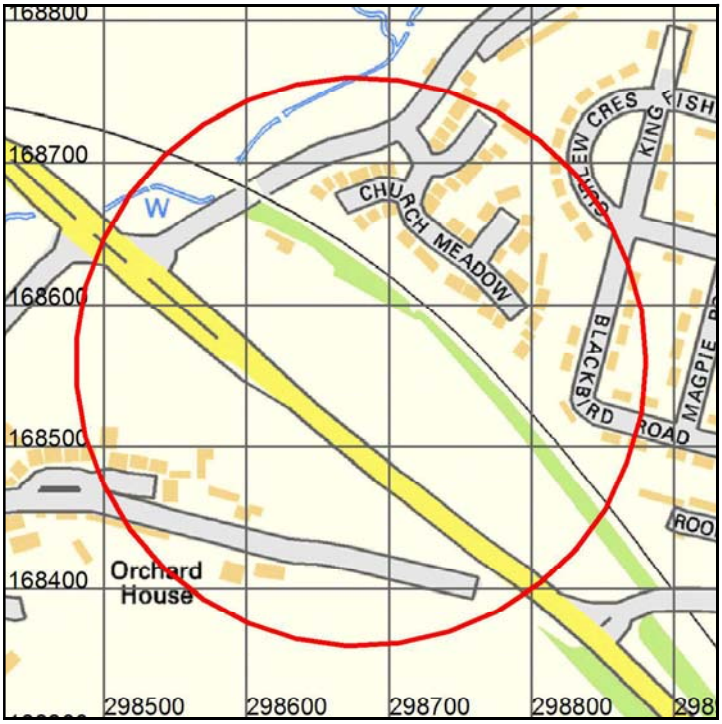
Report Id: ***GR_208883/1***

Client reference: 11344/GNS

Search location



This product includes mapping data licensed from Ordnance Survey.
© Crown Copyright and/or database right 2014. Licence number 100037272
Scale: 1:5 000 (1cm = 50 m)



Contains Ordnance Survey data © Crown Copyright and database right 2014
OS Street View: Scale: 1:5 000 (1cm = 50 m)

This report describes a site located at National Grid Reference 298680, 168560. Note that for sites of irregular shape, this point may lie outside the site boundary. Where the client has submitted a site plan the assessment will be based on the area given.

Search location indicated in red

Radon Report: England and Wales

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

Requirement for radon protective measures
The determination below follows advice in *BR211 Radon: Guidance on protective measures for new buildings (2007 edition)*, which also provides guidance on what to do if the result indicates that protective measures are required.

BASIC RADON PROTECTIVE MEASURES ARE REQUIRED FOR THE REPORT AREA.

The BGS is not able to provide advice on the technical specifications of 'basic' and 'full' radon protective measures. This information is detailed in **BRE Report BR211 Radon: guidance on protective measures for new buildings** which may be purchased from **brebookshop.com.** This report offers guidance on the technical solutions that are required to satisfy Building Regulations requirements.

Technical solutions to radon protection in new build and existing dwellings in radon affected areas are available on the BRE web site at:
http://www.bre.co.uk/page.jsp?id=1626 and http://www.bre.co.uk/radon/ and in a range of technical reports available from **brebookshop.com;** Tel: 01923 664262, email: bookshop@bre.co.uk.
Summary guidance is available on the web at:
http://www.bre.co.uk/radon/protect.html.

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

Radon in existing buildings

Is this property in a radon affected area – YES

The answer to the standard enquiry on house purchase known as **CON29 Standard Enquiry of Local Authority 3.13 Radon Gas: Location of the Property in a radon Affected Area is YES** this property is in a Radon Affected Area as defined by Public Health England (PHE).

The estimated probability of the property being above the Action Level for radon is: 5-10% (INTERMEDIATE PROBABILITY).

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

Radon Affected Areas are designated by Public Health England. They advise that radon gas should be measured in all properties within Radon Affected Areas.

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

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

In radon affected homes, the problem of radon can usually be tackled with simple, effective and relatively inexpensive measures. These measures are comparable in cost to work such as damp-proofing and timber treatment. You can get practical advice about construction work to reduce radon levels from the Building Control Officer at your local council.

For further information, advice about radon, its health risks and details of how to order the radon test, please contact the PHE Radon Helpline on 01235 822622 or go online at www.ukradon.org or write to Radon Survey, Public Health England, Centre for Radiation, Chemical and Environmental Hazards, Chilton, Didcot, Oxon, OX11 0RQ, email: radon@hpa.org.uk. You can obtain an information pack from the PHE free Radon answerphone on 0800 614529

What is radon?

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

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

Radon in workplaces

The Ionising Radiation Regulations, 1999, require employers to take action when radon is present above a defined level in the workplace. Advice may be obtained from your local Health and Safety Executive Area Office or the Environmental Health Department of your local authority. The BRE publishes a guide (BR293)**: Radon in the workplace.** BRE publications may be obtained from the BRE Bookshop, Tel: 01923 664262, email: bookshop@bre.co.ukwebsite: www.brebookshop.com

Contact Details

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British Geological Survey
Environmental Science Centre
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NG12 5GG
Tel: 0115 9363143
Fax: 0115 9363276
Email: enquiries@bgs.ac.uk

Wallingford (WL) Office
British Geological Survey
Maclean Building
Wallingford
Oxford
OX10 8BB
Tel: 01491 838800
Fax: 01491 692345
Email: hydroenq@bgs.ac.uk

Murchison House (MH) Office
British Geological Survey
Murchison House
West Mains Road
Edinburgh
EH9 3LA
Tel: 0131 650 0207
Fax: 0131 650 0252
Email: enquiry@bgs.ac.uk

Terms and Conditions

General Terms & Conditions

This Report is supplied in accordance with the GeoReports Terms & Conditions available on the BGS website at www.bgs.ac.uk/georeports and also available from the BGS Central Enquiries Desk at the above address.

Important notes about this Report

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

Report issued by
BGS Enquiry Service

APPENDIX C

TRIAL PIT LOGS

Intégral Géotechnique
Intégral House, 7 Beddau Way
Castlegate Business Park
Caerphilly CF83 2AX
Tel. 029 20807991
Fax. 029 20862176
mail@integralgeotec.com

Project Name :	Project No.:	Trial Pit No.:
Land Adjacent to Llantwit Major By-Pass	**11344**	**TP1** Sheet 1 of 1

Location :	Client :	Logged By :	Scale :
Boverton, Llantwit Major	Barratt Homes South Wales	JJ	1:25

Equipment :	Coordinates :	Dimensions
JCB 3CX	-	2.00m
Date Excavated : 08/05/2014	Level : -	Depth : 1.30m; 0.70m

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20			TOPSOIL: Grass onto grey brown silty CLAY with many roots and rootlets.
						Dense grey and light brown slightly clayey GRAVEL and COBBLES with frequent boulders of tabular and angular limestone (Weathered Bedrock).
			1.30			Trial Pit Complete at 1.30 m

Remarks:
- Excavation terminated at 1.3m depth on strong limestone bedrock.
- Soakaway test undertaken.

Groundwater : Pit dry.

Stability : Local collapse due to overbreak within Limestone Bedrock.

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

Intégral Géotechnique
Intégral House, 7 Beddau Way
Castlegate Business Park
Caerphilly CF83 2AX
Tel. 029 20807991
Fax. 029 20862176
mail@integralgeotec.com

Project Name : **Land Adjacent to Llantwit Major By-Pass**

Project No.: **11344**

Trial Pit No.: **TP2**
Sheet 1 of 1

Location : Boverton, Llantwit Major

Client : Barratt Homes South Wales

Logged By : JJ

Scale : 1:25

Equipment : JCB 3CX

Coordinates : -

Dimensions: 2.00m; Depth : 1.20m; 0.80m

Date Excavated : 08/05/2014

Level : -

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES		0.10			TOPSOIL: Grass onto soft grey brown silty CLAY with many roots and rootlets.
						Soft to firm orange brown slightly silty CLAY with occasional gravel of fine, medium and coarse angular limestone.
0.70	D		0.80			Dense orange brown and grey slightly clayey GRAVEL and COBBLES with frequent boulders of angular and tabular limestone (Weathered Bedrock).
			1.20			Trial Pit Complete at 1.20 m

Remarks:
- Excavation terminated at 1.2m depth on strong limestone bedrock.

Groundwater : Pit Dry.

Stability : Sides Stable

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

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Caerphilly CF83 2AX
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mail@integralgeotec.com

Project Name :	Project No.:	Trial Pit No.:
Land Adjacent to Llantwit Major By-Pass	**11344**	**TP3** Sheet 1 of 1

Location :	Client :	Logged By :	Scale :
Boverton, Llantwit Major	Barratt Homes South Wales	JJ	1:25

Equipment :	Coordinates :	Dimensions
JCB 3CX	-	2.00m
Date Excavated : 08/05/2014	Level : -	Depth : 1.00m; 0.70m

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20			TOPSOIL: Grass onto grey brown silty CLAY with many roots and rootlets.
			1.00			Dense orange brown and grey slightly clayey GRAVEL and COBBLES with frequent boulders of tabular and angular limestone (Weathered Bedrock).
						Trial Pit Complete at 1.00 m

Remarks:
- Excavation terminated at 1.3m depth on strong limestone bedrock.
- Soakaway test undertaken.

Groundwater : Pit Dry.

Stability : Sides Stable.

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

Intégral Géotechnique
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mail@integralgeotec.com

Project Name :	Project No.:	Trial Pit No.:
Land Adjacent to Llantwit Major By-Pass	**11344**	**TP4** Sheet 1 of 1

Location :	Client :	Logged By :	Scale :
Boverton, Llantwit Major	Barratt Homes South Wales	JJ	1:25

Equipment :	Coordinates :	Dimensions
JCB 3CX	-	2.00m
Date Excavated : 08/05/2014	Level : -	Depth : 0.70m; 0.80m

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						TOPSOIL: Grass onto grey brown silty CLAY with many roots and rootlets.
			0.20			Dense orange brown and grey slightly clayey GRAVEL and COBBLES with frequent boulders of tabular and angular limestone (Weathered Bedrock).
			0.70			Trial Pit Complete at 0.70 m

Remarks:
- Excavation terminated at 0.7m depth on strong limestone bedrock.

Groundwater : Pit Dry.

Stability : Sides Stable.

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

Intégral Géotechnique
Intégral House, 7 Beddau Way
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Caerphilly CF83 2AX
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mail@integralgeotec.com

Project Name :	Project No.:	Trial Pit No.:
Land Adjacent to Llantwit Major By-Pass	**11344**	**TP5** Sheet 1 of 1

Location :	Client :	Logged By :	Scale :
Boverton, Llantwit Major	Barratt Homes South Wales	JJ	1:25

Equipment :	Coordinates :	Dimensions
JCB 3CX	-	2.00m
Date Excavated : 08/05/2014	Level : -	Depth : 1.00m; 0.80m

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					TOPSOIL: Grass onto grey brown silty CLAY with many roots and rootlets.
			0.20			Dense orange brown and grey slightly clayey GRAVEL and COBBLES with frequent boulders of tabular and angular limestone (Weathered Bedrock).
			0.70			Trial Pit Complete at 1.00 m

Remarks:
- Excavation terminated at 0.7m depth on strong limestone bedrock.

Groundwater : Pit Dry.

Stability : Sides Stable.

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

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Project Name :	Project No.:	Trial Pit No.:
Land Adjacent to Llantwit Major By-Pass	**11344**	**TP6** Sheet 1 of 1

Location :	Client :	Logged By :	Scale :
Boverton, Llantwit Major	Barratt Homes South Wales	JJ	1:25

Equipment :	Coordinates :	Dimensions
JCB 3CX	-	2.00m
Date Excavated : 08/05/2014	Level : -	Depth : 0.80m

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20			TOPSOIL: Grass onto grey brown silty CLAY with many roots and rootlets.
			0.80			Dense orange brown and grey slightly clayey GRAVEL and COBBLES with frequent boulders of tabular and angular limestone (Weathered Bedrock).
						Trial Pit Complete at 0.80 m

Remarks:
- Excavation terminated at 0.7m depth on strong limestone bedrock.
- Soakaway test undertaken.

Groundwater : Pit Dry.

Stability : Sides Stable.

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

Intégral Géotechnique
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Project Name : **Land Adjacent to Llantwit Major By-Pass**

Project No.: **11344**

Trial Pit No.: **TP7**
Sheet 1 of 1

Location : Boverton, Llantwit Major

Client : Barratt Homes South Wales

Logged By : JJ

Scale : 1:25

Equipment : JCB 3CX

Coordinates : -

Dimensions
Depth : 1.10m
2.00m
0.80m

Date Excavated : 08/05/2014

Level : -

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.20	ES		0.30			TOPSOIL: Grass onto grey brown silty CLAY with many roots and rootlets.
0.60	D		1.10			Dense orange brown and grey slightly clayey GRAVEL and COBBLES with frequent boulders of tabular and angular limestone (Weathered Bedrock).
						Trial Pit Complete at 1.10 m

Remarks:
- Excavation terminated at 1.1m depth on strong limestone bedrock.

Groundwater : Pit Dry.

Stability : Sides Stable.

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

HoleBASE 3.1 (Bld 426,58) Standard Trialpit Log v2 dated 27th Nov 03

Intégral Géotechnique
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Project Name :	Project No.:	Trial Pit No.:
Land Adjacent to Llantwit Major By-Pass	**11344**	**TP8** Sheet 1 of 1

Location :	Client :	Logged By :	Scale :
Boverton, Llantwit Major	Barratt Homes South Wales	JJ	1:25

Equipment :	Coordinates :	Dimensions
JCB 3CX	-	2.00m
Date Excavated : 08/05/2014	Level : -	Depth : 1.10m; 0.80m

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20			TOPSOIL: Grass onto soft grey brown silty CLAY with many roots and rootlets.
			0.50			Soft to firm orange brown slightly silty CLAY with occasional gravel of fine, medium and coarse angular limestone.
			1.10			Dense orange brown and grey slightly clayey GRAVEL and COBBLES with frequent boulders of angular and tabular limestone (Weathered Bedrock).
						Trial Pit Complete at 1.10 m

0 1 2 3 4 5

Remarks:
- Excavation terminated at 1.1m depth on strong limestone bedrock.

Groundwater : Pit Dry.

Stability : Sides Stable

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

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Project Name :	Project No.:	Trial Pit No.:
Land Adjacent to Llantwit Major By-Pass	**11344**	**TP9** Sheet 1 of 1

Location :	Client :	Logged By :	Scale :
Boverton, Llantwit Major	Barratt Homes South Wales	JJ	1:25

Equipment :	Coordinates :	Dimensions
JCB 3CX	-	Depth : 0.80m (0.80m / 2.00m)
Date Excavated : 08/05/2014	Level : -	

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.20	ES		0.30			TOPSOIL: Grass onto grey brown silty CLAY with many roots and rootlets.
0.50	D		0.80			Dense orange brown and grey slightly clayey GRAVEL and COBBLES with occasional boulders of tabular and angular limestone (Weathered Bedrock).
						Trial Pit Complete at 0.80 m

Remarks:
- Excavation terminated at 0.8m depth on strong limestone bedrock.

Groundwater : Pit Dry.

Stability : Sides Stable.

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

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Project Name :	Project No.:	Trial Pit No.:
Land Adjacent to Llantwit Major By-Pass	**11344**	**TP10** Sheet 1 of 1

Location :	Client :	Logged By :	Scale :
Boverton, Llantwit Major	Barratt Homes South Wales	JJ	1:25

Equipment :	Coordinates :	Dimensions
JCB 3CX	-	2.00m
Date Excavated : 08/05/2014	Level : -	Depth : 1.20m; 0.80m

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						TOPSOIL: Grass onto soft grey brown silty CLAY with many roots and rootlets.
			0.30			Soft to firm orange brown slightly silty CLAY with occasional gravel of fine, medium and coarse angular limestone.
			0.50			Dense orange brown and grey slightly clayey GRAVEL and COBBLES with frequent boulders of angular and tabular limestone (Weathered Bedrock).
			1.20			Trial Pit Complete at 1.20 m

0 1 2 3 4 5

Remarks:
- Excavation terminated at 1.2m depth on strong limestone bedrock.
- Soakaway test undertaken.

Groundwater : Pit Dry.

Stability : Local collapse due to overbreak within limeston bedrock.

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

HoleBASE 3.1 (Bld 426,58) Standard Trialpit Log v2 dated 27th Nov 03

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Project Name : **Land Adjacent to Llantwit Major By-Pass**

Project No.: **11344**

Trial Pit No.: **TP11**
Sheet 1 of 1

Location : Boverton, Llantwit Major

Client : Barratt Homes South Wales

Logged By : JJ

Scale : 1:25

Equipment : JCB 3CX

Coordinates : -

Dimensions: 2.00m

Depth : 0.70m

0.80m

Date Excavated : 08/05/2014

Level : -

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					TOPSOIL: Grass onto grey brown silty CLAY with many roots and rootlets.
			0.30			Dense orange brown and grey slightly clayey GRAVEL and COBBLES with occasional boulders of tabular and angular limestone (Weathered Bedrock).
			0.70			Trial Pit Complete at 0.70 m

Remarks:
- Excavation terminated at 0.7m depth on strong limestone bedrock.

Groundwater : Pit Dry.

Stability : Sides Stable.

Key :
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

HoleBASE 3.1 (Bld 426,58) Standard Trialpit Log v2 dated 27th Nov 03

APPENDIX D

SOIL INFILTRATION TEST RESULTS

Boverton, Llantwit Major

SOAKAWAY TP1 Cycle 1

Date 08-May-14

Engineer JJ **Job Number** 11344

Main Stratigraphic Unit Slightly clayey GRAVEL and COBBLES with frequent boulders
Pit Stable ? Local collapse due to over break.
Weather Conditions Heavy Rain

Time (min.)	Depth (m)
0	0.60
1	0.61
2	0.61
4	0.62
5	0.63
10	0.65
35	0.77
75	0.97
92	1.06
120	1.20

Pit Dimensions

Length (m)	1.9
Width (m)	0.9
Depth (m)	1.3

Effective Storage

Water Depth at Start of Test (m)	0.60	
Water Depth at End of Test (m)	1.20	
Effective Depth (Measured) (m)	0.60	
% Effective Storage Depth	89.55%	
		Depth below GL
Effective Storage Depth (100%) (m)	0.67	
Effective storage depth (75%) (m)	0.5025	1.10 0
Effective storage depth (50%) (m)	0.335	
Effective storage depth (25%) (m)	0.1675	0.7675 0

Time for Soakaway

Time for measured outflow	120	minutes
Time for 100% outflow (see graph or readings?)	140	minutes
Time for 75-25% outflow (see graph)	65	minutes

Volume of infiltrated Water = length x width x effective storage depth

Volume outflowing between measured effective depth	1.026	m^3
Volume outflowing over 100% effective depth	1.146	m^3
Volume outflowing between 75% and 25% effective depth	0.573	m^3

Surface Area

(100% effective Storage)		(75-25% effective storage)		(over measured Depth)	
Length Area (m^2)	2.55	Length Area (m^2)	1.27	Length Area (m^2)	2.28
Width Area (m^2)	1.21	Width Area (m^2)	0.60	Width Area (m^2)	1.08
Base (m^2)	1.71	Base (m^2)	1.71	Base (m^2)	1.71

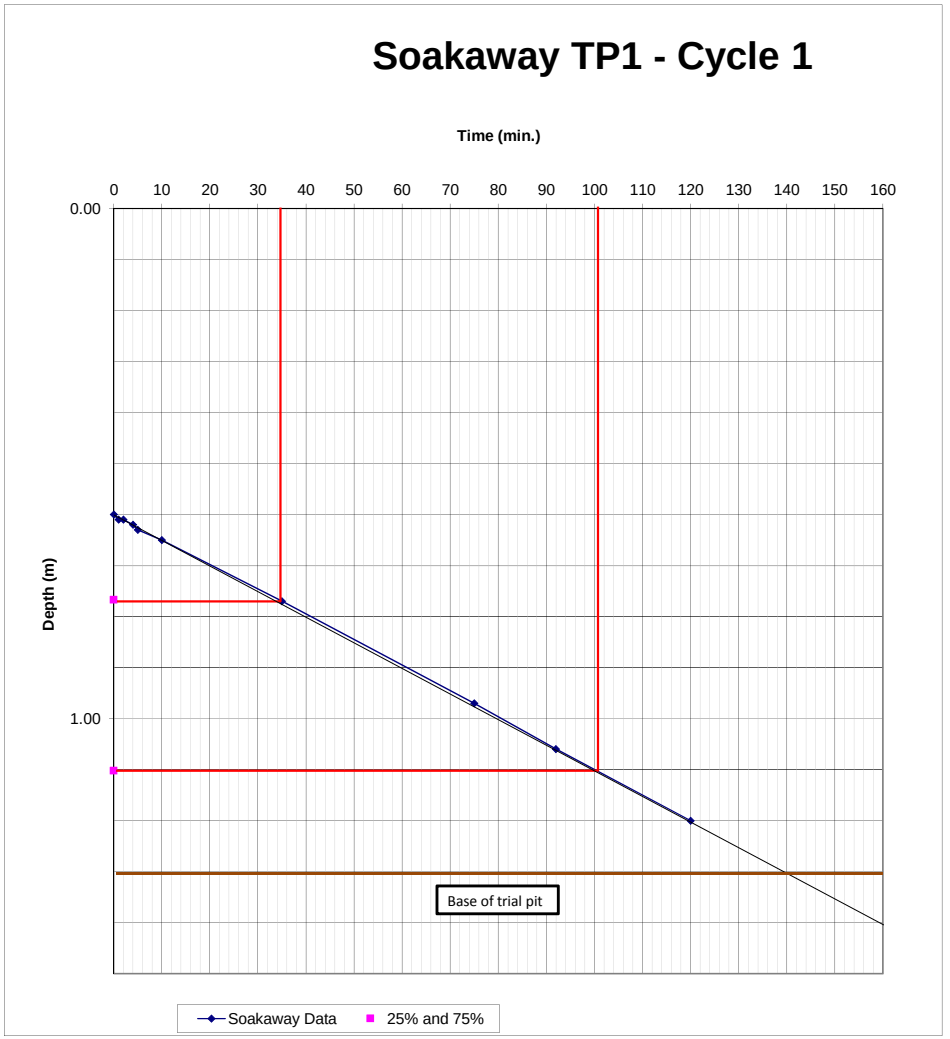
Mean Surface Area through which outflow occurs = (length area x 2) = (width area x 2) + base area

(100% effective storage)	5.46	m^2
(50% effective storage)	3.59	m^2
(Over Measured depth)	5.07	m^2

Soil Infiltration Rate = volume of infiltrated water / (surface area x infiltration time x 60)

Over 100% effective depth:	**2.50E-05**	m/s
Over measured Depth	**2.81E-05**	m/s
Over 75% - 25% effective depth:	**4.10E-05**	m/s

Comments



Boverton, Llantwit Major

SOAKAWAY TP1 Cycle 2

Date 08-May-14

Engineer JJ **Job Number** 11344

Main Stratigraphic Unit Slightly clayey GRAVEL and COBBLES with frequent boulders
Pit Stable ? Local collapse due to over break.
Weather Conditions Heavy Rain

Time (min.)	Depth (m)
0	0.53
1	0.53
2	0.54
5	0.55
13	0.59
41	0.72
85	0.93
113	1.08

Pit Dimensions

Length (m)	1.9
Width (m)	0.9
Depth (m)	1.2

Effective Storage

Water Depth at Start of Test (m)	0.53	
Water Depth at End of Test (m)	1.08	
Effective Depth (Measured) (m)	0.55	
% Effective Storage Depth	84.62%	
		Depth below GL
Effective Storage Depth (100%) (m)	0.65	
Effective storage depth (75%) (m)	0.4875	1.02
Effective storage depth (50%) (m)	0.325	
Effective storage depth (25%) (m)	0.1625	0.6925

0
0

Time for Soakaway

Time for measured outflow	113	minutes
Time for 100% outflow (see graph or readings?)	138	minutes
Time for 75-25% outflow (see graph)	65	minutes

Volume of infiltrated Water = length x width x effective storage depth

Volume outflowing between measured effective depth	0.941 m^3
Volume outflowing over 100% effective depth	1.112 m^3
Volume outflowing between 75% and 25% effective depth	0.556 m^3

Surface Area

(100% effective Storage)		(75-25% effective storage)		(over measured Depth)	
Length Area (m^2)	2.47	Length Area (m^2)	1.24	Length Area (m^2)	2.09
Width Area (m^2)	1.17	Width Area (m^2)	0.59	Width Area (m^2)	0.99
Base (m^2)	1.71	Base (m^2)	1.71	Base (m^2)	1.71

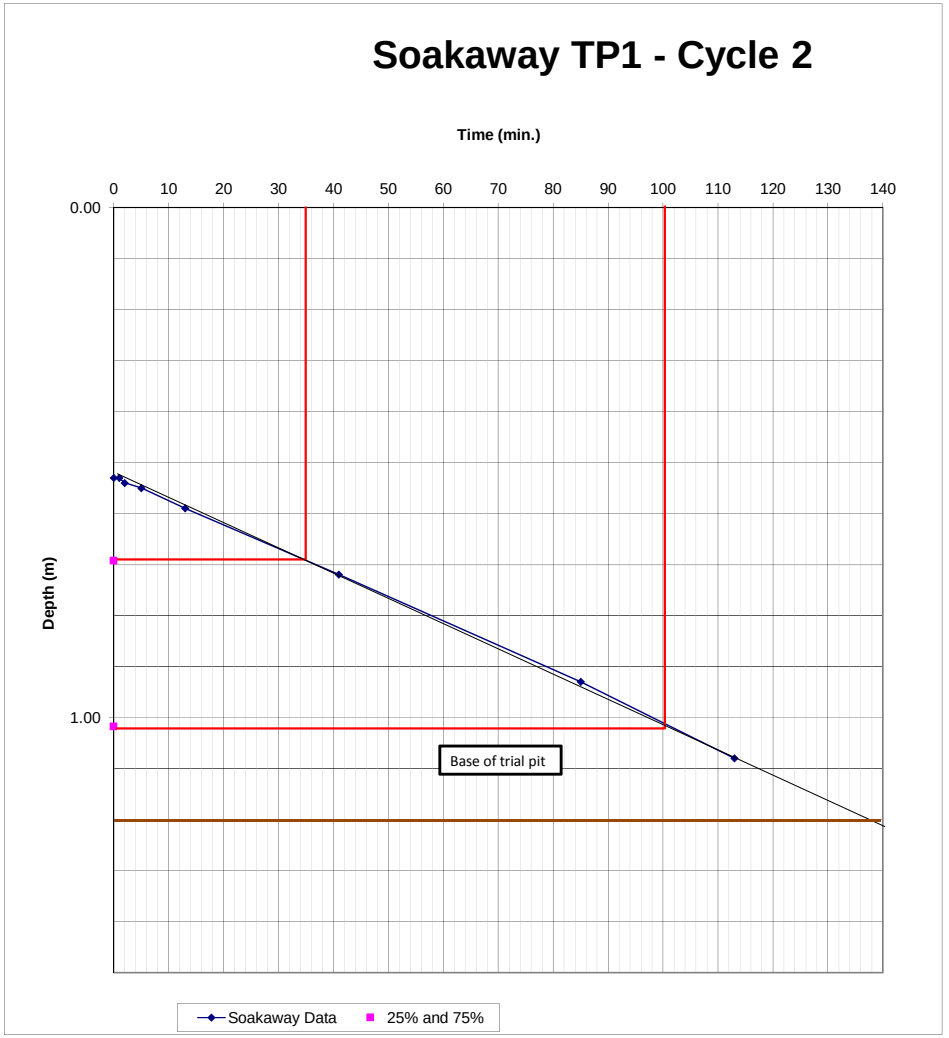
Mean Surface Area through which outflow occurs = (length area x 2) = (width area x 2) + base area

(100% effective storage)	5.35 m^2
(50% effective storage)	3.53 m^2
(Over Measured depth)	4.79 m^2

Soil Infiltration Rate = volume of infiltrated water / (surface area x infiltration time x 60)

Over 100% effective depth:	**2.51E-05** m/s
Over measured Depth	**2.90E-05** m/s
Over 75% - 25% effective depth:	**4.04E-05** m/s

Comments



Boverton, Llantwit Major

SOAKAWAY — TP1 Cycle 3

Date 09-May-14

Engineer JJ **Job Number** 11344

Main Stratigraphic Unit Slightly clayey GRAVEL and COBBLES with frequent boulders
Pit Stable ? Local collapse due to over break.
Weather Conditions Heavy Rain

Time (min.)	Depth (m)
0	0.68
1	0.68
2	0.68
5	0.69
23	0.79
37	0.85
50	0.91

Pit Dimensions

Length (m)	1.9
Width (m)	0.9
Depth (m)	1.2

Effective Storage

Water Depth at Start of Test (m)	0.68	
Water Depth at End of Test (m)	0.91	
Effective Depth (Measured) (m)	0.23	
% Effective Storage Depth	46.00%	
		Depth below GL
Effective Storage Depth (100%) (m)	0.50	
Effective storage depth (75%) (m)	0.375	1.06
Effective storage depth (50%) (m)	0.25	
Effective storage depth (25%) (m)	0.125	0.805

0

0

Time for Soakaway

Time for measured outflow	50	minutes
Time for 100% outflow (see graph or readings?)	108	minutes
Time for 75-25% outflow (see graph)	55	minutes

Volume of infiltrated Water = length x width x effective storage depth

Volume outflowing between measured effective depth	0.393 m^3
Volume outflowing over 100% effective depth	0.855 m^3
Volume outflowing between 75% and 25% effective depth	0.428 m^3

Surface Area

(100% effective Storage)		(75-25% effective storage)		(over measured Depth)	
Length Area (m^2)	1.90	Length Area (m^2)	0.95	Length Area (m^2)	0.87
Width Area (m^2)	0.90	Width Area (m^2)	0.45	Width Area (m^2)	0.41
Base (m^2)	1.71	Base (m^2)	1.71	Base (m^2)	1.71

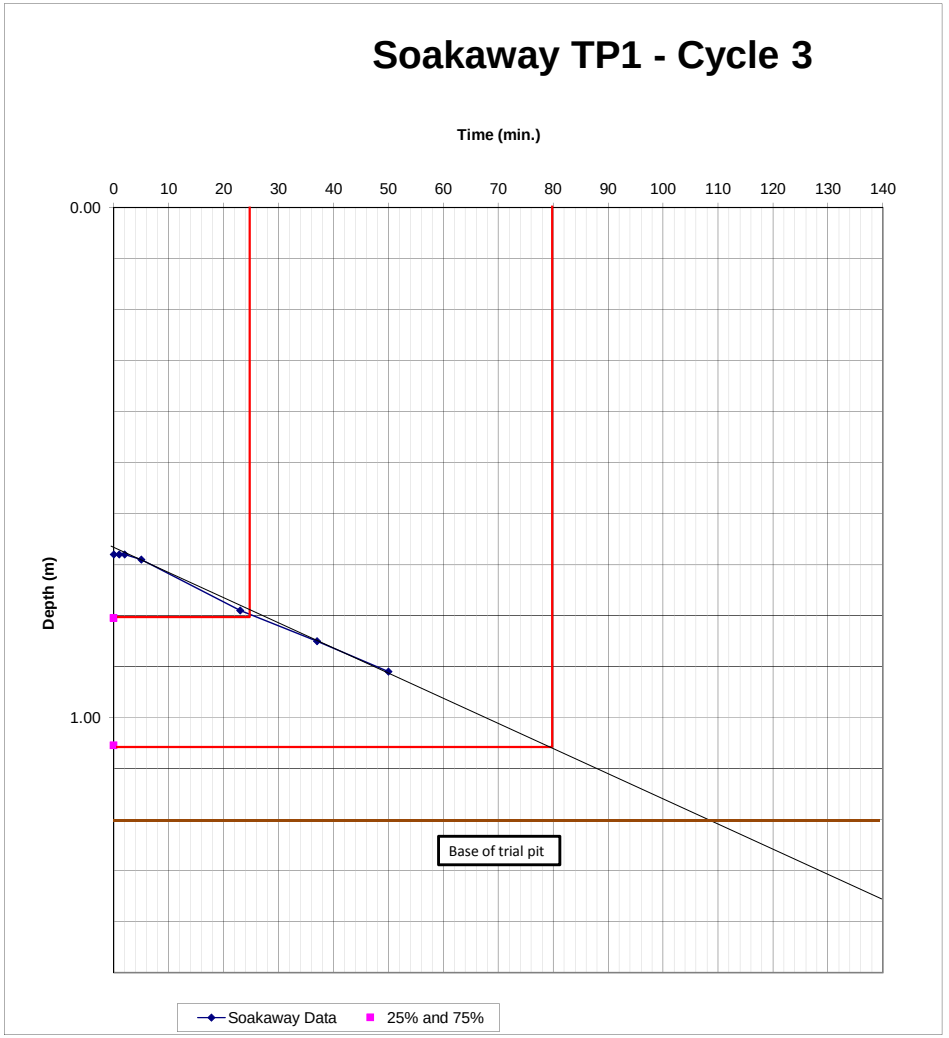
Mean Surface Area through which outflow occurs = (length area x 2) = (width area x 2) + base area

(100% effective storage)	4.51 m^2
(50% effective storage)	3.11 m^2
(Over Measured depth)	3.00 m^2

Soil Infiltration Rate = volume of infiltrated water / (surface area x infiltration time x 60)

Over 100% effective depth:	**2.93E-05** m/s
Over measured Depth	**4.37E-05** m/s
Over 75% - 25% effective depth:	**4.17E-05** m/s

Comments



Boverton, Llantwit Major

SOAKAWAY — TP3 Cycle 1

Date 08-May-14

Engineer JJ **Job Number** 11344

Main Stratigraphic Unit Slightly clayey GRAVEL and COBBLES with frequent boulders
Pit Stable ? Sides Stable
Weather Conditions Heavy Rain

Time (min.)	Depth (m)
0	0.30
5	0.31
10	0.32
28	0.35
55	0.41
90	0.48
111	0.52
151	0.60
190	0.68

Pit Dimensions

Length (m)	1.8
Width (m)	0.7
Depth (m)	0.9

Effective Storage

Water Depth at Start of Test (m)	0.30		
Water Depth at End of Test (m)	0.68		
Effective Depth (Measured) (m)	0.38		
% Effective Storage Depth	63.33%		
		Depth below GL	
Effective Storage Depth (100%) (m)	0.60		
Effective storage depth (75%) (m)	0.45	0.75	0
Effective storage depth (50%) (m)	0.3		
Effective storage depth (25%) (m)	0.15	0.45	0

Time for Soakaway

Time for measured outflow	190	minutes
Time for 100% outflow (see graph or readings?)	300	minutes
Time for 75-25% outflow (see graph)	150	minutes

Volume of infiltrated Water = length x width x effective storage depth

Volume outflowing between measured effective depth	0.479 m^3
Volume outflowing over 100% effective depth	0.756 m^3
Volume outflowing between 75% and 25% effective depth	0.378 m^3

Surface Area

(100% effective Storage)		(75-25% effective storage)		(over measured Depth)	
Length Area (m^2)	2.16	Length Area (m^2)	1.08	Length Area (m^2)	1.37
Width Area (m^2)	0.84	Width Area (m^2)	0.42	Width Area (m^2)	0.53
Base (m^2)	1.26	Base (m^2)	1.26	Base (m^2)	1.26

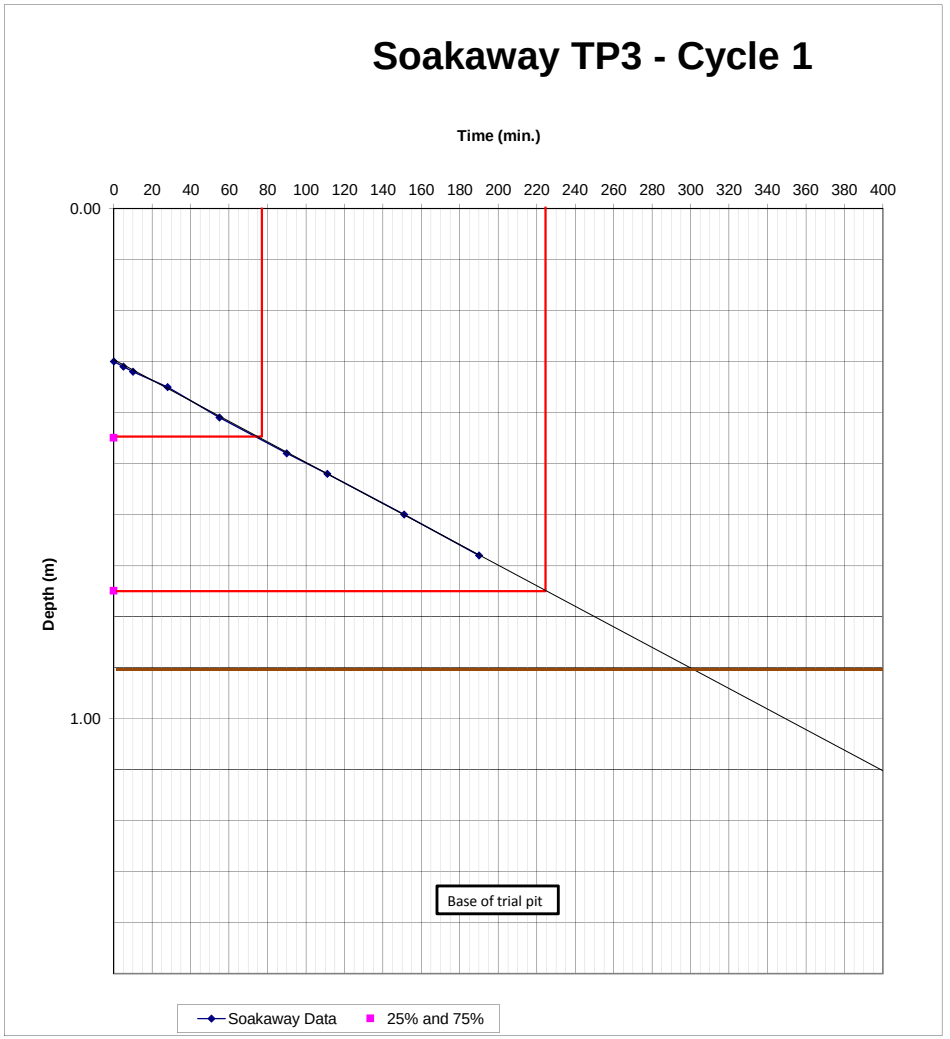
Mean Surface Area through which outflow occurs = (length area x 2) = (width area x 2) + base area

(100% effective storage)	4.26 m^2
(50% effective storage)	2.76 m^2
(Over Measured depth)	3.16 m^2

Soil Infiltration Rate = volume of infiltrated water / (surface area x infiltration time x 60)

Over 100% effective depth:	**9.86E-06** m/s
Over measured Depth	**1.33E-05** m/s
Over 75% - 25% effective depth:	**1.52E-05** m/s

Comments



Boverton, Llantwit Major

SOAKAWAY TP6 Cycle 1

Date 08-May-14

Engineer JJ **Job Number** 11344

Main Stratigraphic Unit Slightly clayey GRAVEL and COBBLES with frequent boulders
Pit Stable ? Sides Stable
Weather Conditions Heavy Rain

Time (min.)	Depth (m)
0	0.41
1	0.41
3	0.42
5	0.42
25	0.50
60	0.60
75	0.63
100	0.70
115	0.73

Pit Dimensions

Length (m)	2.0
Width (m)	0.7
Depth (m)	0.8

Effective Storage

Water Depth at Start of Test (m)	0.41		
Water Depth at End of Test (m)	0.73		
Effective Depth (Measured) (m)	0.32		
% Effective Storage Depth	82.05%		
		Depth below GL	
Effective Storage Depth (100%) (m)	0.39		
Effective storage depth (75%) (m)	0.2925	0.70	0
Effective storage depth (50%) (m)	0.195		
Effective storage depth (25%) (m)	0.0975	0.5075	0

Time for Soakaway

Time for measured outflow	115	minutes
Time for 100% outflow (see graph or readings?)	140	minutes
Time for 75-25% outflow (see graph)	75	minutes

Volume of infiltrated Water = length x width x effective storage depth

Volume outflowing between measured effective depth	0.448	m^3
Volume outflowing over 100% effective depth	0.546	m^3
Volume outflowing between 75% and 25% effective depth	0.273	m^3

Surface Area

(100% effective Storage)		(75-25% effective storage)		(over measured Depth)	
Length Area (m^2)	1.56	Length Area (m^2)	0.78	Length Area (m^2)	1.28
Width Area (m^2)	0.55	Width Area (m^2)	0.27	Width Area (m^2)	0.45
Base (m^2)	1.40	Base (m^2)	1.40	Base (m^2)	1.40

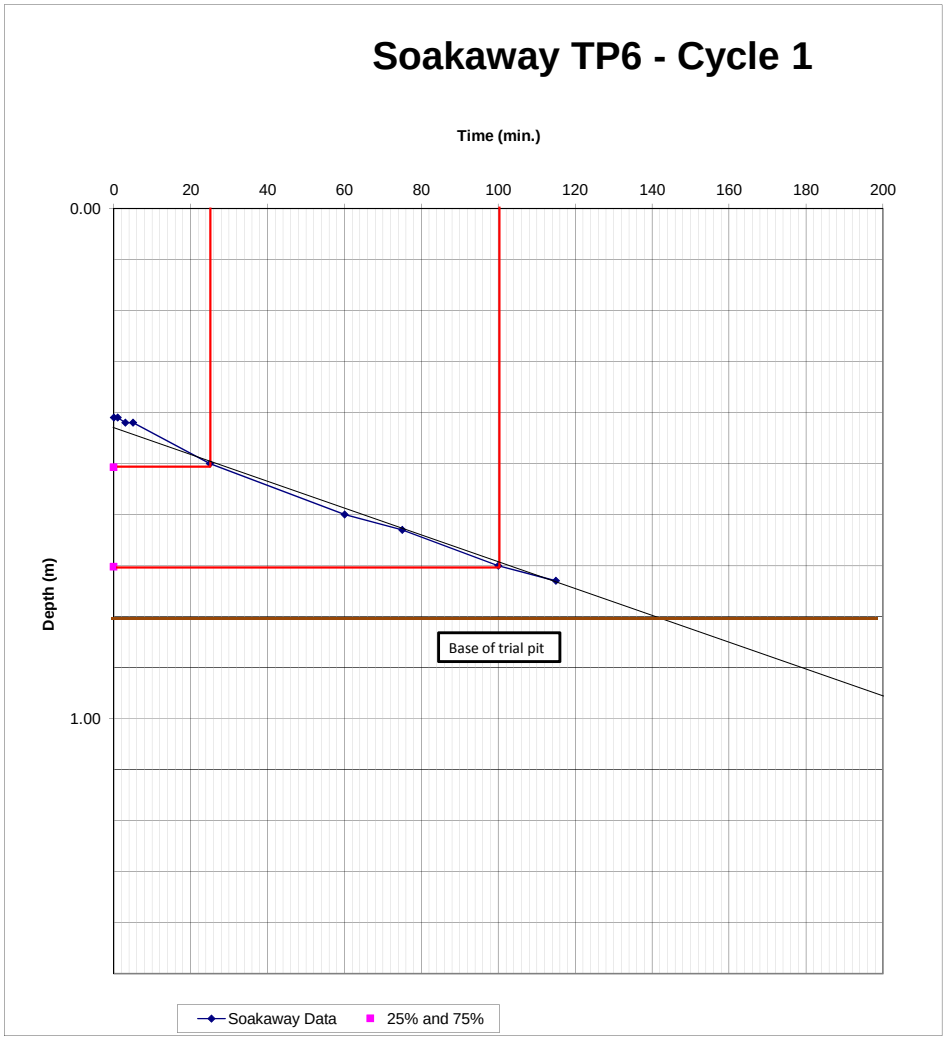
Mean Surface Area through which outflow occurs = (length area x 2) = (width area x 2) + base area

(100% effective storage)	3.51	m^2
(50% effective storage)	2.45	m^2
(Over Measured depth)	3.13	m^2

Soil Infiltration Rate = volume of infiltrated water / (surface area x infiltration time x 60)

Over 100% effective depth:	**1.85E-05**	m/s
Over measured Depth	**2.08E-05**	m/s
Over 75% - 25% effective depth:	**2.47E-05**	m/s

Comments



Boverton, Llantwit Major

SOAKAWAY TP6 Cycle 2

Date 08-May-14

Engineer JJ **Job Number** 11344

Main Stratigraphic Unit Slightly clayey GRAVEL and COBBLES with frequent boulders
Pit Stable ? Sides Stable
Weather Conditions Heavy Rain

Time (min.)	Depth (m)
0	0.36
1	0.36
2	0.37
3	0.37
5	0.37
18	0.41
48	0.49
60	0.53
95	0.61
105	0.65

Pit Dimensions

Length (m)	2.0
Width (m)	0.7
Depth (m)	0.8

Effective Storage

Water Depth at Start of Test (m)	0.41		
Water Depth at End of Test (m)	0.73		
Effective Depth (Measured) (m)	0.32		
% Effective Storage Depth	82.05%		
		Depth below GL	
Effective Storage Depth (100%) (m)	0.39		
Effective storage depth (75%) (m)	0.2925	0.70	0
Effective storage depth (50%) (m)	0.195		
Effective storage depth (25%) (m)	0.0975	0.5075	0

Time for Soakaway

Time for measured outflow	105	minutes
Time for 100% outflow (see graph or readings?)	166	minutes
Time for 75-25% outflow (see graph)	76	minutes

Volume of infiltrated Water = length x width x effective storage depth

Volume outflowing between measured effective depth	0.448	m^3
Volume outflowing over 100% effective depth	0.546	m^3
Volume outflowing between 75% and 25% effective depth	0.273	m^3

Surface Area

(100% effective Storage)		(75-25% effective storage)		(over measured Depth)	
Length Area (m^2)	1.56	Length Area (m^2)	0.78	Length Area (m^2)	1.28
Width Area (m^2)	0.55	Width Area (m^2)	0.27	Width Area (m^2)	0.45
Base (m^2)	1.40	Base (m^2)	1.40	Base (m^2)	1.40

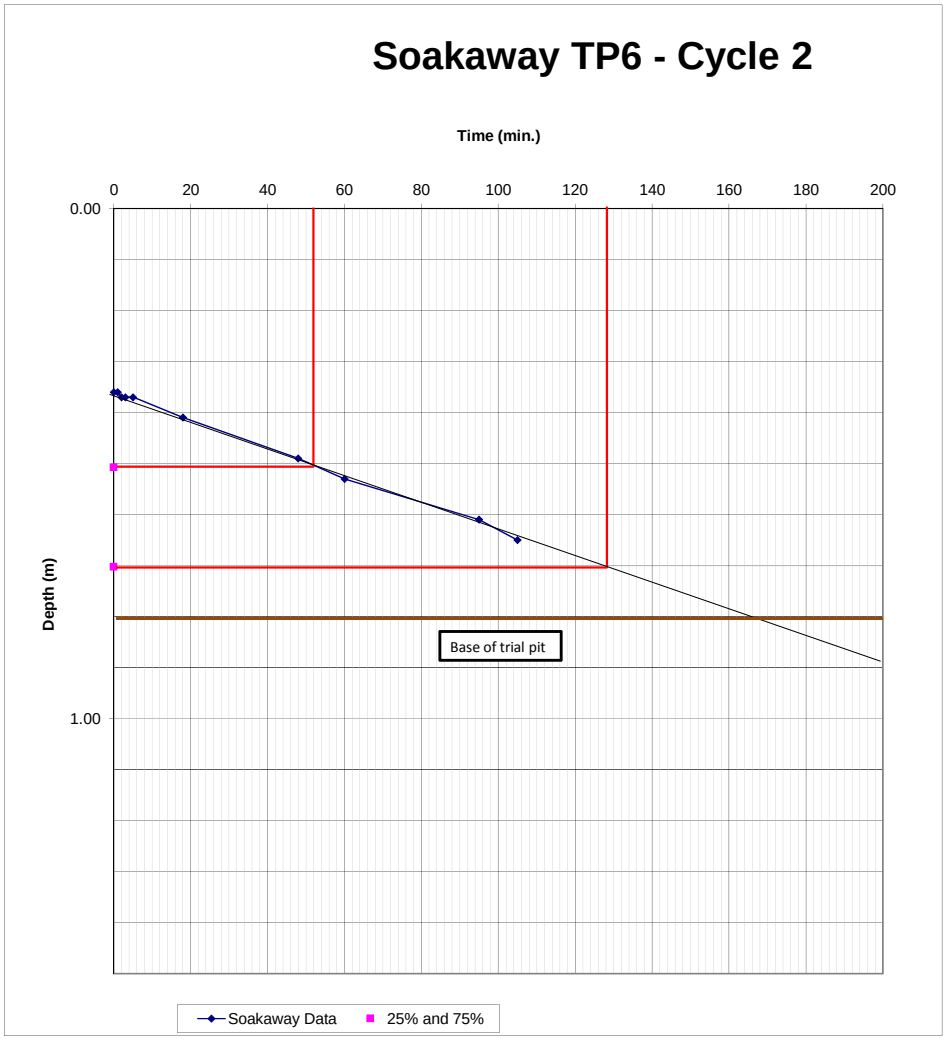
Mean Surface Area through which outflow occurs = (length area x 2) = (width area x 2) + base area

(100% effective storage)	3.51	m^2
(50% effective storage)	2.45	m^2
(Over Measured depth)	3.13	m^2

Soil Infiltration Rate = volume of infiltrated water / (surface area x infiltration time x 60)

Over 100% effective depth:	**1.56E-05**	m/s
Over measured Depth	**2.27E-05**	m/s
Over 75% - 25% effective depth:	**2.44E-05**	m/s

Comments



Boverton, Llantwit Major

SOAKAWAY TP10 Cycle 1

Date 08-May-14

Engineer JJ **Job Number** 11344

Main Stratigraphic Unit Slightly clayey GRAVEL and COBBLES with frequent boulders
Pit Stable ? Local collapse due to over break.
Weather Conditions Heavy Rain

Time (min.)	Depth (m)
0	0.59
2	0.59
5	0.62
34	0.77
64	0.97
83	1.12

Pit Dimensions

Length (m)	1.8
Width (m)	0.8
Depth (m)	1.3

Effective Storage

Water Depth at Start of Test (m)	0.59	
Water Depth at End of Test (m)	1.12	
Effective Depth (Measured) (m)	0.53	
% Effective Storage Depth	74.65%	
		Depth below GL
Effective Storage Depth (100%) (m)	0.71	
Effective storage depth (75%) (m)	0.5325	1.12 0
Effective storage depth (50%) (m)	0.355	
Effective storage depth (25%) (m)	0.1775	0.7675 0

Time for Soakaway

Time for measured outflow	83	minutes
Time for 100% outflow (see graph or readings?)	120	minutes
Time for 75-25% outflow (see graph)	50	minutes

Volume of infiltrated Water = length x width x effective storage depth

Volume outflowing between measured effective depth	0.763	m^3
Volume outflowing over 100% effective depth	1.022	m^3
Volume outflowing between 75% and 25% effective depth	0.511	m^3

Surface Area

(100% effective Storage)		(75-25% effective storage)		(over measured Depth)	
Length Area (m^2)	2.56	Length Area (m^2)	1.28	Length Area (m^2)	1.91
Width Area (m^2)	1.14	Width Area (m^2)	0.57	Width Area (m^2)	0.85
Base (m^2)	1.44	Base (m^2)	1.44	Base (m^2)	1.44

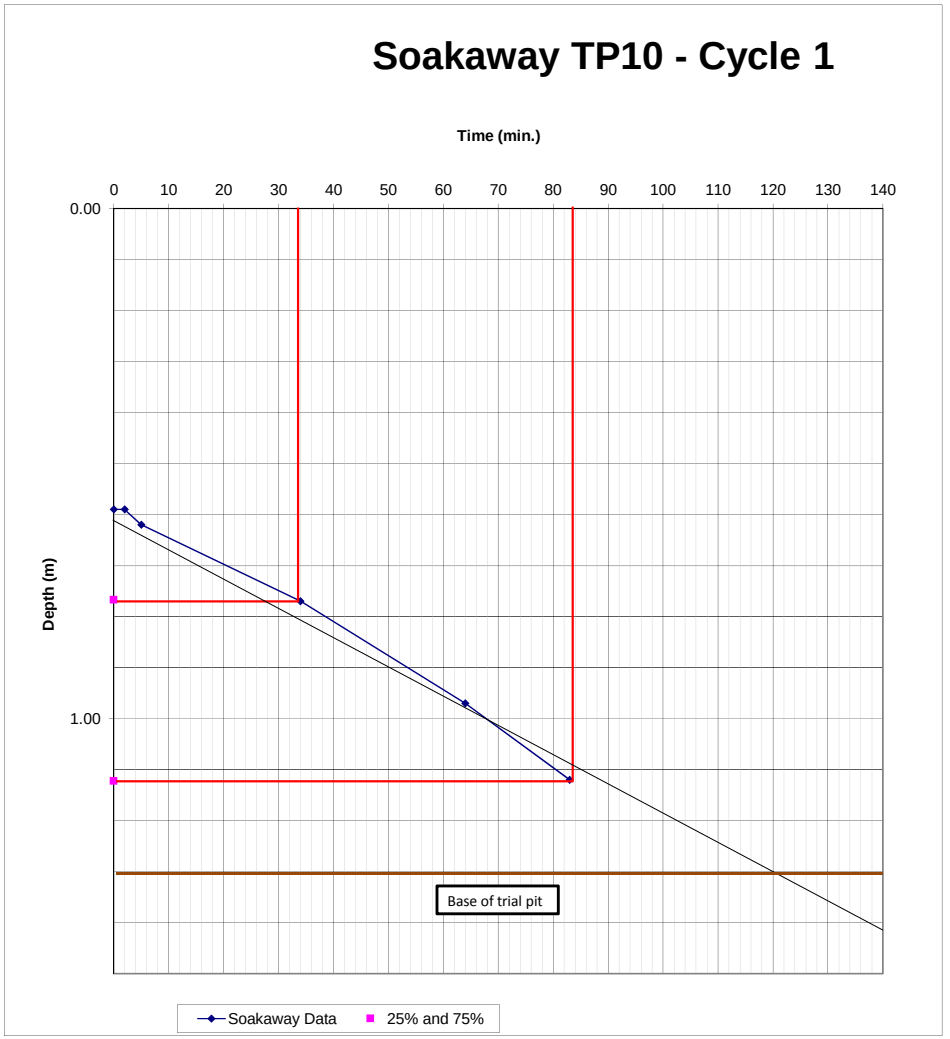
Mean Surface Area through which outflow occurs = (length area x 2) = (width area x 2) + base area

(100% effective storage)	5.13	m^2
(50% effective storage)	3.29	m^2
(Over Measured depth)	4.20	m^2

Soil Infiltration Rate = volume of infiltrated water / (surface area x infiltration time x 60)

Over 100% effective depth:	**2.77E-05**	m/s
Over measured Depth	**3.65E-05**	m/s
Over 75% - 25% effective depth:	**5.19E-05**	m/s

Comments



APPENDIX E

LABORATORY CHEMICAL TEST RESULTS (SOILS)

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Analytical Report Number : 14-54371

Project / Site name:	Boverton, Llantwit Major	**Samples received on:**	13/05/2014
Your job number:	11344/JJ	**Samples instructed on:**	13/05/2014
Your order number:		**Analysis completed by:**	20/05/2014
Report Issue Number:	1	**Report issued on:**	21/05/2014
Samples Analysed:	5 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: 14-54371

Project / Site name: Boverton, Llantwit Major

Lab Sample Number				338066	338067	338068	338069	338070
Sample Reference				TP2	TP5	TP7	TP9	TP11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.20	0.20	0.10
Date Sampled				08/05/2014	08/05/2014	08/05/2014	08/05/2014	08/05/2014
Time Taken				0930	1100	1200	1300	1400
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	26	24	27	32	22
Total mass of sample received	kg	0.001	NONE	0.45	0.37	0.37	0.39	0.38
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	-
General Inorganics								
pH	pH Units	N/A	MCERTS	7.0	6.5	6.6	5.9	6.3
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO_4	mg/kg	100	ISO 17025	1100	1100	1200	1400	610
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.030	0.031	0.045	0.036	0.030
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	30	31	45	36	30
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.015	0.015	0.022	0.018	0.015
Sulphide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphur	mg/kg	100	NONE	390	400	480	490	260
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.5	2.3	2.1	3.9	2.0
Loss on Ignition @ 450°C	%	0.2	MCERTS	13	10	9.6	12	7.4
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	0.1	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	0.1	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenanthrene	mg/kg	0.1	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	0.1	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Pyrene	mg/kg	0.1	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(a)anthracene	mg/kg	0.1	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	0.1	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	0.1	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Dibenz(a,h)anthracene	mg/kg	0.1	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

Analytical Report Number: 14-54371

Project / Site name: Boverton, Llantwit Major

Lab Sample Number				338066	338067	338068	338069	338070
Sample Reference				TP2	TP5	TP7	TP9	TP11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.20	0.20	0.10
Date Sampled				08/05/2014	08/05/2014	08/05/2014	08/05/2014	08/05/2014
Time Taken				0930	1100	1200	1300	1400
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	11	13	17	8.6
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	1.3	1.2	1.2	1.1
Boron (water soluble)	mg/kg	0.2	MCERTS	1.5	1.8	1.1	1.2	1.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	0.7	0.7	0.6	0.5
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	27	29	28	28	24
Copper (aqua regia extractable)	mg/kg	1	MCERTS	30	33	31	32	27
Lead (aqua regia extractable)	mg/kg	2	MCERTS	43	29	36	61	22
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	25	26	23	22	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	34	36	36	36	30
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	69	67	78	92	56

Analytical Report Number : 14-54371

Project / Site name: Boverton, Llantwit Major

* 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 *
338066	TP2	None Supplied	0.10	Brown topsoil and clay with vegetation.
338067	TP5	None Supplied	0.10	Brown topsoil and clay with vegetation.
338068	TP7	None Supplied	0.20	Brown topsoil and clay with vegetation.
338069	TP9	None Supplied	0.20	Brown topsoil and clay with vegetation.
338070	TP11	None Supplied	0.10	Brown topsoil and clay with vegetation.

Analytical Report Number : 14-54371

Project / Site name: Boverton, Llantwit Major

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
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-PL	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
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
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-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.	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
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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	ISO 17025
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	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 F

SUMMARY OF CHEMICAL RESULTS - TOPSOIL

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 11344
Site: Boverton, Llantwit Major
Soil Type: TOPSOIL
Soil Organic Matter: 2.5%

METALS AND SEMI-METALS

No.	Location	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
1	TP2	0.10	14	1.5	1.2	0.6	27	< 4.0	30	43	< 0.3	25	< 1.0	34	69
2	TP5	0.10	11	1.8	1.3	0.7	29	< 4.0	33	29	< 0.3	26	< 1.0	36	67
3	TP7	0.20	13	1.1	1.2	0.7	28	< 4.0	31	36	< 0.3	23	< 1.0	36	78
4	TP9	0.20	17	1.2	1.2	0.6	28	< 4.0	32	61	< 0.3	22	< 1.0	36	92
5	TP11	0.10	8.6	1	1.1	0.5	24	< 4.0	27	22	< 0.3	21	< 1.0	30	56
	Screening Criteria Value		32.0	291.0	51.0	10.0	4.3	4.3	2330.0	450.0	1.0	130.0	350.0	75.0	3750.0
	Source of Screening Criteria Value		SGV	LQM	LQM	SGV	LQM	LQM	LQM	SGV	SGV	SGV	SGV	LQM	LQM

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 11344
Site: Boverton, Llantwit Major
Soil Type: TOPSOIL
Soil Organic Matter: 2.5%

INORGANIC CHEMICALS & OTHERS

No.	Location	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Monohydric phenols (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)
1	TP2	0.10	< 1	13	26	< 2.0	7	0.03	1100	< 1.0	390	2.5
2	TP5	0.10	< 1	10	24	< 2.0	6.5	0.031	1100	< 1.0	400	2.3
3	TP7	0.20	< 1	9.6	27	< 2.0	6.6	0.045	1200	< 1.0	480	2.1
4	TP9	0.20	< 1	12	32	< 2.0	5.9	0.036	1400	< 1.0	490	3.9
5	TP11	0.10	< 1	7.4	22	< 2.0	6.3	0.03	610	< 1.0	260	2
		Screening Criteria Value	**34.0**	**10.0**	**-**	**420.0**	**5.0**	**-**	**-**	**-**	**-**	**6.0**
		Source of Screening Criteria Value	ATRISK	WAC	-	SGV	-	-	-	-	-	WAC

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 11344
Site: Boverton, Llantwit Major
Soil Type: TOPSOIL
Soil Organic Matter: 2.5%

POLYAROMATIC HYDROCARBONS (PAH)

No.	Location	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
1	TP2	0.10	< 0.10	< 0.20	< 0.10	< 0.20	< 0.10	< 0.10	< 0.05	< 0.20	< 0.05	< 0.20	< 0.20	< 0.20	< 0.20	< 0.05	< 0.20	< 0.20
2	TP5	0.10	< 0.10	< 0.20	< 0.10	< 0.20	< 0.10	< 0.10	< 0.05	< 0.20	< 0.05	< 0.20	< 0.20	< 0.20	< 0.20	< 0.05	< 0.20	< 0.20
3	TP7	0.20	< 0.10	< 0.20	< 0.10	< 0.20	< 0.10	< 0.10	< 0.05	< 0.20	< 0.05	< 0.20	< 0.20	< 0.20	< 0.20	< 0.05	< 0.20	< 0.20
4	TP9	0.20	< 0.10	< 0.20	< 0.10	< 0.20	< 0.10	< 0.10	< 0.05	< 0.20	< 0.05	< 0.20	< 0.20	< 0.20	< 0.20	< 0.05	< 0.20	< 0.20
5	TP11	0.10	< 0.10	< 0.20	< 0.10	< 0.20	< 0.10	< 0.10	< 0.05	< 0.20	< 0.05	< 0.20	< 0.20	< 0.20	< 0.20	< 0.05	< 0.20	< 0.20
	Screening Criteria Value		480.0	400.0	4900.0	4.7	0.9	6.5	46.0	9.6	8.0	0.9	460.0	380.0	3.9	3.7	200.0	1000.0
	Source of Screening Criteria Value		LQM	LQM	LQM	LQM	LQM	LQM	LQM	LQM	LQM	LQM	LQM	LQM	LQM	LQM	LQM	LQM

Intégral Géotechnique

FIGURES

NORTH

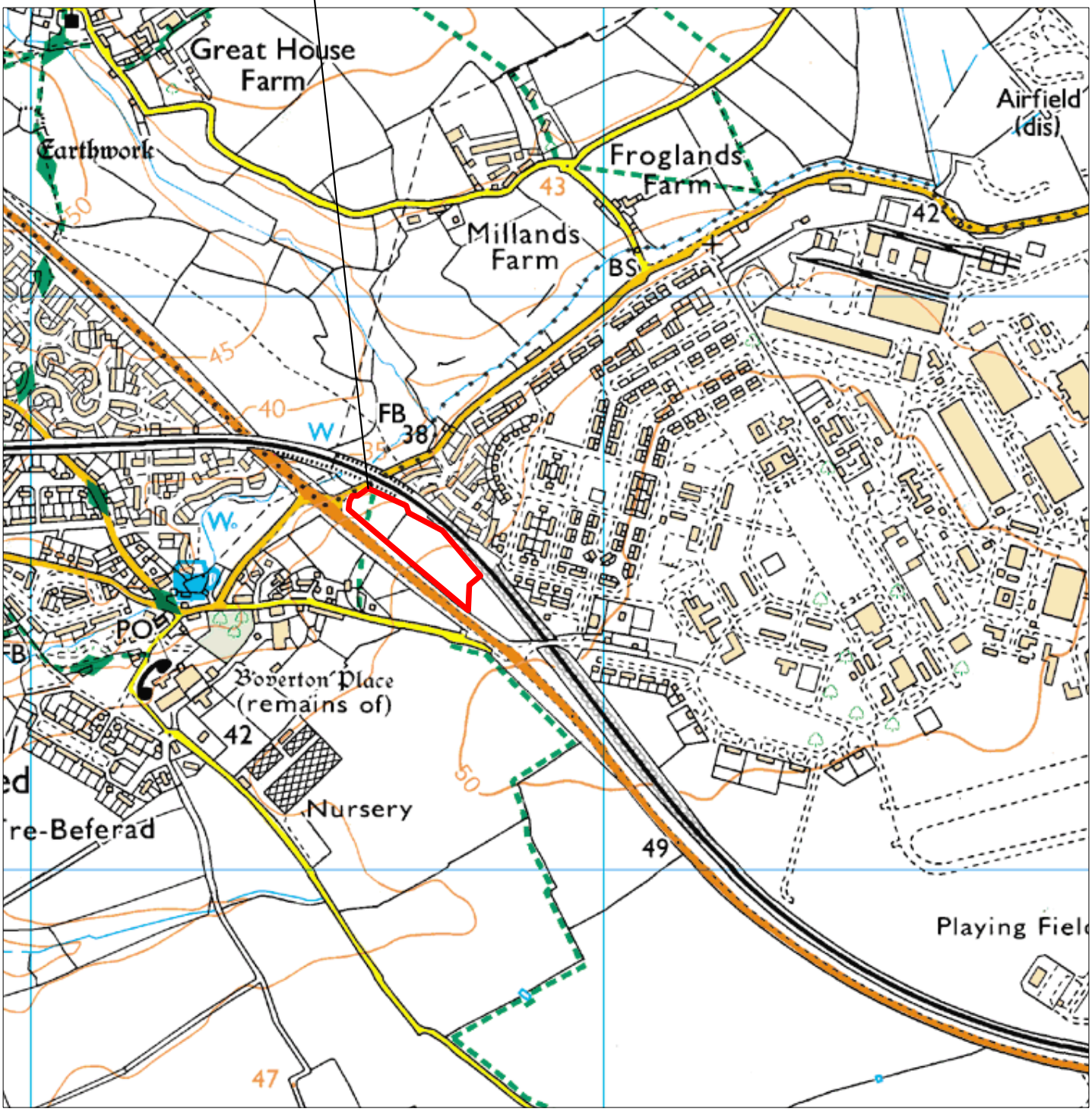
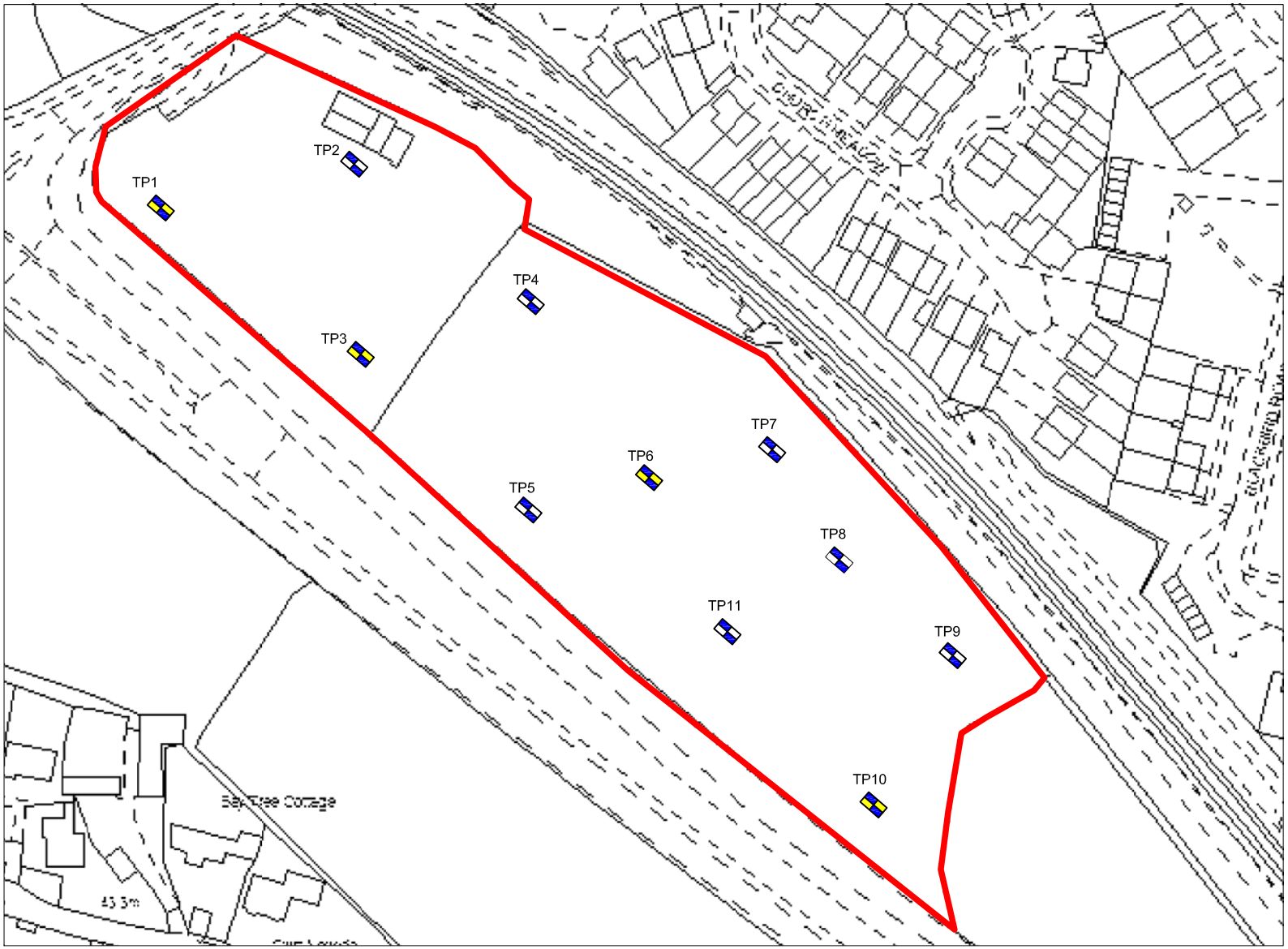


Figure 1: Site Location

Project: Land adjacent to Llantwit Major By-Pass, Boverton	Job no.: 11344	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Barratt Homes South Wales	Scale: 1:10,000 at A4		



NORTH

Legend

Approximate Location of Trial Pit

Approximate Location of Soil Infiltration Test

Figure 2: Site Plan

Project: Land adjacent to Llantwit Major By-Pass, Boverton	Job No.: 11344	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Barratt Homes South Wales	Scale: 1:1,500 at A4		