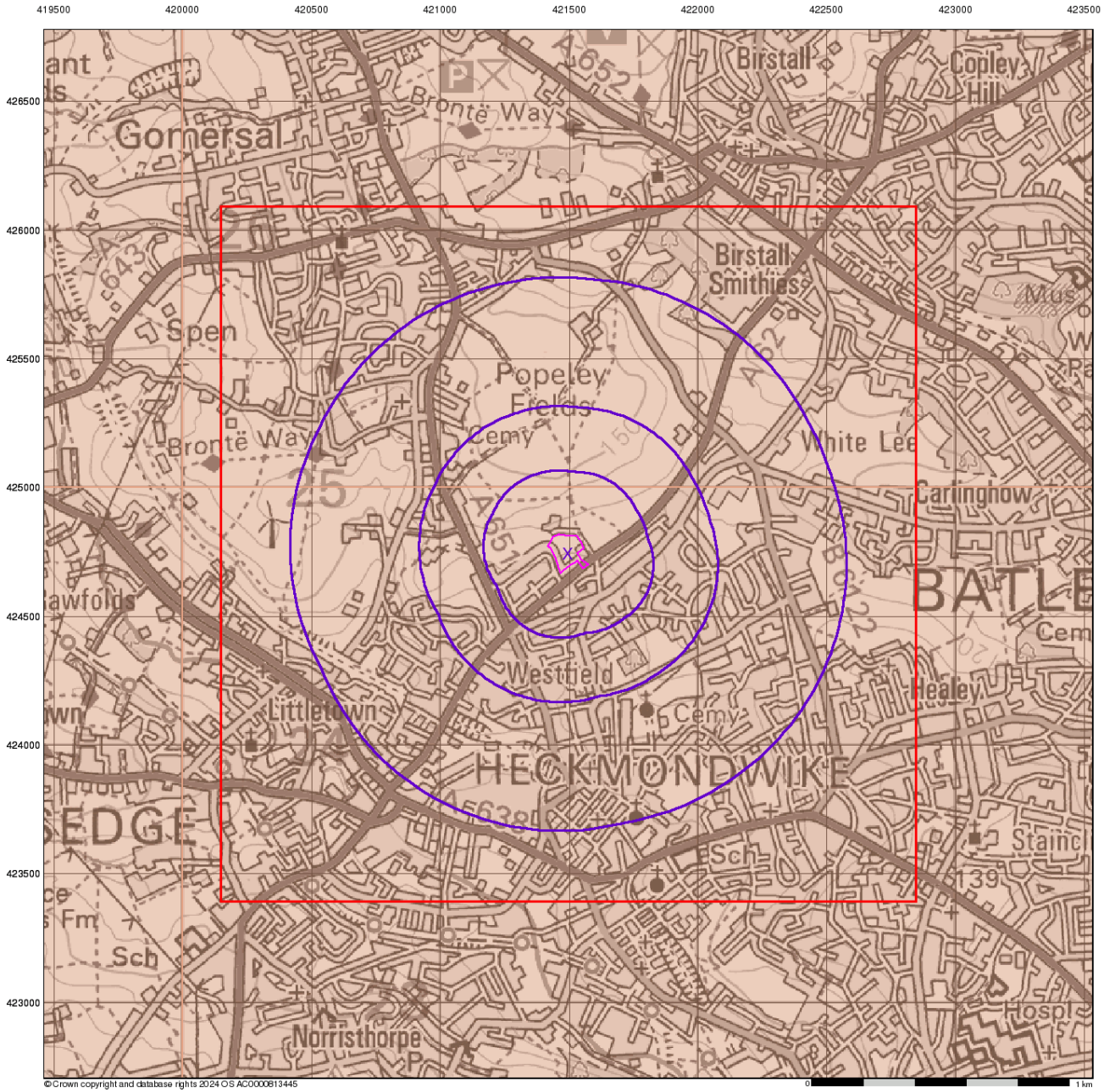


ARP GEOTECHNICAL LTD

Bedrock Aquifer Designation

General

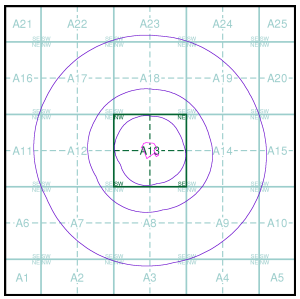
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



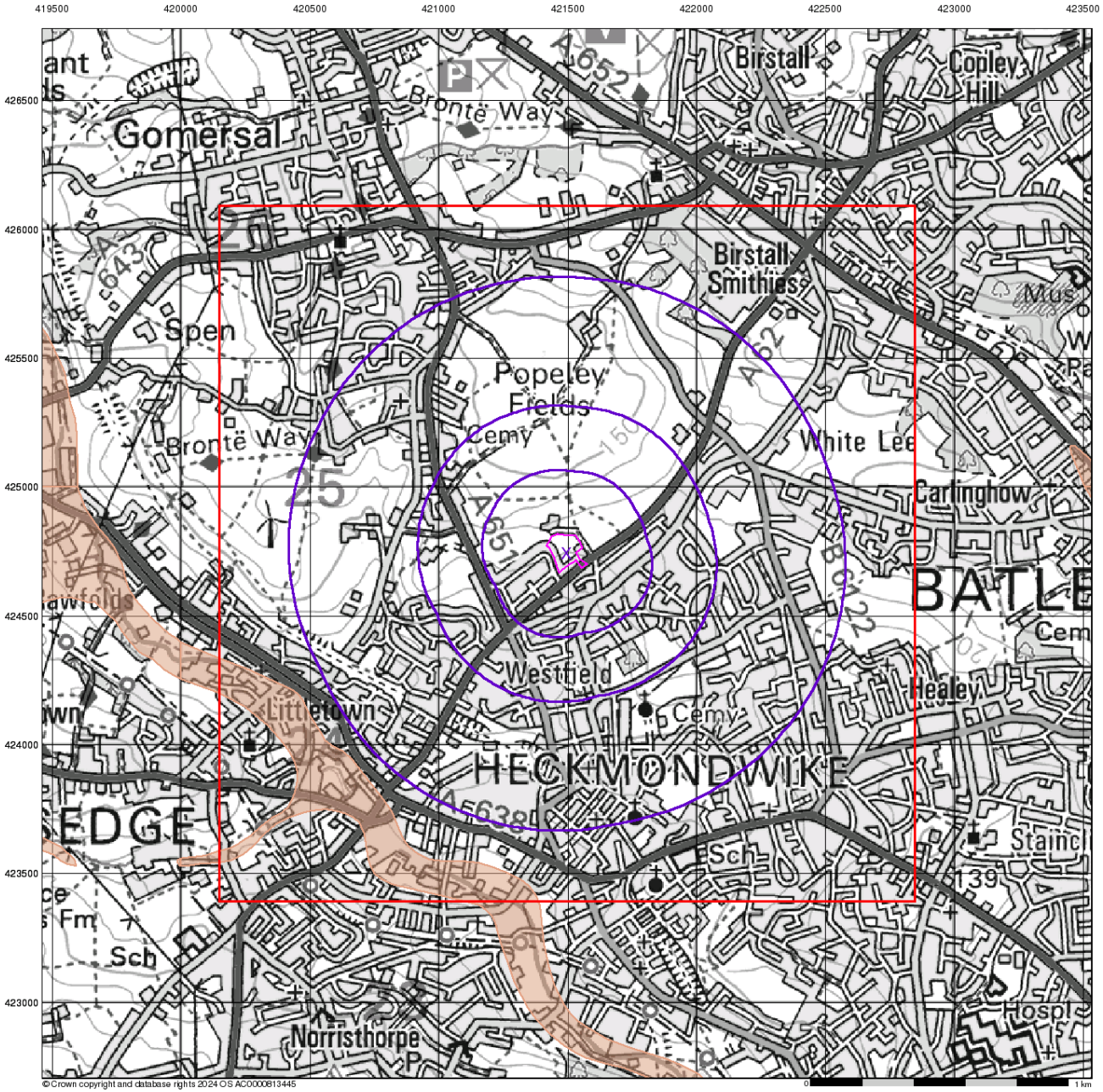
Order Details

Order Number:	360382419_1_1
Customer Ref:	ORH/25
National Grid Reference:	421500, 424740
Slice:	A
Site Area (Ha):	1.33
Search Buffer (m):	1000

Site Details

195, Leeds Road, HECKMONDWIKE, WF16 9DB

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



ARP GEOTECHNICAL LTD

Superficial Aquifer Designation

General

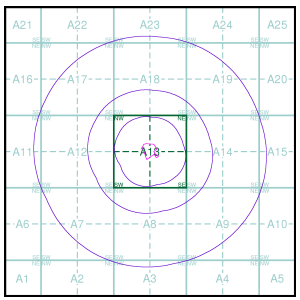
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	360382419_1_1
Customer Ref:	ORH/25
National Grid Reference:	421500, 424740
Slice:	A
Site Area (Ha):	1.33
Search Buffer (m):	1000

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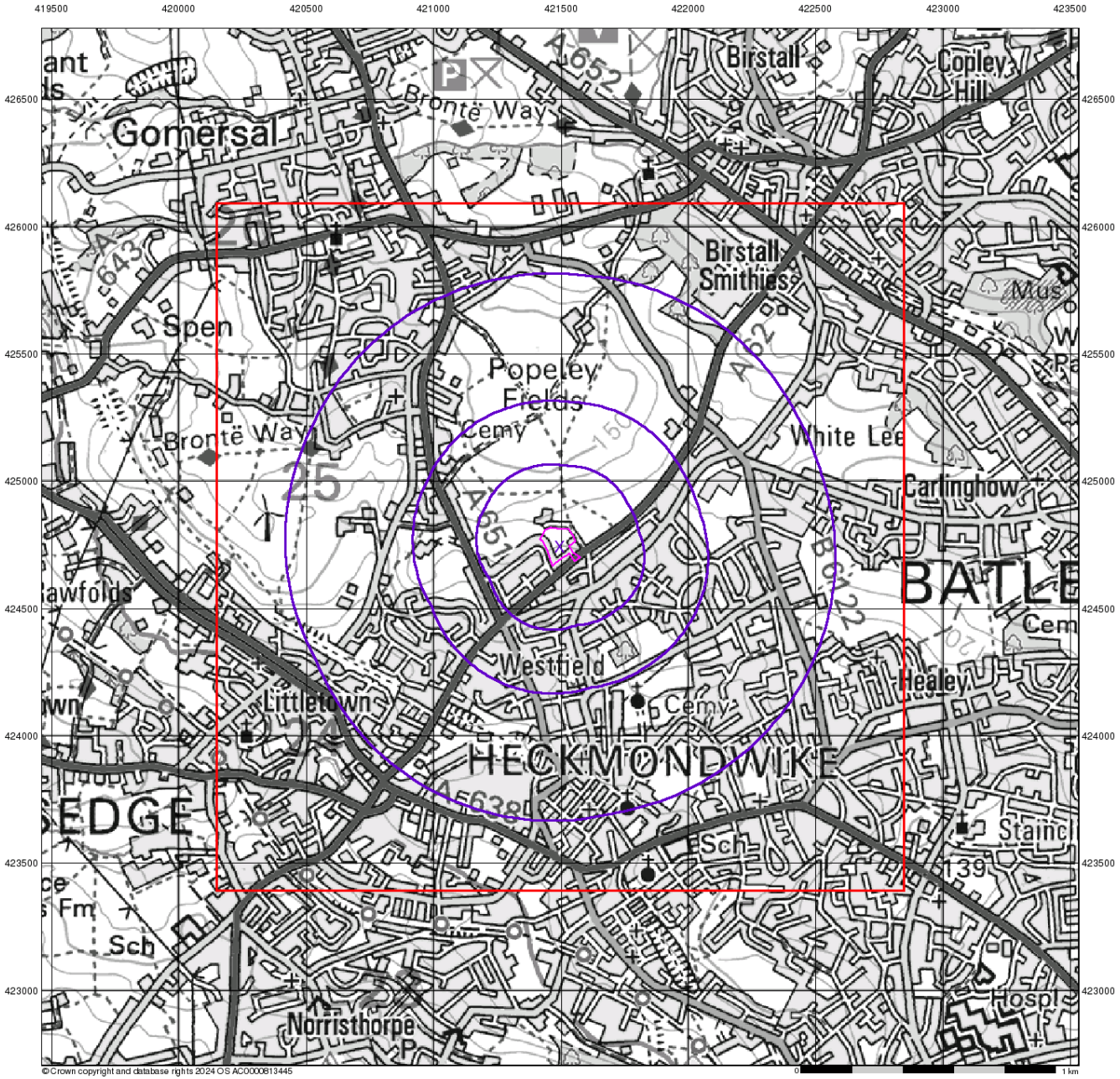


ARP GEOTECHNICAL LTD

Source Protection Zones

General

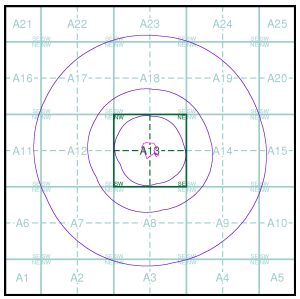
Specified Site | Specified Buffer(s) | Bearing Reference Point

Slice | Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	360382419_1_1
Customer Ref:	ORH/25
National Grid Reference:	421500, 424740
Slice:	A
Site Area (Ha):	1.33
Search Buffer (m):	1000

Site Details

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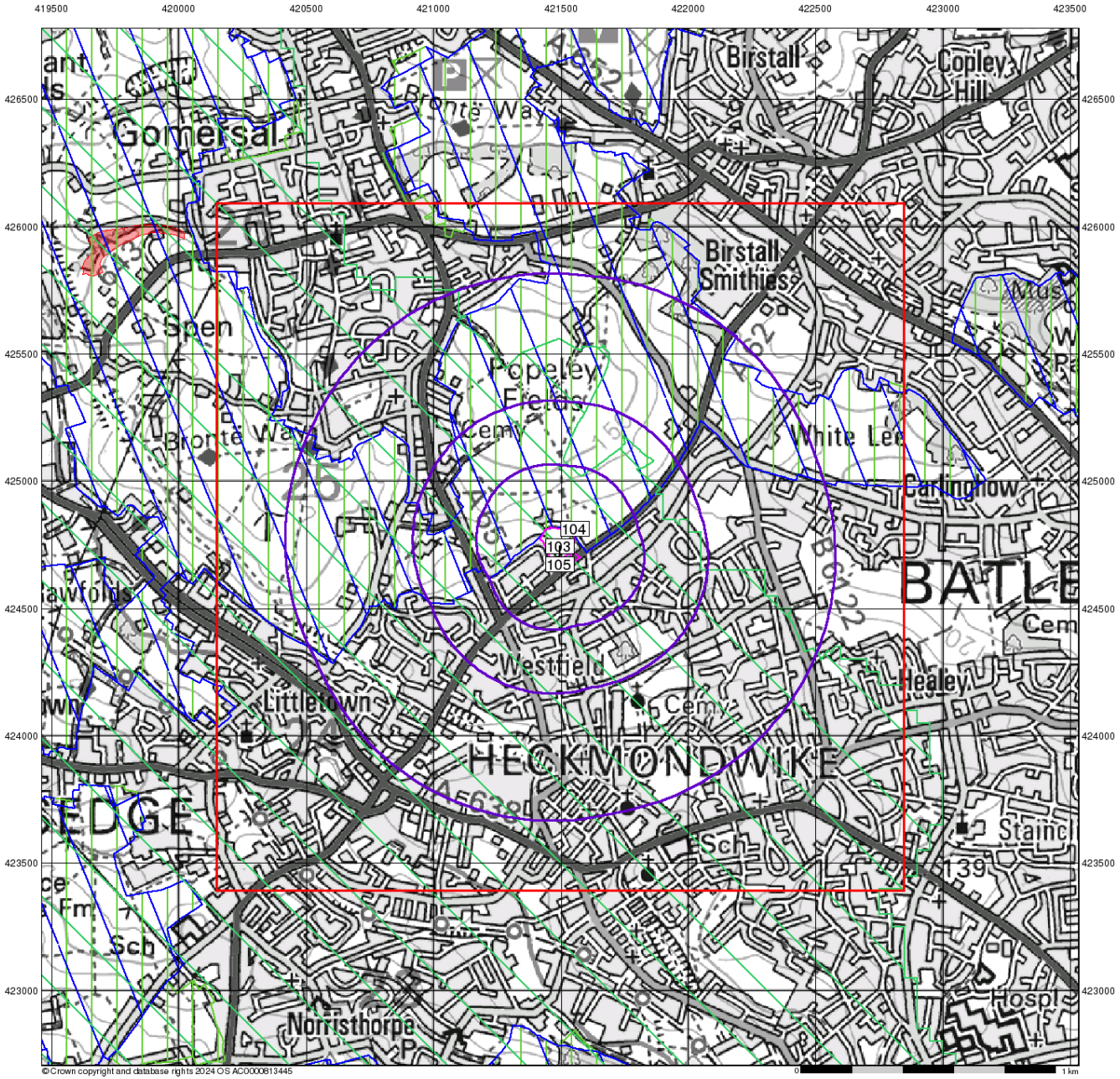


ARP GEOTECHNICAL LTD

Sensitive Land Uses

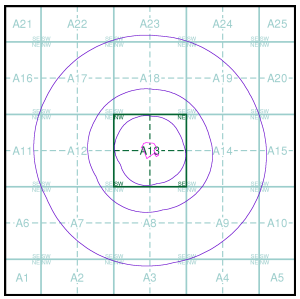
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	360382419_1_1
Customer Ref:	ORH/25
National Grid Reference:	421500, 424740
Slice:	A
Site Area (Ha):	1.33
Search Buffer (m):	1000

Site Details

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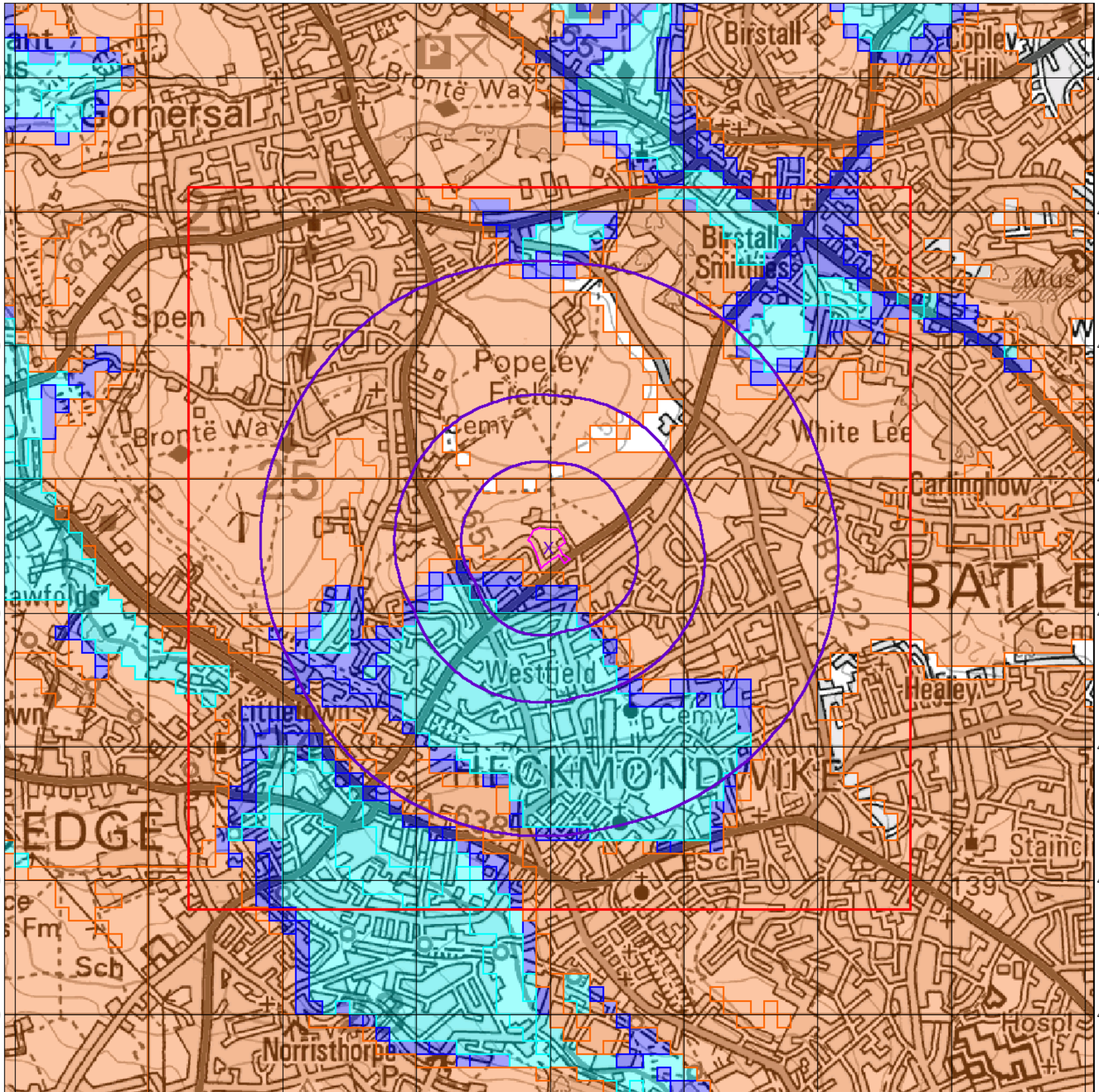


ARP GEOTECHNICAL LTD

BGS Flood GFS Data

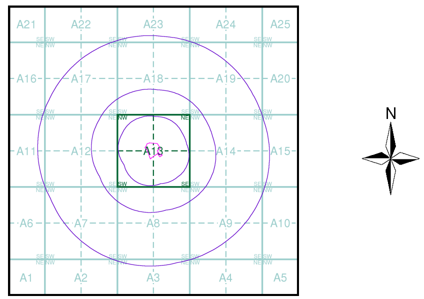
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice

Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	360382419_1_1
Customer Ref:	ORH/25
National Grid Reference:	421500, 424740
Slice:	A
Site Area (Ha):	1.33
Search Buffer (m):	1000

Site Details

195, Leeds Road, HECKMONDWIKE, WF16 9DB

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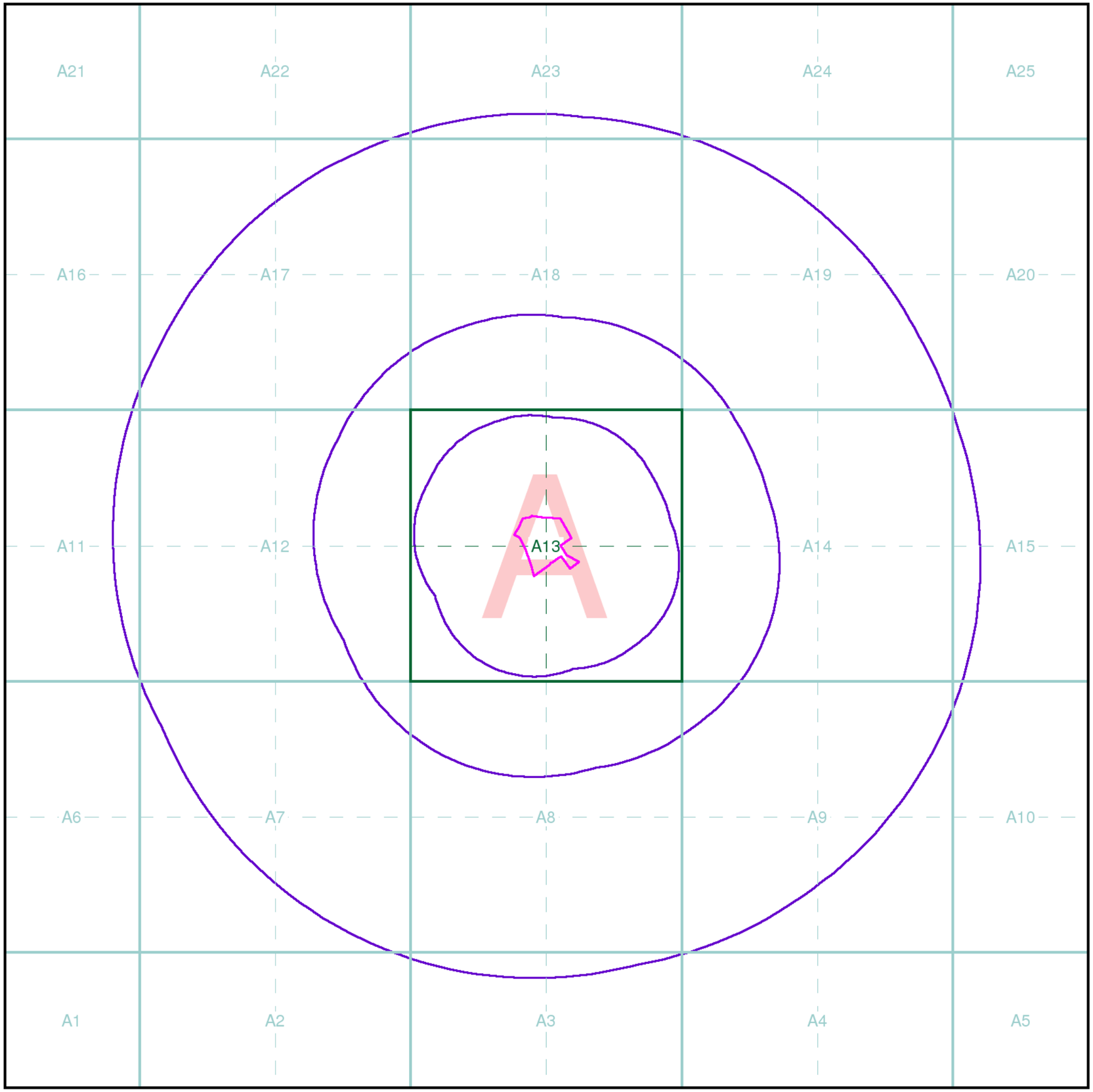

ARP GEOTECHNICAL LTD

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:

Envirocheck reports are compiled from 136 different sources of data.

Client Details

Mr J Race, ARP Geotechnical Ltd, Northwest House, 5-6 Northwest Business Park, Servia Hill, Leeds, LS6 2QH

Order Details

Order Number:	360382419_1_1
Customer Ref:	ORH/25
National Grid Reference:	421490, 424750
Site Area (Ha):	1.33
Search Buffer (m):	1000

Site Details

195, Leeds Road, HECKMONDWIKE, WF16 9DB

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

Landmark INFORMATION GROUP
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Fax: 0844 844 9951
Web: www.envirocheck.co.uk

A P P E N D I X G

RISK CATEGORISATION TABLES

Severity of Consequence

Severe	Short term (acute) risks to human health, likely to result in significant harm. Major pollution of (watercourses or groundwater)
Medium	Long-term (Chronic) damage (significant harm) to human health. Pollution of sensitive water resources.
Mild	Pollution of non-sensitive water resources.
Minor	Non-permanent health effects easily prevented by use of personal protective equipment during site works.

Probability of Risk Event Occurring

High Likelihood	There is a pollutant linkage and an event that either appears very likely in the short term, almost inevitable in the long term, or there is evidence of harm or pollution at the receptor.
Likely	There is a pollution linkage and all the elements are present and in the right place, so that a risk event is possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which a risk event could occur. However, it is not certain that such an event would take place even over a longer period, and even less likely in the short term.
unlikely	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the very long term.

Comparison of Probability Against Severity of Consequence

		Severity of Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	**Very High Risk**	**High Risk**	**Moderate Risk**	**Moderate/ Low Risk**
	Likely	**High Risk**	**Moderate Risk**	**Moderate/ Low Risk**	**Low Risk**
	Low Likelihood	**Moderate Risk**	**Moderate/ Low Risk**	**Low Risk**	**Very Low Risk**
	Unlikely	**Moderate/ Low Risk**	**Low Risk**	**Very Low Risk**	**Very Low Risk**

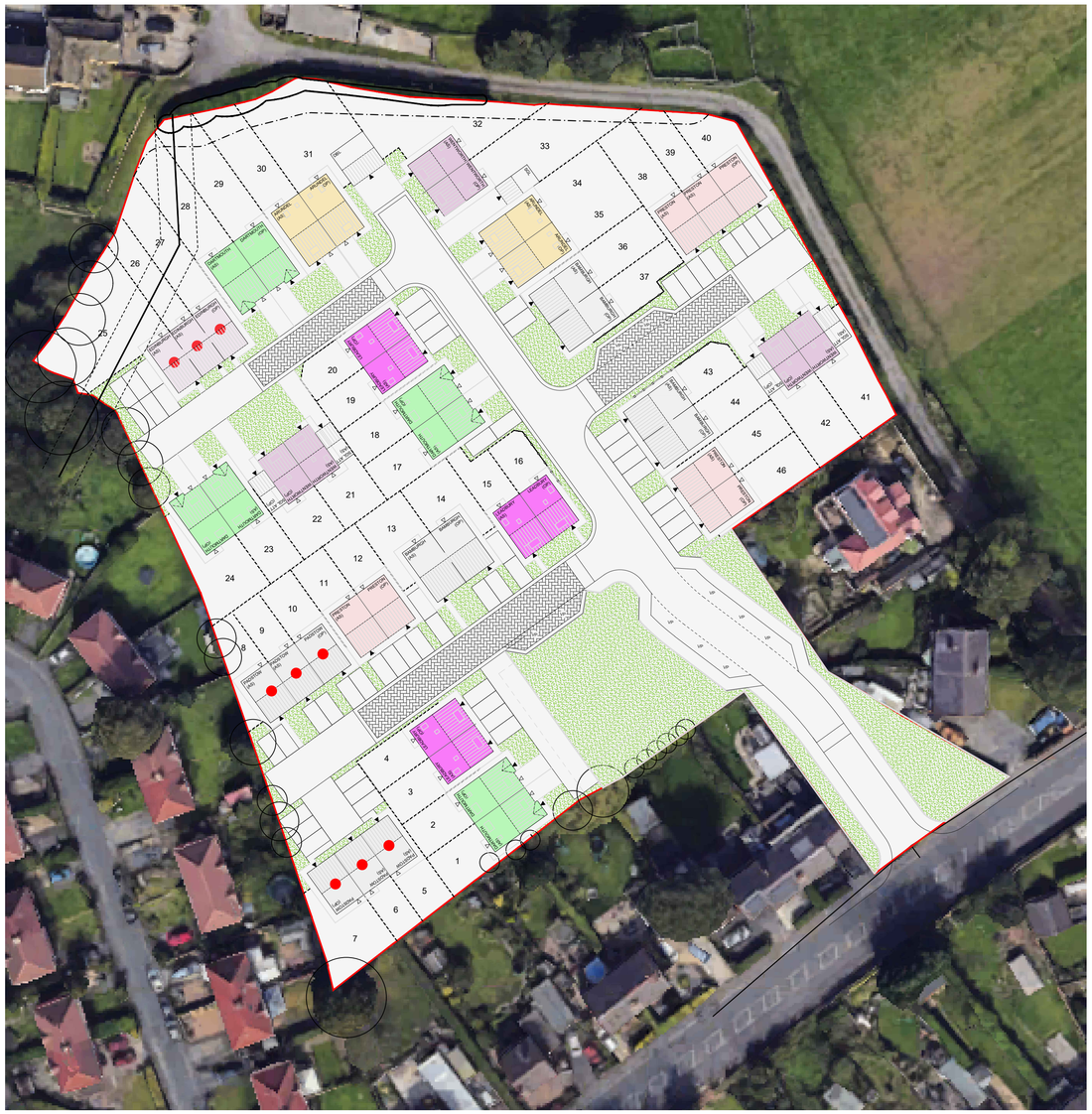
Risk Categories - Definitions

Very High Risk	High probability that severe harm could arise to a receptor, or there is evidence that severe harm is already occurring. Urgent investigation is required and urgent remediation is likely to be required.
High Risk	Harm is likely to arise to a receptor. Urgent investigation is required and remediation may be necessary in the short term and likely over the longer term.
Moderate Risk	Possible that harm could arise to a receptor, but low likelihood that such harm would be severe. Harm is likely to be mild. Investigation normally required to clarify risk. Some remedial works may be required in the long-term.
Moderate/ Low Risk	Possible that harm could arise to a receptor, but where a combination of likelihood and consequence results in a risk that is above low, but is not of sufficient concern to be classified as mild. Limited further investigation may be required to clarify the risk. If necessary, remediation works are likely to be limited in extent.
Low Risk	Possible that harm could arise to a receptor. Such harm, at worst, would normally be mild.
Very Low Risk	Low possibility that harm could arise to a receptor. Such harm is unlikely to be any worse than mild.

A P P E N D I X H

INDICATIVE PROPOSED SITE LAYOUT AND CONCEPTUAL SITE MODEL

Leeds Road, Heckmondwike



Leeds Rd, Heckmonwike
Orion Homes

Housetype	number	Beds	Storeys	sqft	total	% mix
Private sale						
Preston	7	3	2	934	6538	15.22
Bamburgh	6	3	2	1002	6012	13.04
Leadbury	6	3	2.5	1085	6510	13.04
Wentworth	6	4	2.5	1284	7704	13.04
Dartmouth	8	3	2.5	1284	10272	17.39
Arundel	4	4	2.5	1462	5848	8.70
Site total	**37**				**42884**	**80.43**
Affordable housing						
Edinburgh	3	2	2	750	2250	6.52
Padstow	6	3	2	914	5484	13.04
AH total	**9**				**7734**	**19.57**
Site total	**46**				**50618**	**100.00**

Site Area - Gross	3.27 acres	/ 1.325 Hectares
Site Area - Nett	3.01 acres	/ 1.225 Hectares
Density	37.5dph	
coverage	16,816 sqft per acre	

N

Revision notes:

Rev:	Date:	Notes:
A	15.04.19	Amended to suit JL comments - CD
B	22.07.24	Layout and mix amended - CD
C	25.07.24	Mix amended - CD

Revision notes:

Rev:	Date:	Notes:
..	..	..

Revision notes:

Rev:	Date:	Notes:
..	..	..

Date: 15.04.19

Scale @ A1: 1:500

Drawn By: CD

Project: Leeds Road, Heckmondwike

Drawing Number: Site Layout - SK 001

Revision: C

OrionHomes
SO GOOD TO COME HOME TO
Unit 5, Benton Office Park, Bennett Avenue,
Horbury, Wakefield, WF4 5RA, Tel: 01924 831030

SOURCES:

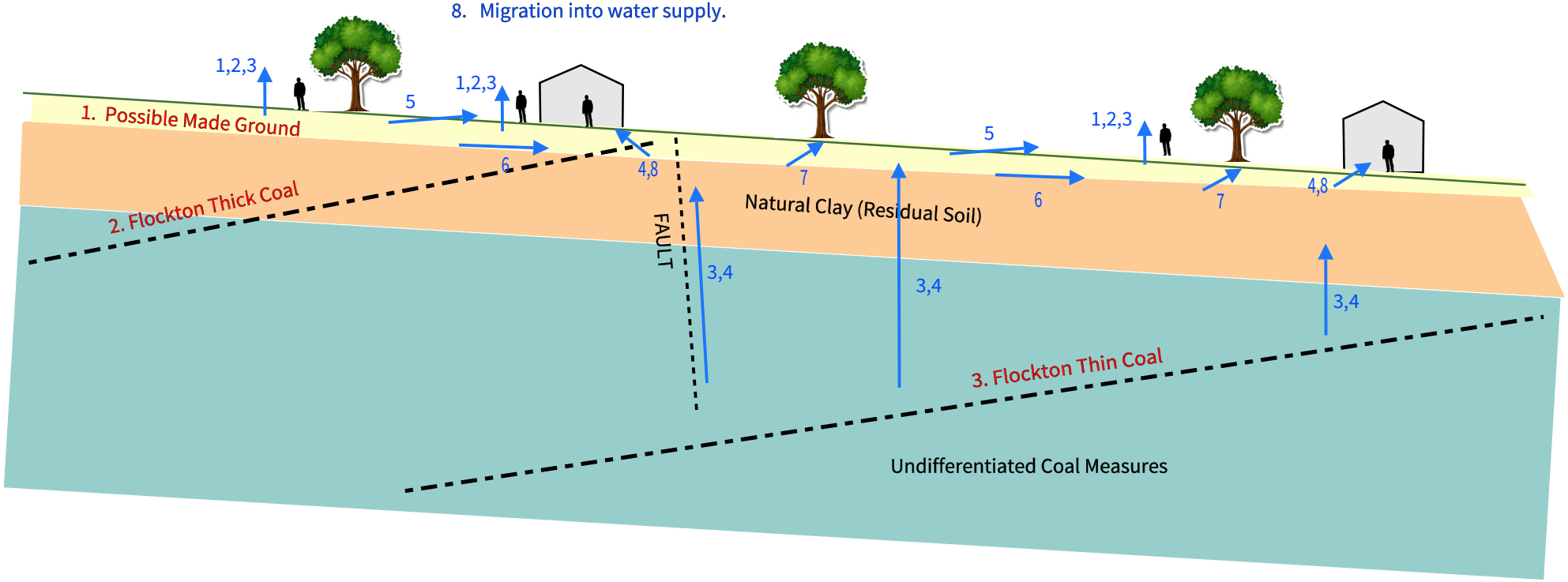
1. Possible localised Made Ground: Metals, Inorganics, TPH, PAH, Asbestos.
2. Probable workings within Flockton Thick Coal beneath northern end of site: CO2, CH4.
3. Recorded shallow workings within Flockton Thin Coal underlying southern end of site

PATHWAYS:

1. Inhalation, ingestion & dermal contact with soil and dust.
2. Fruit & vegetable intake, with soil.
3. Vapour inhalation outdoor.
4. Vapour inhalation indoor.
5. Migration in surface water.
6. Migration in groundwater
7. Root uptake.
8. Migration into water supply.

RECEPTORS:

- Future occupants, maintenance workers and adjacent residents/public.
- Surface Water.
- Groundwater.
- Vegetation.



Title: CONCEPTUAL SITE MODEL - FINISHED DEVELOPMENT	Client: ORION HOMES	ARP GEOTECHNICAL LTD CHARTERED CONSULTING ENGINEERS	Drawn: JR	Scale: NTS
Project: 195 LEEDS ROAD, HECKMONDWIKE	Date: NOVEMBER 2024		Job No.: **ORH/25**	

Northwest House 5-6 Northwest Business Park · Servia Hill · Leeds LS6 2QH
Telephone : 0113 245 8498 Fax : 0113 244 3864 · E-Mail : leeds@arpassociates.co.uk

APPENDIX J

BOREHOLE AND TRIAL PIT LOCATION PLAN AND LOGS

0m 20m

Approximate Scale

- Trial Pit
- Window Sample Borehole
- Window Sample Borehole and Gas Well Installation

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS
Northwest House 5-6 Northwest Business Park Servia Hill · Leeds LS6 2QH
Telephone : 0113 245 8498 Fax : 0113 244 3864 E-Mail : leeds@arpassociates.co.uk

Project
LAND AT 195 LEEDS ROAD HECKMONDWIKE

Client
ORION HOMES LTD

Title
SITE INVESTIGATION PLAN

Date
NOVEMBER 2024

Drawn	Scale
JP	AS SHOWN

Job No.
ORH/25

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Number
Leeds Road, Heckmondwike	WS1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Orion Homes Ltd	ORH/25
	Location	**Dates** 17/10/2024	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					(0.20) 0.20	MADE GROUND: Dark brown gravelly sandy clayey TOPSOIL. Gravel is subangular to subrounded, fine to medium, of sandstone and brick.			
0.20-0.30	ES1				(0.20) 0.40	MADE GROUND: Dark greyish brown gravelly sandy CLAY. Gravel is angular to subrounded, fine to coarse, of brick, coal and sandstone.			
					(0.60) 1.00	Firm to stiff orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone			
1.00-1.45	SPT(C) N=8		1,2/2,2,2,2		(0.20) 1.20	No Recovery. Cone SPT. Medium strength/Loose soil.			
					(0.40) 1.60	Firm medium strength grey mottled orangish brown slightly gravelly silty CLAY. Gravel is subangular, fine to medium, of mudstone.			
2.00-2.45	SPT(C) N=11		1,1/2,2,3,4		(0.70) 2.30	COAL: Recovered as medium dense black slightly clayey sandy GRAVEL.			
					(0.20) 2.50	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.			
2.50-2.73	SPT(C) 25*/60 50/170		25/31,19		(0.23) 2.73	No Recovery. Cone SPT. Very high strength/Very dense soil.			
						Complete at 2.73m			

Remarks
Hole terminated at 2.73m due to hard strata or obstruction.
No groundwater ingress encountered.
Gas monitoring well installed to 2.5m. Bottom 2m; Slotted pipe with gravel surround, Upper 0.5m; Plain pipe with bentonite seal. Lockable flush cover above.

Scale (approx)	Logged By
1:25	JP

Figure No. ORH/25.WS1

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Number
Leeds Road, Heckmondwike	WS2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Orion Homes Ltd	ORH/25
	Location	**Dates** 17/10/2024	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					(0.20) 0.40	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
					(0.60) 1.00	Firm to stiff orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
1.00-1.45	SPT(C) N=12		2,2/2,3,3,4		(0.20) 1.20	No Recovery. Cone SPT. Medium strength/Medium dense soil.		
					(0.70) 1.90	Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of muddstone with rare coal fragments. Cobbles are subangular, of mudstone		
2.00-2.45	SPT(C) N=21		9,9/5,5,5,6		(0.70) 2.60	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
2.60-2.80	SPT(C) 25*/80 50/115		20,5/27,23		(0.12) 2.72	No Recovery. Cone SPT. Very high strength/Very dense soil.		
						Complete at 2.72m		

Remarks
Hole terminated at 2.715m due to hard strata or obstruction.
No groundwater ingress encountered.
Backfilled with arisings upon completion.

Scale (approx)	Logged By
1:25	JP

Figure No. ORH/25.WS2

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Number
Leeds Road, Heckmondwike	WS3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Orion Homes Ltd	ORH/25
	Location	**Dates** 17/10/2024	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					(0.40) 0.60	Firm dark grey mottled orange slightly gravelly slightly sandy silty CLAY. Gravel is subangular to subrounded, fine to medium, of sandstone and coal.		
					(0.20) 0.80	Firm grey gravelly silty CLAY. Gravel is subangular, fine, of coal.		
1.00-1.45	SPT(C) N=26		1,2/5,7,8,6		(0.50) 1.30	Stiff high strength light grey mottled orangish brown gravelly silty CLAY. Gravel is angular to subangular, fine to coarse, of sandstone and coal.		
					(0.50) 1.80	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
1.80-2.04	SPT(C) 25*/80 50/155		19,6/20,25,5		(0.24) 2.04	No Recovery. Cone SPT. Very high strength/Very dense soil.		
						Complete at 2.04m		

Remarks
Hole terminated at 2.035m due to hard strata or obstruction.
No groundwater ingress encountered.
Backfilled with arisings upon completion.

Scale (approx)	Logged By
1:25	JP

Figure No. ORH/25.WS3

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Number
Leeds Road, Heckmondwike	WS4

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Orion Homes Ltd	ORH/25
	Location	**Dates** 17/10/2024	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.20	ES1				(0.30) 0.30	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					(0.20) 0.50	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
1.00-1.45	SPT(C) N=12		2,1/3,2,3,4		(1.20) 1.70	Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
					(0.30) 2.00	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
2.00-2.28	SPT(C) 25*/135 50/145		14,11/22,28		(0.28) 2.28	No Recovery. Cone SPT. Very high strength/Very dense soil.		
						Complete at 2.28m		

Remarks
Hole terminated at 2.28m due to hard strata or obstruction.
No groundwater ingress encountered.
Backfilled with arisings upon completion.

Scale (approx)	Logged By
1:25	JP

Figure No. ORH/25.WS4

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Number
Leeds Road, Heckmondwike	WS5

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Orion Homes Ltd	ORH/25
	Location	**Dates** 17/10/2024	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					(0.30)	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.			
					0.30				
					(0.20)	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.			
					0.50				
1.00-1.45	SPT(C) N=10		3,4/2,3,2,3		(1.00)	Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone			
					1.50				
					(0.50)	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.			
2.00-2.31	SPT(C) 25*/105 48/200		14,11/16,18,14		2.00				
					(0.31)	No Recovery. Cone SPT. Very high strength/Very dense soil.			
					2.31	Complete at 2.31m			

Remarks
Hole terminated at 2.305m due to hard strata or obstruction.
No groundwater ingress encountered.
Gas monitoring well installed to 2.0m. Bottom 1m; Slotted pipe with gravel surround, Upper 1m; Plain pipe with bentonite seal. Lockable flush cover above.

Scale (approx)	Logged By
1:25	JP

Figure No. ORH/25.WS5

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site Leeds Road, Heckmondwike			**Number** WS6
Excavation Method Drive-in Windowless Sampler	**Dimensions**	**Ground Level (mOD)**	**Client** Orion Homes Ltd	**Job Number** ORH/25
	Location	**Dates** 17/10/2024	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					(0.30) 0.30	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.			
					(0.20) 0.50	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.			
1.00-1.45	SPT(C) N=14		4,3/3,4,3,3,4		(1.00) 1.50	Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone			
					(0.50) 2.00	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.			
2.00-2.26	SPT(C) 50/105		12,12/16,34		(0.26) 2.26	No Recovery. Cone SPT. Very high strength/Very dense soil.			
						Complete at 2.26m			

Remarks
Hole terminated at 2.255m due to hard strata or obstruction.
No groundwater ingress encountered.
Gas monitoring well installed to 2.0m. Bottom 1m; Slotted pipe with gravel surround, Upper 1m; Plain pipe with bentonite seal. Lockable flush cover above.

Scale (approx)	Logged By
1:25	JP

Figure No. ORH/25.WS6

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Trial Pit Number
Leeds Road, Heckmondwike	TP01

Machine : JCB 3CX Method :	Dimensions	Ground Level (mOD)	Client Orion Homes Ltd	Job Number ORH/25
	Location	Dates 22/10/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.20	ES1				(0.30)	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					0.30			
					(0.20)	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
					0.50			
0.70	HV 37.33kPa		34,41,37/Av. 37.33			Firm low strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
1.00	HV 43.33kPa		50,41,39/Av. 43.33		(1.00)	From 1.0m: Becomes medium strength.		
1.00	D1							
1.30	HV 76.67kPa		75,79,76/Av. 76.67					
					1.50	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
					(0.80)			
					2.30	Complete at 2.30m		

Plan

Remarks

Trial pit terminated at 2.3m due to hard strata.
No groundwater ingress encountered.
Backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:25	JP	ORH/25.TP1

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site Leeds Road, Heckmondwike			**Trial Pit Number** TP02
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** Orion Homes Ltd	**Job Number** ORH/25
	Location	**Dates** 22/10/2024	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					0.30			
					(0.30)	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
					0.60			
0.70	HV 57.33kPa		54,56,62/Av. 57.33			Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
1.00 1.00	HV 55.33kPa ES1		49,59,58/Av. 55.33		(1.10)			
					1.70			
					(0.50)	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
					2.20			
						Complete at 2.20m		

Plan

Remarks

Trial pit terminated at 2.2m due to hard strata.
Slight groundwater ingress at 2.2m.
Backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:25	JP	ORH/25.TP2

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Trial Pit Number
Leeds Road, Heckmondwike	TP03

Machine : JCB 3CX Method :	Dimensions	Ground Level (mOD)	Client Orion Homes Ltd	Job Number ORH/25
	Location	Dates 22/10/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.20	ES1				(0.30)	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					0.30			
					(0.20)	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
					0.50			
0.70	HV 66kPa		56,74,68/Av. 66.00			Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
1.10	HV 53kPa		48,52,59/Av. 53.00		(1.40)			
					1.90			
					(0.40)	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
					2.30			
						Complete at 2.30m		

Plan

Remarks

Trial pit terminated at 2.3m due to hard strata.
Moderate groundwater ingress at 1.0m.
Backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:25	JP	ORH/25.TP3

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Trial Pit Number
Leeds Road, Heckmondwike	TP04

Machine : JCB 3CX Method :	Dimensions	Ground Level (mOD)	Client Orion Homes Ltd	Job Number ORH/25
	Location	Dates 22/10/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.20	ES1				(0.30) 0.30	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					(0.20) 0.50	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
0.70	HV 69kPa		65,70,72/Av. 69.00		(0.50) 1.00	Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
					(0.80) 1.80	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
						Complete at 1.80m		

Plan

Remarks

Trial pit terminated at 1.8m due to hard strata.
Slight groundwater ingress at 1.8m.
Backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:25	JP	ORH/25.TP4

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site Leeds Road, Heckmondwike			**Trial Pit Number** TP05
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** Orion Homes Ltd	**Job Number** ORH/25
	Location	**Dates** 22/10/2024	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					0.30			
					(0.20)	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
					0.50			
0.60	HV 50kPa		52,48,50/Av. 50.00			Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
1.20	HV 56kPa		60,51,57/Av. 56.00		(1.40)			
1.60	D1							
					1.90	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
					(0.50)			
					2.40	Complete at 2.40m		

Plan

Remarks

Trial pit terminated at 2.4m due to hard strata.
No groundwater ingress encountered.
Backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:25	JP	ORH/25.TP5

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site Leeds Road, Heckmondwike			**Trial Pit Number** TP06
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** Orion Homes Ltd	**Job Number** ORH/25
	Location	**Dates** 22/10/2024	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
0.30-0.50	ES1				0.30 (0.20)	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
0.60 0.70	ES2 HV 48.67kPa		42,49,55/Av. 48.67		0.50	Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
1.10	HV 67.33kPa		58,67,77/Av. 67.33		(1.20)	From 1.2m: Becomes friable.		
					1.70 (0.20)	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
					1.90	Complete at 1.90m		

Plan

Remarks

Trial pit terminated at 1.9m due to hard strata.
No groundwater ingress encountered.
Backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:25	JP	ORH/25.TP6

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Trial Pit Number
Leeds Road, Heckmondwike	TP07

Machine : JCB 3CX Method :	Dimensions	Ground Level (mOD)	Client Orion Homes Ltd	Job Number ORH/25
	Location	Dates 22/10/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					0.30 (0.20)	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
					0.50			
0.60	HV 41kPa		40,40,43/Av. 41.00			Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
1.10	HV 46.33kPa		47,40,52/Av. 46.33		(1.30)			
1.50	ES1							
					1.80			
					(0.40)	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
					2.20	Complete at 2.20m		

Plan

Remarks

Trial pit terminated at 2.2m due to hard strata.
Moderate groundwater ingress at 2.2m. Stratum noted to be wet between 1.8m and 2.24m.
Backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:25	JP	ORH/25.TP7

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site Leeds Road, Heckmondwike			**Trial Pit Number** TP08
Machine : JCB 3CX **Method :**	**Dimensions**	**Ground Level (mOD)**	**Client** Orion Homes Ltd	**Job Number** ORH/25
	Location	**Dates** 22/10/2022	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					0.30			
					(0.20)	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
					0.50			
0.70	HV 56.67kPa		52,48,70/Av. 56.67		(0.30)	Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
					0.80			
					(0.20)	Soft dark greyish brown slightly gravelly sandy CLAY. Gravel is subangular, fine to coarse, of weathered mudstone.		
					1.00			
					(0.40)	Soft light grey slightly sandy gravelly CLAY with a low cobble content. Gravel is angular to subrounded, fine to coarse, of mudstone. Cobbles are angular to subangular mudstone.		
					1.40			
					(0.50)	Firm to stiff orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
					1.90			
					(1.10)	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
					3.00			
						Complete at 3.00m		

Plan

Remarks

Trial pit terminated at 3.0m due to hard strata.
Slight groundwater ingress at 1.0m. Stratum noted to be wet between 0.8m and 1.4m.
Backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:25	JP	ORH/25.TP8

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Trial Pit Number
Leeds Road, Heckmondwike	TP09

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Orion Homes Ltd	ORH/25
	Location	**Dates** 22/10/2024	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					0.30			
					(0.20)	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
					0.50			
0.60 0.60	HV 46.33kPa D1		40,46,53/Av. 46.33		(1.00)	Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone		
					1.50			
					(0.30)	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
					1.80	Complete at 1.80m		

Plan

Remarks

Trial pit terminated at 1.8m due to hard strata.
Moderate groundwater ingress at 1.8m.
Backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:25	JP	ORH/25.TP9

ARP GEOTECHNICAL LTD
CHARTERED CONSULTING ENGINEERS

Site	Trial Pit Number
Leeds Road, Heckmondwike	TP10

Machine : JCB 3CX Method :	Dimensions	Ground Level (mOD)	Client Orion Homes Ltd	Job Number ORH/25
	Location	Dates 22/10/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.20	ES1				(0.30)	Dark brown slightly sandy silty clayey TOPSOIL with frequest roots and rootlets.		
					0.30			
					(0.20)	Soft brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium, of mudstone.		
					0.50			
0.60	HV 46.33kPa		43,50,46/Av. 46.33		(0.60)	Firm medium strength orangish brown mottled grey slightly gravelly sandy silty CLAY with a low cobble content. Gravel is subangular to subrounded, fine to coarse, of mudstone with rare coal fragments. Cobbles are subangular, of mudstone From 0.8m: Becomes stiff, high strength.		
0.80	HV 77.67kPa		81,60,92/Av. 77.67					
					1.10			
					(0.30)	Orange brown clayey sandy GRAVEL with a moderate cobble content. Gravel and cobbles are subangular, of mudstone.		
					1.40			
						Complete at 1.40m		

Plan

Remarks

Trial pit terminated at 1.4m due to hard strata.
No groundwater ingress encountered.
Backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:25	JP	ORH/25.TP10

APPENDIX K

LABORATORY TEST CERTIFICATES AND SCREENING VALUES

ARP GEOTECHNICAL LIMITED
IMPORTED SOIL CONTAMINANT SCREENING VALUES
RESIDENTIAL WITH HOME-GROWN PRODUCE

Determinand	S4UL (unless stated otherwise) (mg/kg)			C4SL (mg/kg)		
Arsenic	37			37		
Cadmium	11			22		
Chromium (trivalent) (MAFF)	400					
Chromium (hexavalent)	6			21		
Copper (MAFF)	80#					
Lead				200		
Inorganic Mercury	40			200		
Nickel (MAFF)	50#					
Selenium	250					
Zinc (MAFF)	200#					
Acidity (pH)	*Should be Greater Than 5			*Should be Greater Than 5		
	1% SOM	**2.5% SOM**	**6% SOM**	**1% SOM**	**2.5% SOM**	**6% SOM**
Naphthalene	2.3	5.6	13	15	36	85
Acenaphthylene	170	420	920			
Acenaphthene	210	510	1,100			
Fluorene	170	400	860			
Phenanthrene	95	220	440			
Anthracene	2,400	5,400	11,000			
Fluoranthene	280	560	890			
Pyrene	620	1,200	2,000			
Benzo(a)anthracene	7.2	11	13			
Chrysene	15	22	27			
Benzo(b)fluoranthene	2.6	3.3	3.7			
Benzo(k)fluoranthene	77	93	100			
Benzo(a)pyrene	2.2	2.7	3			5
Indeno(1,2,3-cd)pyrene	27	36	41			
Dibenzo(a,h)anthracene	0.24	0.28	0.30			
Benzo(g,h,I)perylene	320	340	350			
Phenols	120	200	380			
Total TPH	*Above 500, speciate and compare with values below:					
C5 to C6 Aliphatic	42	78	160			
C6 to C8 Aliphatic	100	230	530			
C8 to C10 Aliphatic	27	65	150			
C10 to C12 Aliphatic	130	330	760			
C12 to C16 Aliphatic	1100	2,400	4,300			
C16 to C35 Aliphatic	65,000	92,000	110,000			
C35 TO C44 Aliphatic	65,000	92,000	110,000			
C5 to C7 Aromatic (Benzene)	70	140	300			
C7 to C8 Aromatic (Toluene)	130	290	660			
C8 to C10 Aromatic	34	83	190			
C10 to C12 Aromatic	74	180	380			
C12 to C16 Aromatic	140	330	660			
C16 to C21 Aromatic	260	540	930			
C21 TO C35 Aromatic	1100	1,500	1,700			
C35 TO C44 Aromatic	1100	1,500	1,700			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suitable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits.

MAFF: Ministry of Agriculture, Fisheries and Food - "Code of Good Agricultural Practice for the Protection of Soil

#pH dependent. If exceeded, to be compared against appropriate MAFF value for the pH

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	24-34512-1 24-34512-1
Initial Date of Issue:	29/Oct/2024 29/Oct/2024
Re-Issue Details:	
Client	ARP Geotechnical Ltd ARP Geotechnical Ltd
Client Address:	5/6 Northwest Business Park Servia Hill Leeds Yorkshire LS6 2QH 5/6 Northwest Business Park Servia Hill Leeds Yorkshire LS6 2QH
Contact(s):	Jake Pemberton Jake Pemberton
Project	ORH/25 195 Leeds Road

Quotation No.:	Q24-33517 Q24-33517	**Date Received:**	24/Oct/2024 24
Order No.:	ORH/25 ORH/25	**Date Instructed:**	24/Oct/2024 24
No. of Samples:	11 11		
Turnaround (Wkdays):	5 5	**Results Due:**	30/Oct/2024 30
Date Approved:	29/Oct/2024 29/Oct/2024		

Approved By:

Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Soil

Project:

Client: ARP Geotechnical Ltd				**Chemtest Job No.:**		24-34512	24-34512	24-34512	24-34512	24-34512	24-34512	24-34512	24-34512
Quotation No.: Q24-33517				**Chemtest Sample ID.:**		1885344	1885345	1885347	1885348	1885350	1885351	1885352	1885353
Order No.: ORH/25				Client Sample Ref.:		1	1	1	1	1	2	1	1
				Sample Location:		WS1	WS3	TP2	TP3	TP6	TP6	TP7	TP10
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.2	0		0	0.3			0
				Bottom Depth (m):		0.3	0.2	1	0.2	0.5	0.6	1.5	0.2
				Date Sampled:		17-Oct-2024	17-Oct-2024	22-Oct-2024	22-Oct-2024	22-Oct-2024	22-Oct-2024	22-Oct-2024	22-Oct-2024
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type		U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	21	23	14	33	17	18	12	26
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones and Roots	Stones and Roots	None	Stones and Roots	Stones	Stones and Roots	Stones	Stones and Roots
Soil Texture		N	2040		N/A	Clay	Loam	Clay	Clay	Clay	Clay	Clay	Clay
pH at 20C		M	2010		4.0	8.1	6.5	6.2	6.1	6.1	7.3	6.4	6.0
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	< 0.010	< 0.010	0.019	0.051	< 0.010	0.010	< 0.010	< 0.010
Sulphate (Total)		U	2430	mg/kg	100	1800	850	880	2100	710	140	120	880
Arsenic		M	2455	mg/kg	0.5	37	12	13	39	11	3.0	3.3	16
Cadmium		M	2455	mg/kg	0.10	0.24	0.15	0.16	0.51	0.36	< 0.10	< 0.10	0.22
Chromium		M	2455	mg/kg	0.5	26	16	31	24	17	17	10	17
Copper		M	2455	mg/kg	0.50	68	19	48	47	22	24	18	26
Mercury		M	2455	mg/kg	0.05	0.27	0.39	0.10	0.41	0.09	< 0.05	< 0.05	0.16
Nickel		M	2455	mg/kg	0.50	40	10	54	27	24	16	16	16
Lead		M	2455	mg/kg	0.50	57	37	30	86	28	14	9.1	40
Selenium		M	2455	mg/kg	0.25	1.8	0.67	2.3	1.5	1.1	0.63	0.54	0.94
Zinc		M	2455	mg/kg	0.50	130	53	130	110	85	62	58	73
Chromium (Trivalent)		N	2490	mg/kg	1.0	26	16	31	24	17	17	10	17
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter		M	2625	%	0.40	23	5.4	2.0	15	3.1	0.75	0.44	4.7
Total TPH >C6-C40	EH_1D_Total	U	2670	mg/kg	10	27	39	< 10	30	< 10	< 10	< 10	39
Naphthalene		M	2800	mg/kg	0.10	0.11	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		M	2800	mg/kg	0.10	0.81	0.38	0.37	1.2	< 0.10	< 0.10	< 0.10	0.20
Anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10	0.13	0.17	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		M	2800	mg/kg	0.10	0.52	0.63	0.28	1.9	< 0.10	< 0.10	< 0.10	0.39
Pyrene		M	2800	mg/kg	0.10	0.47	0.62	0.26	1.6	< 0.10	< 0.10	< 0.10	0.36
Benzo[a]anthracene		M	2800	mg/kg	0.10	0.27	0.27	< 0.10	0.88	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene		M	2800	mg/kg	0.10	0.36	0.31	< 0.10	1.1	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	0.39	0.51	< 0.10	1.3	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	0.16	0.18	< 0.10	0.47	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene		M	2800	mg/kg	0.10	0.25	0.31	< 0.10	0.96	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project:

Client: ARP Geotechnical Ltd				**Chemtest Job No.:**		24-34512	24-34512	24-34512	24-34512	24-34512	24-34512	24-34512	24-34512
Quotation No.: Q24-33517				**Chemtest Sample ID.:**		1885344	1885345	1885347	1885348	1885350	1885351	1885352	1885353
Order No.: ORH/25				Client Sample Ref.:		1	1	1	1	1	2	1	1
				Sample Location:		WS1	WS3	TP2	TP3	TP6	TP6	TP7	TP10
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.2	0		0	0.3			0
				Bottom Depth (m):		0.3	0.2	1	0.2	0.5	0.6	1.5	0.2
				Date Sampled:		17-Oct-2024	17-Oct-2024	22-Oct-2024	22-Oct-2024	22-Oct-2024	22-Oct-2024	22-Oct-2024	22-Oct-2024
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	0.19	< 0.10	< 0.10	0.53	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.60	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's		N	2800	mg/kg	2.0	3.5	3.2	< 2.0	11	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols		M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project:

Client: ARP Geotechnical Ltd				**Chemtest Job No.:**		24-34512	24-34512	24-34512
Quotation No.: Q24-33517				**Chemtest Sample ID.:**		1885438	1885439	1885440
Order No.: ORH/25				Client Sample Ref.:		1	1	1
				Sample Location:		TP1	TP5	TP9
				Sample Type:		SOIL	SOIL	SOIL
				Top Depth (m):		1	1.6	0.6
				Bottom Depth (m):				
				Date Sampled:		17-Oct-2024	17-Oct-2024	22-Oct-2024
				Asbestos Lab:				
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type		U	2192		N/A			
Asbestos Identification		U	2192		N/A			
Moisture		N	2030	%	0.020	9.4	15	19
Soil Colour		N	2040		N/A	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones	None	None
Soil Texture		N	2040		N/A	Loam	Clay	Clay
pH at 20C		M	2010		4.0	7.5	6.1	7.2
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010
Sulphate (Total)		U	2430	mg/kg	100			
Arsenic		M	2455	mg/kg	0.5			
Cadmium		M	2455	mg/kg	0.10			
Chromium		M	2455	mg/kg	0.5			
Copper		M	2455	mg/kg	0.50			
Mercury		M	2455	mg/kg	0.05			
Nickel		M	2455	mg/kg	0.50			
Lead		M	2455	mg/kg	0.50			
Selenium		M	2455	mg/kg	0.25			
Zinc		M	2455	mg/kg	0.50			
Chromium (Trivalent)		N	2490	mg/kg	1.0			
Chromium (Hexavalent)		N	2490	mg/kg	0.50			
Organic Matter		M	2625	%	0.40			
Total TPH >C6-C40	EH_1D_Total	U	2670	mg/kg	10			
Naphthalene		M	2800	mg/kg	0.10			
Acenaphthylene		N	2800	mg/kg	0.10			
Acenaphthene		M	2800	mg/kg	0.10			
Fluorene		M	2800	mg/kg	0.10			
Phenanthrene		M	2800	mg/kg	0.10			
Anthracene		M	2800	mg/kg	0.10			
Fluoranthene		M	2800	mg/kg	0.10			
Pyrene		M	2800	mg/kg	0.10			
Benzo[a]anthracene		M	2800	mg/kg	0.10			
Chrysene		M	2800	mg/kg	0.10			
Benzo[b]fluoranthene		M	2800	mg/kg	0.10			
Benzo[k]fluoranthene		M	2800	mg/kg	0.10			
Benzo[a]pyrene		M	2800	mg/kg	0.10			

Results - Soil

Project:

Client: ARP Geotechnical Ltd				**Chemtest Job No.:**		24-34512	24-34512	24-34512
Quotation No.: Q24-33517				**Chemtest Sample ID.:**		1885438	1885439	1885440
Order No.: ORH/25				Client Sample Ref.:		1	1	1
				Sample Location:		TP1	TP5	TP9
				Sample Type:		SOIL	SOIL	SOIL
				Top Depth (m):		1	1.6	0.6
				Bottom Depth (m):				
				Date Sampled:		17-Oct-2024	17-Oct-2024	22-Oct-2024
				Asbestos Lab:				
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**			
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10			
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10			
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10			
Total Of 16 PAH's		N	2800	mg/kg	2.0			
Total Phenols		M	2920	mg/kg	0.10			

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2010	pH Value of Soils	pH at 20°C	pH Meter	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID	
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS	
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.	

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.
Any comments or interpretations are outside the scope of UKAS accreditation.
The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.
Uncertainty of measurement for the determinands tested are available upon request .
None of the results in this report have been recovery corrected.
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 EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at ≤ 30°C prior to analysis.
All Asbestos testing is performed at the indicated laboratory .
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.
All water samples will be retained for 14 days from the date of receipt.
Charges may apply to extended sample storage.

Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

GQF-008-48
Issue 01 - Oct 22

Summary of Classification Test Results

Project No.
J290534

Project Name
195 Leeds Road, Heckmondwike

Hole No.	Sample				Soil Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Remarks
	Ref	Top	Base	Type		Mg/m^3		%	%	%	%	%	Mg/m^3	
TP1	1	1.00		D	Multicoloured slightly sandy slightly gravelly CLAY			24	77	44	21	23		
TP5	1	1.60		D	Brown slightly sandy slightly gravelly CLAY			21	91	38	22	16		
TP9	1	5.00		D	Multicoloured slightly sandy CLAY			29	100	52	27	25		

All tests performed in accordance with BS1377:1990 unless specified otherwise

Date Printed 08/11/2024

Key

Density test
Linear measurement unless :
wd - water displacement
wi - immersion in water

Liquid Limit
4pt cone unless :
cas - Casagrande method
1pt - single point test

Particle density
sp - small pyknometer
gj - gas jar

UKAS TESTING
7758

INDEX

APPENDIX L

METHOD STATEMENT FOR ASSESSMENT OF IMPORTED SOILS

METHOD STATEMENT FOR ASSESSMENT OF IMPORTED SOILS

AT

195 LEEDS ROAD

HECKMONDWIKE

ON BEHALF OF

ORION HOMES LTD

ARP GEOTECHNICAL LTD

CHARTERED CONSULTING ENGINEERS

Northwest House 5/6 Northwest Business Park Servia Hill Leeds LS6 2QH

☎ 0113 245 8498 ✉ leeds@arpgeotechnical.co.uk 🌐 www.arpconsultingengineers.co.uk

CLIENT: ORION HOMES LTD

JOB NUMBER: ORH/25

PROJECT: 195 LEEDS ROAD, HECKMONDWIKE

REPORT TYPE: METHOD STATEMENT FOR ASSESSMENT OF IMPORTED SOILS

REPORT REFERENCE: ORH/25imp

	Name	**Signature**
Prepared By:	J Race BSc CGeol FGS EurGeol	
Reviewed & Authorised By:	O Gwilym BSc MSc FGS	

ISSUE	**DATE**	**STATUS**
1	18TH NOVEMBER 2024	V1 FINAL

1.0 Introduction

1.1 This document has been prepared to provide information for the Client and other interested parties, such as the Regulatory Authorities, outlining how any soils imported to the site will be managed to ensure that they are suitable, in terms of human health, for the intended residential use. The document should be agreed, prior to implementation, with the relevant Regulatory Authorities, usually the local Planning Authority and NHBC or other building control provider.

2.0 The Site

2.1 The ARP Geotechnical Ltd Combined Stage 1/Stage 2 Geo-environmental Report, dated November 2024 under reference ORH/25r1, makes an assessment of contamination, along with other aspects.

2.2 The conceptual site model is for a residential development, including private gardens.

2.3 The vast majority of the site comprises four undeveloped grassed fields, separated by post and wire fences. A narrow grassed area provides access from the farm road at the northeastern boundary. A smaller area of the site comprises the buildings, gardens and outbuildings associated with two semi-detached dwellings in the southeastern corner of the site. The site and surrounding area slope down to the south. The site is bounded to the north, and part of the northeast, by an access track to a farm adjacent to the northern boundary. Residential properties abut the eastern, southeastern, and southwestern boundaries of the site. Farmland is present across the track to the north (surrounding the farm) to the northeast, and northwest.

2.4 Ordnance Survey archive maps show no indication of any potentially contaminating use of the site, or of significant development, except for limited residential development in the southeastern corner.

2.5 The geological maps show the site to be underlain by undifferentiated strata (mudstones, siltstones and minor sandstones) of the Lower Coal Measures. No superficial deposits are indicated to be present. A fault and a coal seam outcrop are shown to cross the site.

2.6 The site is at potential risk of ground instability from underground coal mining, which will need to be assessed by a rotary borehole investigation. This is programmed for the near future and the findings will be reported separately on completion. There is a risk of unrecorded mine entries, considered to be slight on most of the site and higher on the northern quarter of the site. This should be addressed by Geotechnical Engineer inspection of the ground surface following the topsoil strip. In addition, site workers should be notified of their possible presence, and if any suspect features are identified during the site works, these should be inspected by a Geotechnical Engineer.

2.7 The strata beneath the site are classed as a Minor Aquifer. There are no groundwater abstractions within 1km of the site. No watercourses shown within 500m downslope of the site. There are no active surface water abstractions for sensitive uses within 1km. The site is not at risk of river flooding.

2.8 Basic radon protection measures recommended, to minimise conveyancing issues. Ground gas monitoring is ongoing, to assess risks from indicated shallow coal and possible workings, and the findings will be reported separately on completion.

2.9 The ground investigation only encountered made ground at one location (WS1), 0.4m thick. Below this, and below topsoil on the rest of the site, a sequence of gravelly clays onto clayey gravels onto mudstone, was encountered, consistent with in situ weathering of Coal Measures mudstone. A 0.7m thick weathered coal seam was found in one borehole on the north of the site, which is consistent with the published geological map.

2.10 The contamination testing did not identify any concentrations of contaminants requiring any remedial measures. However, it is still necessary to have in place a method statement for the assessment of any soils to be imported, in order to satisfy the Regulatory Authorities that the soils are suitable for use on the site, in terms of human health. This needs to be independently confirmed, in accordance with the guidance supplied in the document produced by the Yorkshire and Lincolnshire Pollution Advisory Council (YALPAG): "Guidance on the Verification Requirements for Cover Systems". The measures described below will be required to ensure compliance with the document.

3.0 Imported Soils

3.1 If any imported soils are required, the source will need to be confirmed, and the material tested for the attached suite of contaminants, to comply with the maximum screening values listed. The frequency of testing is given on the table below.

Material Type	**Number of Samples**
Topsoil or subsoil from greenfield site or manufactured source	Minimum 3No. or 1 per 250m^3 (whichever is greater)
Topsoil or subsoil from brownfield site or screened source	Minimum 6No. or 1 per 100m^3 (whichever is greater)

3.2 The material should be placed in quarantined stockpiles and once a stockpile has been approved by the Engineer, no further material should be added to the stockpile, and any further import should be stockpiled separately. Further testing shall be carried out where any mixing is suspected to have occurred.

3.3 As and when required, the soils will be used around the plots as the development progresses, and it will be necessary to verify that the appropriate soils have been placed on the plots, and not soils from any other source. This will be achieved by excavating trial pits on the basis of one per four plots. The trial pits will be photographed, to include a reference scale, and the photographs included within any report to enable the location on site to be identified.

3.4 If space is insufficient on the site to store quarantined stockpiles, the soils can be placed directly into the appropriate gardens/landscape areas, but samples of each material would need to be taken and tested directly from the trial pits within the gardens, described in 3.3 above.

3.5 The results of all the laboratory analysis, sample descriptions, plans, and import documents, will form part of the Soils Validation Report.

3.6 In order to enable the scheme to progress and sales of properties to continue throughout the construction of the development, interim Soils Validation Reports may be prepared for specific areas. This will enable enquiries during the sales of the properties to be satisfied and a final Soils Validation Report will be prepared at the end of the development, incorporating all the interim reports to satisfy the planning conditions.

4.0 Unexpected Contamination

4.1 Any unexpected contamination uncovered during the works shall be inspected, sampled and analysed in laboratory for the suite of determinands appended to this Method Statement, and compared to the maximum concentration levels listed on the enclosure. Works on the affected materials shall cease until the appraisal is complete and, if necessary, a Remediation Statement is to be prepared and approved by the Planning Authority before work is recommenced.

ARP GEOTECHNICAL LIMITED
IMPORTED SOIL CONTAMINANT SCREENING VALUES
RESIDENTIAL WITH HOME-GROWN PRODUCE

Determinand	S4UL (unless stated otherwise) (mg/kg)			C4SL (mg/kg)		
Arsenic	37			37		
Cadmium	11			22		
Chromium (trivalent) (MAFF)	400					
Chromium (hexavalent)	6			21		
Copper (MAFF)	80#					
Lead				200		
Inorganic Mercury	40			200		
Nickel (MAFF)	50#					
Selenium	250					
Zinc (MAFF)	200#					
Acidity (pH)	*Should be Greater Than 5			*Should be Greater Than 5		
	1% SOM	**2.5% SOM**	**6% SOM**	**1% SOM**	**2.5% SOM**	**6% SOM**
Naphthalene	2.3	5.6	13	15	36	85
Acenaphthylene	170	420	920			
Acenaphthene	210	510	1,100			
Fluorene	170	400	860			
Phenanthrene	95	220	440			
Anthracene	2,400	5,400	11,000			
Fluoranthene	280	560	890			
Pyrene	620	1,200	2,000			
Benzo(a)anthracene	7.2	11	13			
Chrysene	15	22	27			
Benzo(b)fluoranthene	2.6	3.3	3.7			
Benzo(k)fluoranthene	77	93	100			
Benzo(a)pyrene	2.2	2.7	3			5
Indeno(1,2,3-cd)pyrene	27	36	41			
Dibenzo(a,h)anthracene	0.24	0.28	0.30			
Benzo(g,h,I)perylene	320	340	350			
Phenols	120	200	380			
Total TPH	*Above 500, speciate and compare with values below:					
C5 to C6 Aliphatic	42	78	160			
C6 to C8 Aliphatic	100	230	530			
C8 to C10 Aliphatic	27	65	150			
C10 to C12 Aliphatic	130	330	760			
C12 to C16 Aliphatic	1100	2,400	4,300			
C16 to C35 Aliphatic	65,000	92,000	110,000			
C35 TO C44 Aliphatic	65,000	92,000	110,000			
C5 to C7 Aromatic (Benzene)	70	140	300			
C7 to C8 Aromatic (Toluene)	130	290	660			
C8 to C10 Aromatic	34	83	190			
C10 to C12 Aromatic	74	180	380			
C12 to C16 Aromatic	140	330	660			
C16 to C21 Aromatic	260	540	930			
C21 TO C35 Aromatic	1100	1,500	1,700			
C35 TO C44 Aromatic	1100	1,500	1,700			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suitable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits.

MAFF: Ministry of Agriculture, Fisheries and Food - "Code of Good Agricultural Practice for the Protection of Soil

#pH dependent. If exceeded, to be compared against appropriate MAFF value for the pH