TECHNICAL NOTE

DATE:	20 November 2025	**CONFIDENTIALITY:**	Public
SUBJECT:	70097732 - Heckmondwike Bus Hub – Materials Management.		
PROJECT:	70097732 - Heckmondwike BS	**AUTHOR:**	L McFadden
CHECKED:	C Smith	**APPROVED:**	I Hall

RE: MATERIALS MANAGEMENT – ACCEPTABILITY OF IBAA AS BACKFILL IN DRAINAGE TRENCHES

1. INTRODUCTION

WSP is supporting the redevelopment of Heckmondwike Bus Station, which is currently ongoing and being delivered by contractor RG Carter.

As part of the site enabling works, Type 1 material (as described further below) was imported as part of the Heckmondwike Bus hub development primarily for use as fill beneath the hub building and backfill along drainage trenches. This material was subsequently assessed to be geotechnically unsuitable for use as backfill beneath the hub building and the majority of it was excavated and removed off site, a limited volume of the imported material was used to infill drainage trenches, this small quantity of material remains on site.

This technical note provides a summary of the nature of the material imported and commentary on its suitability to remain on site. It is understood that discussions were had between Tim Fawcett (Kirklees Council) and the Kirklees EHO and at the time of the initial importation / subsequent removal of material (ca. mid-February 2025) and placement in the drainage trenches.

2. MATERIAL IMPORT AND PLACEMENT

Approximately 350m^3 of material was imported to the Heckmondwike Bus Hub site to be used as fill beneath the hub building as well as backfill to drainage trenches across the site. The imported material is understood to be a recycled product comprising Incinerator Bottom Ash Aggregate (IBAA) sourced from Ferrybridge. The material underwent both geotechnical and chemical testing, as a result of the geotechnical testing the material was deemed geotechnically unsuitable for use as fill beneath the hub building and was subsequently removed from the hub building area of the site. A small volume of the imported material does remain on site as backfill to drainage trenches, RG Carter have confirmed that the volume of the material remaining in-situ at the site is approximately 28.5 m^3 (approximately 48.5 tonnes). **Figure 1** shows the areas where the material remains on site, it has predominantly been placed as fill within drainage runs. The IBAA material remaining on site is beneath areas of proposed hardstanding and has not been placed in areas of soft landscaping or as part of soakaway drainage solutions. **Figure 2** shows the proposed site layout, with an overlay showing the areas where the material remains on site. The Proposed Site Plan (without overlay) is provided as **Appendix 1**.

In relation to the material being placed along drainage runs and in consideration of the requirements of Environment Agency guidance RPS 247:Using unbound IBAA in construction activities, RG Carter have

confirmed that the material has been placed in accordance with the following requirements outlined for the use of IBAA as 'pipe bedding':

'You must use a low permeability surface above the pipe-run with adequate falls to prevent standing water.

You must not:

- *store and use more than 510 tonnes in total of IBAA as pipe bedding in any single construction project and pipe run*
- *use IBAA as pipe bedding more than 0.3 metres deep in a trench more than 2 metres wide*
- *use the IBAA as a drainage medium'*

In addition, the following requirements of Environment Agency guidance RPS247 have also been met:

'You must not:

- *store IBAA pending use for more than 6 months*
- *store more IBAA than you need*
- *store or use IBAA within a groundwater source protection zone 1 or 2*
- *store or use IBAA within 50 metres of any spring or well, or any borehole used to supply water*
- *use IBAA below the water table*
- *use IBAA underneath any residential building or garden'*

3. LABORATORY TESTING

Two composite samples (ES1 and ES2) of the imported material were submitted for chemical analysis, the laboratory analysis results for which are attached as **Appendix 2**. Given the volume of material remaining in-situ (28.5 m^3), this gives a testing frequency of 1 sample per 14.25 m^3, in excess of the 1 sample per 500 m^3 stated in the WSP Remediation Strategy[1] (Table 8-1 therein).

When compared against the verification criteria for imported material (Appendix E of the WSP Remediation Strategy) exceedances for lead, nickel and zinc were reported as shown in Table 1. The verification criteria for import material are conservatively based on the most stringent of generic assessment criteria (GAC), whereas the GAC for a commercial end use (on which the site reuse verification criteria are based on) are more aligned with the actual use of the site as a bus hub. Further discussion is provided in Section 4. Concentrations of all other determinands were reported to be below the verification criteria and in the case of phenols, PAH, VOCs and TPH the majority of the results were all reported to be below the laboratory limit of detection (LOD), the exception being Aliphatic EC21 – EC35 which was reported at

[1] Remediation Strategy, Heckmondwike Bus Hub. Dated October 2023, ref. 70079085_RS.

9.2mg/kg, marginally above the LOD of 8mg/kg and significantly below the verification criteria for import material. No asbestos was identified in testing. It is also noted that no visual or olfactory evidence of contamination has been identified during material import or placement.

Table 1 – Summary of Exceedances within Samples ES1 and ES2

Compound	**Reported Concentration (mg/kg) and Sample No.**		**Verification criteria for imported material (Remediation Strategy Appendix E) (mg/kg)**	***Verification criteria for site won material* (Remediation Strategy *Appendix E) (mg/kg)***
	ES1	**ES2**		
Lead	400	300	134	*1,390*
Nickel	170	170	126	*1,710*
Zinc	4,600	5,700	3,860	*1,050,000*

4. RISK ASSESSMENT

Human Health

The first stage of assessment of the suitability of imported materials for use on site comprises screening of laboratory results against the conservative verification criteria for imported soils as detailed in Appendix E of the Remediation Strategy. It is stated within the remediation strategy that should there be exceedances of the verification criteria further assessment would be required and agreed with the Local Authority. In consideration of the identified exceedances of the import criteria the commentary below details the further assessment (i.e. screening against the verification criteria for site won materials) which has been completed.

The reported concentrations of lead, nickel and zinc do exceed the verification criteria for imported material, however they do not exceed the verification for the reuse of site won material. It is noted that the exceedances of the verification criteria for imported material are marginal and the reported concentrations are within the same order of magnitude as the verification criteria. It is also noted that the reported concentrations of lead, nickel and zinc are significantly below the verification criteria for site won material and of at least an order of magnitude lower.

The verification criteria for imported material are based on the most conservative of GAC, residential with plant uptake, the verification criteria for site won material are based on a commercial land use scenario which is considered a more applicable scenario for the site use as a bus hub than residential.

Although recognised that the imported material exceeds the verification criteria for three determinands, as the imported material does not exceed the verification criteria for site won material it is considered that it does not pose a risk to identified human health receptors, primarily future users of the bus hub. This is further supported by the placement of the material beneath hardstanding areas only, thereby mitigating the potential risks posed by direct exposure.

It is a key assumption that any future groundworks are, as standard practices require, completed in accordance with suitable Risk Assessments and Method Statements (RAMS) which include standard industry practice requirements for the use of appropriate Personal Protective Equipment (PPE) and good hygiene.

Dust generation is being managed through the construction activities by the contractor, therefore the risk to any human health receptors during construction (i.e., groundworkers or transitory nearby members of public) is very low.

The risk to human health receptors (future site users) is low, due to the nature of the development being a bus hub comprising predominantly hardstanding and buildings. The buildings and hardstand will sever the potential exposure pathway to future site users. It is noted that there are areas of soft landscaping around the periphery of the development (see Proposed Site Plan, **Appendix 1**), however as shown on **Figure 1,** the extent of the placement of the imported material, along drainage runs, does not extend into the areas of soft landscaping.

Controlled Waters

The River Spen is located approximately 230 m to the southwest of the Site and the Site lies on a bedrock Secondary A Aquifer. The site does not lie within a groundwater source protection zone and there are no active licensed groundwater abstractions within 1km of the site. Given the low sensitivity of the site setting, the limited volume of imported material remaining on site and in consideration that the imported materials are to be encapsulated below hardstanding areas, the likelihood of infiltration and subsequent mobilisation of low level contamination to controlled waters is considered to be unlikely.

Based on the above the risk to controlled waters is assessed as low.

5. SUMMARY & CONCLUSION

Following the import of approximately 350m^3 of Type 1 IBAA material and subsequent removal due to its geotechnical unsuitability for use beneath the Heckmondwike bus hub building, a limited volume (approximately 28.5m^3) of IBAA material remains on site having been placed along drainage runs as shown on **Figure 1**. The placement of the material along the drainage runs is within the requirements of Environment Agency guidance RPS 247.

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Chemical testing of the material indicates that reported concentrations of lead, nickel and zinc exceed the verification criteria for imported materials (based on GAC for residential with plant uptake), however the reported concentrations are significantly below the verification criteria for the reuse of materials on site which are based on the GAC for a commercial end use.

Given the limited volume of the material which remains on site, the sensitivity of the site setting and the marginality of the exceedances of the verification criteria for imported material it is considered that placement of the imported Type 1 material along the drainage routes presents a low risk to both human health and controlled waters receptors.

6. CLOSE

We trust that the above provides sufficient information in relation to the imported Type 1 IBAA material that remains on site and you find it acceptable for the material to remain in situ as fill along the drainage trenches, on the basis that there is a low risk posed to both human health and controlled waters receptors.

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Figure 1 – Plan Showing Where IBAA Material Remains In-Situ (highlighted areas)

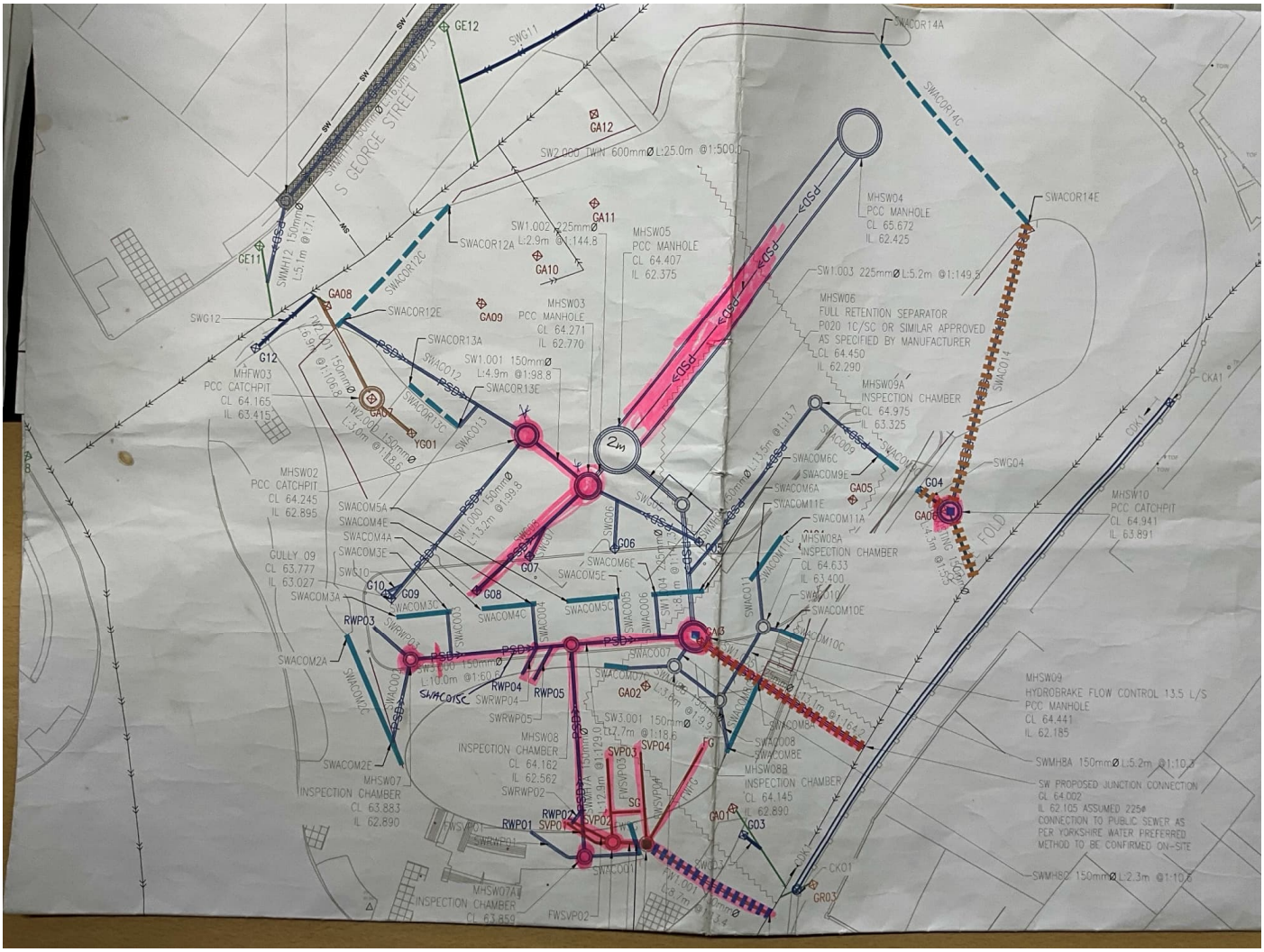

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Figure 2 – Proposed Site Plan showing where IBAA Material Remains In-Situ (highlighted areas)

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Appendix 1 – Proposed Site Plan

CAPACITY:

DIDO Stands:	1 No.	12 Bus movements per hour
DIRO Stands:	5 No.	40 Bus movements per hour
Total:	**6 Stands**	**52 b.m.h**
Layover Bays:	1 No.	

1 Proposed Site Plan Stage 4
1 : 200

SCALE 1:200
1m 10m 20m

Red Line Boundary based on O/S Data and **NOT** confirmed as the Legal Boundary

Rev	Date	By	Description
P1	06/12/2022	DM	Initial issue of Proposed Site Plan at Stage 4. Bin Store moved back into landscape and hatching added following bus test results.
P2	27/01/2023	DM	Issued for information to design team
P3	11/04/2023		Site Plan issued with updated coordinates for design team.
P4	24/05/2023		Site Plan amended following Planning Highways changes. Changes include realignment of kerb lines at stand 6 and the layover bay. Cycle shelter relocated with steps and wall in line with WSP latest level information. Bus stand curtain wall at bus stand 1 and bus stand 6 amended to suit, seating locations at bus stands amended to suit latest levels.

Refer to the following SGP dwgs for:

390101 for the Building access step details
390000 Bin store dwg
390100 Cycle Shelter and adjacent wall/ step details
390200 Access gate and railing details
201120 Typical Bus Stand Areas and Pedestrian Barriers
390300 Bus Barriers
390301 Head of Queue and seating details

Refer to WSP Civils' and Landscape Architect dwgs for details on paving, levels, landscape furniture, planting etc

Kirklees COUNCIL

SGP
Architects + Masterplanners

Prologis House,
Blythe Gate,
Blythe Valley Park,
Solihull, B90 8AH

t: +44 (0)121 711 6929

www.stephengeorge.co.uk

Heckmondwike Bus Station
Royle Fold
Heckmondwike WF16 0HR

Drawing Name:
Proposed Site Plan

Drawing Stage: **RIBA Stage 4**

Status: **PRELIMINARY**

SGP File Ref: 20233-03-SGP-HEK-ZZ-M3-A-022002

SGP Project No:	Date:	Drawn:	Team:	Scale:	Rev:
20-233-003	11/01/22	DM	Leeds	1 : 200 @ A1	P4

Drawing Number:
20233-03 - SGP - HEK-XX-DR-A- 201001
Project Code Originator Volume Level Type Role Number

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Appendix 2 – Soil Chemical Lab Results

UKAS TESTING
4041

Evolve Geo-Environmental Limited
15 Newland
Lincoln
Lincolnshire

e: joshr@evolvegeo-env.co.uk

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

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

Analytical Report Number : 25-004878

Project / Site name:	New Bus Station, Heckmondwike	**Samples received on:**	03/02/2025
Your job number:	EGE-24-07-14-02	**Samples instructed on/ Analysis started on:**	03/02/2025
Your order number:	EGE0568	**Analysis completed by:**	10/02/2025
Report Issue Number:	1	**Report issued on:**	10/02/2025
Samples Analysed:	2 non soil samples		

Signed: _____

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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

Analytical Report Number: 25-004878
Project / Site name: New Bus Station, Heckmondwike
Your Order No: EGE0568

Lab Sample Number				441661	441662
Sample Reference				ES1	ES2
Sample Number				Composite	Composite
Water Matrix				N/A	N/A
Depth (m)				None Supplied	None Supplied
Date Sampled				30/01/2025	30/01/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	5.7	6
Total mass of sample received	kg	0.1	NONE	0.6	0.6
Asbestos					
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DOC	DOC
Total Phenols					
Total Phenols (monohydric)	mg/kg	1	NONE	< 1.0	< 1.0
Speciated PAHs					
Naphthalene	mg/kg	0.05	NONE	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	NONE	< 0.05	< 0.05
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	NONE	12	11
Cadmium (aqua regia extractable)	mg/kg	0.2	NONE	7.8	7.1
Chromium (hexavalent)	mg/kg	1.8	NONE	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	220	210
Chromium (aqua regia extractable)	mg/kg	1	NONE	220	210
Copper (aqua regia extractable)	mg/kg	1	NONE	2300	2300
Lead (aqua regia extractable)	mg/kg	1	NONE	400	300
Mercury (aqua regia extractable)	mg/kg	0.3	NONE	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	NONE	170	170
Selenium (aqua regia extractable)	mg/kg	1	NONE	2.3	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	NONE	4600	5700

Analytical Report Number: 25-004878
Project / Site name: New Bus Station, Heckmondwike
Your Order No: EGE0568

Lab Sample Number				441661	441662
Sample Reference				ES1	ES2
Sample Number				Composite	Composite
Water Matrix				N/A	N/A
Depth (m)				None Supplied	None Supplied
Date Sampled				30/01/2025	30/01/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Petroleum Hydrocarbons					
TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	NONE	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	NONE	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	NONE	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	NONE	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	NONE	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	NONE	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	NONE	< 8.0	9.2
TPHCWG - Aliphatic >EC35 - EC44 EH_CU_1D_AL	mg/kg	8.4	NONE	< 8.4	< 8.4
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10
TPHCWG - Aliphatic >EC5 - EC44 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	NONE	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	NONE	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	NONE	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	NONE	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	NONE	< 10	< 10
TPHCWG - Aromatic >EC35 - EC44 EH_CU_1D_AR	mg/kg	8.4	NONE	< 8.4	< 8.4
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	< 10
TPHCWG - Aromatic >EC5 - EC44 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	< 10
VOCs					
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0
Benzene	µg/kg	5	NONE	< 5.0	< 5.0
Toluene	µg/kg	5	NONE	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	NONE	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	NONE	< 8.0	< 8.0
o-Xylene	µg/kg	5	NONE	< 5.0	< 5.0

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

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Analytical Report Number : 25-004878
Project / Site name: New Bus Station, Heckmondwike

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
441661	ES1	Composite	None Supplied	Non Soil. *g
441662	ES2	Composite	None Supplied	Non Soil. *g

Analytical Report Number : 25-004878
Project / Site name: New Bus Station, Heckmondwike

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	NONE
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	NONE
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	NONE
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	NONE
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-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	L080-PL	W	NONE

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

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

*g - Unaccredited sample matrix.