

GRC Developments

134 Derby Road

Old Swan

Liverpool L13 3DW

11th January 2022

Dear Sirs,

Re: Validation Report for Land at 27 Brent Way, Halewood, Liverpool, L26 9XH

1. Introduction

This document presents the validation/verification information following the completion of some of the required ground remediation works at land located at the aforementioned address. This information is required to inform the discharge of the contaminated land conditions attached to the planning decision notice for redevelopment of the site for residential land use.

Site assessment reports (i.e. Phase 1 and Phase 2) reports and a remediation strategy have been produced for this site. The information in these documents provide good coverage and characterisation of the site and it is recommended that they are read in conjunction with the information provided in this verification document, as the information presented within them provides the basis for the conceptual understanding of the site. The reports are:

- TerraConsult, Phase 1 Desk Study Report, March 2018
- TerraConsult, Phase 2 Site Investigation Report, June 2018
- TerraConsult, Remediation Strategy, March 2021

2. Requirement for Remediation

The intrusive ground investigation identified the presence of Made Ground deposits across the site at a thickness which varied between 0.3m and 1.0m. Chemical analysis detected the presence of elevated contaminants of concern within some of the Made Ground deposits (i.e. asbestos, polyaromatic hydrocarbons and lead) and assessments identified the remediation measures are required to eliminate the potential risks to human health. Risks to controlled waters and other receptors were deemed to be low and so no remediation measures are required to protect other identified receptors.

The recommended remedial measures (as detailed in the remediation strategy) were:

1. The incorporation of gas protection measures in all properties in line with the site's CS3 (Amber 2) classification.
2. A 600mm clean cover system in areas of soft landscaping, due to the identified presence of elevated concentrations of contaminants of concern.
3. The provision of impermeable hardstanding in areas of car parking and / or the presence of building floor slabs to sever exposure pathways in areas where contamination hotspots were detected in Made Ground deposits beneath the site.

t 0151 291 6451

e info@envirosolution.co.uk

America House | Rumford Place | Liverpool | L3 9DD

3. Validation of Gas Protection Measures

The gas protection measures have been installed at the site in accordance with the recommendations in the remediation strategy. Photographs showing the installed membrane and a copy of the membrane specification are enclosed.

4. Validation of Imported Topsoil

A 600mm clean cover system has been laid down in areas of soft landscaping. Photographic evidence of this is enclosed.

Certified topsoil was purchased from SED Services Ltd for use in the areas of soft landscaping. A copy of the supplier's certificate and delivery notes are enclosed.

Yours sincerely

For EnviroSolution Limited

—

BRENTWAY – HALEWOOD

DOCUMENTS FROM GRC DEVELOPMENTS FOR PHASE 4 CONTAMINATION REPORT.

GAS MEMBRANE – SITE PHOTOGRAPHS TAKEN APIRL 2020





GAS MEMBRANE – DATA SHEET

Solshield Ultra Gas Barrier

Description:

Solshield Ultra Gas Barrier is a multi-layer low density polyethylene (LDPE) gas barrier and damp-proof membrane reinforced with a polypropylene grid with an integral aluminium foil. The membrane is designed for use in concrete ground floors, above and below slab not subject to hydrostatic pressure.

Solshield Ultra protects buildings against Moisture, Radon, Carbon Dioxide, Methane, and Hydrocarbon/VOC Vapours from the ground.

Resistance to Water & Water Vapour - the membrane provides an effective barrier to the passage of water & water vapours from the ground.

Resistance to Hydrocarbon Vapours when the membrane is separated from the ground, for example above a block and beam.

Resistance to puncture - the membrane has a strong resistance to puncture and on smooth surfaces will not be damaged by foot/site traffic.

Durability - the membrane remains effective against the ingress of water and water vapour, will restrict the ingress of radon, methane, and carbon dioxide during the lifetime of the flooring construction in which it is installed.

Compliance:

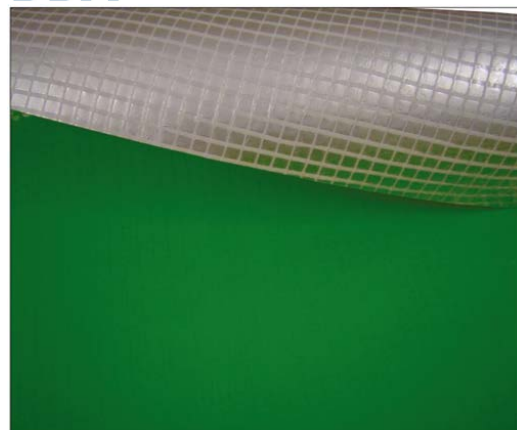
- NHBC Standards 2019, Chapters 4.1/5.1.
- CE Marking Standard EN13967:2012
- BS8485:2015+A1:2019.
- CP 102:1973, Section 2.
- BS8000-4:1989.

General:

- Solshield Ultra Gas Membrane should not be installed at temperatures below 5°C, to prevent the risk of surface condensation.
- The membrane must be installed and fixed in accordance with the relevant clauses in BRE Report BR 211:2015, and guidance given in BS 8485:2015+A1:2019.
- The membrane should be installed on a sand blinding layer, Solshield P30 protection fleece, or a smooth concrete float finish. In order to provide a continuous barrier across the cavity, Solshield Ultra Gas Barrier should be taken through the blockwork and incorporated below the damp proof course cavity tray in the outer leaf.
- Solshield Ultra Gas Membrane is suitable for installation with:
 - Beam and block floor application with 150mm clear void in an Amber 2 category project with hydrocarbons.
 - Reinforced raft foundation and in situ suspended slab, providing the membrane is laid above the ground and not in direct contact with the source of hydrocarbon/VOC vapour.
- Long periods of exposure to ultraviolet light will reduce the effectiveness of the membrane.

Venting:

- Solshield Ultra can be used on site where passive or active ventilation is required.
- Solshield Geocomposite Drainage & Venting Mat should be used in conjunction with the relative vent connectors where required. These types of systems are designed on a bespoke site specific nature.
- Please contact us for our design advice.



- Complies with latest codes of practice as published by BRE, BSI & CIRIA.
- BBA Cert 20/5737, NHBC Compliant & CE Marked.
- Suitable to protect against the ingress of Rn, CO₂, CH₄, and VOC Vapours.
- A multi-layer reinforced polyethylene membrane with integral aluminium foil.
- BS8485:2015+A1:2019 Accordant.
- Suitable for use as gas protection for NHBC Green, Amber 1, and Amber 2 site situations.
- High resistance to puncture.
- Also acts as a damp proof membrane.

Solco, Unit 51, Portmanmoor Road Industrial Estate, Ocean Park, Cardiff, CF24 5HB

Technical Data:

Property	Test Method	Value
Thickness	EN 1849-2	0.60mm
Thickness - Between Scrim	BS EN ISO 9863-1:2016	0.40mm
Width	EN 1849-2	2.0m
Length	EN 1849-2	50m
Weight	EN 1849-2	370 g/m ²
Hydraulic Properties		
Water Column Test	EN 20811	> 300
Resistance to Water Penetration	EN 13967 / EN 1928	130m
Watertightness	EN 1296 / EN 1367 / EN 1928	Pass
Mechanical Properties		
Resistance to Static Load	EN 12730-B	20 kg
Tensile Strength (MD)	EN 12311 - 1	600 N/50mm
Tensile Strength (CMD)	EN 12311 - 1	480 N/50mm
Tensile Elongation (MD)	EN 12310 - 1	20%
Tensile Elongation (CMD)	EN 12310 - 1	20%
Puncture Resistance	EN 12236	1.25 kN
Resistance to Tearing (Nail Shank) (MD)	EN 12310 - 1	330 N
Resistance to Tearing (Nail Shank) (CMD)	EN 12310 - 1	400 N
Durability and Chemical Resistance		
Transmission Rate of Volatile Liquids (Diesel)	ISO 6179:2010 (B)	0.246 g/m ² /hr
Transmission Rate of Volatile Liquids (Xylene)	ISO 6179:2010 (B)	0.571 g/m ² /hr
Transmission Rate of Volatile Liquids (Toluene)	ISO 6179:2010 (B)	0.583 g/m ² /hr
Transmission Rate of Volatile Liquids (Petrol)	ISO 6179:2010 (B)	0.135 g/m ² /hr
Gas Permeability		
Methane Permeability	BS EN ISO 15105-1	< 0.09 ml/m ² /day/atm
Carbon Dioxide Permeability	BS EN ISO 15105-1	< 0.09 ml/m ² /day/atm
Radon Permeability	K124/02/95	8.0x10 ⁻¹⁵ m ² /s

Solco, Unit 51, Portmanmoor Road Industrial Estate, Ocean Park, Cardiff, CF24 5HB

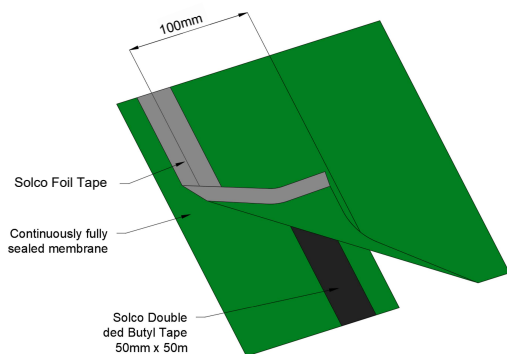
Installation:

1. The membrane must only be applied to surfaces that have a smooth finish - free from voids, projections, and mortar deposits. Surfaces should be dry and free from dust and frost. In order to provide a continuous barrier across the cavity, Solshield Ultra should be taken through the blockwork and incorporated below the damp proof course cavity in the outer leaf.
2. Concrete surfaces should be dense. Vertical surfaces of brickwork and blockwork must be dry and rendered to provide an even surface. Brickwork or blockwork not rendered must be flush pointed to give a smooth surface without sudden changes in level.
3. Solshield Ultra is rolled out with the coloured side up, ensuring that it is properly aligned. All end and side overlaps should be a minimum of 100mm and prepared.
4. When the membrane is laid below the concrete slab, it should be loose-laid to accommodate any small movements.
5. All surfaces must be dried thoroughly prior to joining. Roll edges can be welded or taped.
6. The continuity of the damp proofing must extend over the footprint of the building, and the membrane must be sealed to a damp-proof course where required.
7. The membrane should be covered by a screed or other protective layer, such as Solco Protection Fleece, as soon as possible after installation. If blockwork protection is used, care must be taken to avoid damage to the membrane during construction. Care should be taken when handling building materials over the exposed surface.

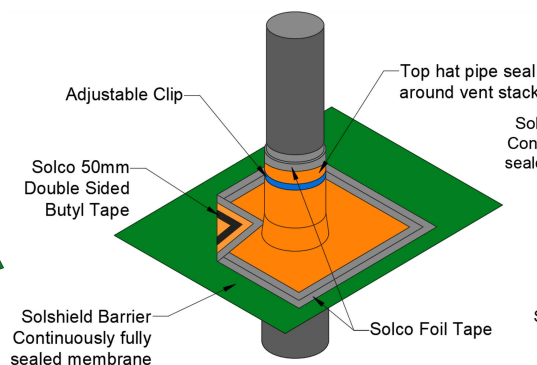
Jointing Detail:

1. Apply Solco Double Sided Butyl Tape around 50mm from the membrane edge, leaving the backing paper on.
2. Lay the next membrane, overlapping the first by a minimum of 100mm.
3. Remove the backing paper from the double sided butyl tape and join the top sheet to the bottom sheet, by applying pressure with a hand roller.
4. Where the membranes overlap, apply Solco Single Sided Foil Tape, equidistant on both membranes (see detail). All service entry points must have airtight seals. Top hats and corner pre-forms must be sealed using double sided butyl tape.

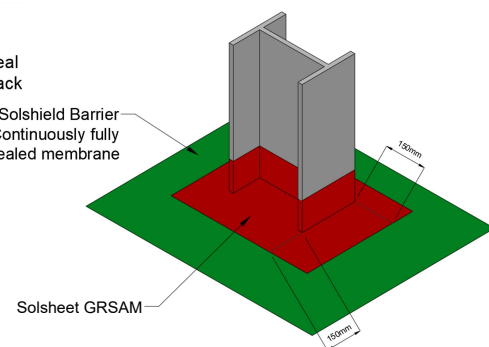
Typical Jointing Details for Solshield Ultra



Typical Lap Detail



Typical Penetration Detail

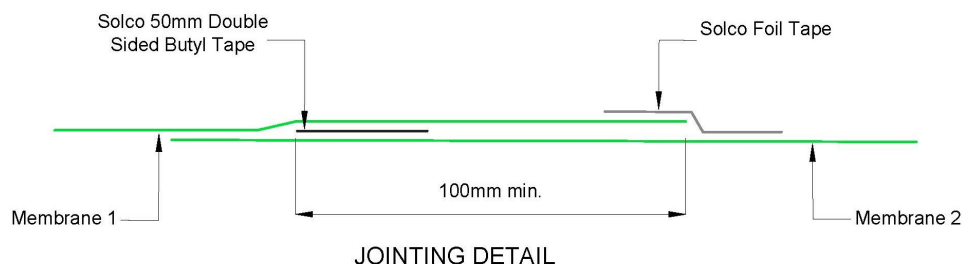


Typical Column Detail

Solco, Unit 51, Portmanmoor Road Industrial Estate, Ocean Park, Cardiff, CF24 5HB

Note:

All service entry points must have airtight seals. Top hats and corner pre-forms must be sealed using double sided butyl tape.



Solshield Ultra System Accessories

Solco Top Hats	Form an effective seal where a pipe, duct, or service penetrates Solsheet membranes.	Units
Solco Double Sided Butyl Tape	A double-sided synthetic butyl mastic tape, used for securing joints and laps in DPC's, Cavity trays & pre-formed Cloaks.	Rolls
Solco Foil Tape	A single-sided tape for securing laps & joints.	Rolls
Solco Venting Accessories	Allows the effective venting of gas from beneath a building.	Units
Solco Int / Ext Corners	Preformed units that ensure protection at corners.	Units
Solco GR DPC	A gas resistant tri-polymer damp proof course.	Rolls
Solco P30 Protection Fleece	Forms a protective layer to prevent damage to the membrane.	Rolls
Solsheet GR Self-Adhesive Membrane	A gas resistant self-adhesive membrane.	Rolls
Solseal HP Primer	Used to provide adhesion to bitumen enhanced geomembranes.	Tins
Solshield Venting Mat	Cuspated (HDPE) drainage mat for providing a drainage / venting channel.	Rolls
Solseal Liquid Gas Barrier	A gas resistant liquid applied membrane	Tins

Storage and Handling on Site:

- Solshield Ultra is classified as non-hazardous (code of practice CP102 1973).
- Rolls should be stored on a flat surface, kept under cover, and protected from sunlight and mechanical damage. The product is chemically inert and any acids or alkalis present in the subsoil will not affect the membrane.
- Do not use when exposed to sunlight and general outdoor weather conditions for long periods of time.
- Quality control during the laying of the membrane is extremely important.
- The membrane should be protected either through the use of temporary protection over its whole area or the immediate laying of the concrete slab. Care should be taken when handling building materials over the exposed surface.

Solco, Unit 51, Portmanmoor Road Industrial Estate, Ocean Park, Cardiff, CF24 5HB

REDUCED DIG – SITE PHOTOGRAPHS – FEB 2021





TOP SOIL – CERTIFICATE OF ANALYSIS



Certificate of Analysis

Client: STUART BALDWIN
(T283) SED SERVICES LTD
LANDGATE FARM
LANDGATE LANE
BRYN
WIGAN WN4 0EJ

Originator: SOIL

Lab ID: 34750 - 58265
Sample ID: SAMPLE 3
Sample Weight: 552g

Date Received: 16/12/2020
Date Reported: 11/01/2021

BS 3882 : 2015 SPECIFICATION FOR TOPSOIL Multipurpose Grade

				Compliant with range (Y/N)					
				Multi-P	Acid	Calc	Low-F	Low-F	Low-F
								Acid	Calc
		Unit	Result						
Texture:	Clay	% w/w	9						
	Silt	% w/w	8						
	Sand	% w/w	83						
	Textural Class		Loamy Sand	Y	Y	Y	Y	Y	Y
					See area of permitted soil textural classes in Fig. 1.				
Organic Matter:		% w/w	8.7	Y	Y	Y	Y	Y	Y
Coarse	>2 mm	% w/w	10.8	Y	Y	Y	Y	Y	Y
Fragment	>20 mm	% w/w	0.0	Y	Y	Y	Y	Y	Y
Content:	>50 mm	% w/w	0.0	Y	Y	Y	Y	Y	Y
Soil pH:			8.1	Y	N	Y	Y	N	Y
Carbonate:		% w/w	2.9			Y			Y
Available	Nitrogen	% w/w	0.412	Y	Y	Y			
Plant	Phosphorus	mg/l	72.0 (5)*	Y	Y	Y	N	N	N
Nutrients:	Potassium	mg/l	1375.4 (6)*	Y	Y	Y			
	Magnesium	mg/l	174.3 (3)*	Y	Y	Y			
Carbon:Nitrogen Ratio:		:1	12.3	Y	Y	Y	Y	Y	Y
Exchangeable Sodium Percentage:		%	8.0						
Phytotoxic	Total Zinc	mg/kg	104	Y	Y	Y	Y	Y	Y
Contaminants:	Total Copper	mg/kg	30.1	Y	Y	Y	Y	Y	Y
	Total Nickel	mg/kg	10.0	Y	Y	Y	Y	Y	Y
Visible	> 2mm	% w/w	0.00	Y	Y	Y	Y	Y	Y
Contaminants:	Plastics	% w/w	0.00	Y	Y	Y	Y	Y	Y
	Number of Sharps		0	Y	Y	Y	Y	Y	Y
Additional	Available Sodium	mg/l	251.0						
Analysis:	Available Calcium	mg/l	1535.0						
	Conductivity	uS/cm	3231	Y					
Compliance:				Y	N	Y	N	N	N

Results are expressed on a dry matter basis.

* Soil indices from RB209

Released by:

Myles Nicholson

Date: 11/01/2021

DECLARATION:

I certify that this sample has been analysed by NRM in accordance with BS 3882 Specification for Topsoil (2015).

NRM Coopers Bridge, Braziers Lane, Bracknell, Berkshire RG42 6NS

Tel: +44 (0) 1344 886338 **Fax:** +44 (0) 1344 890972 **Email:** enquiries@nrm.uk.com **www:** nrm.uk.com



Analytical Report

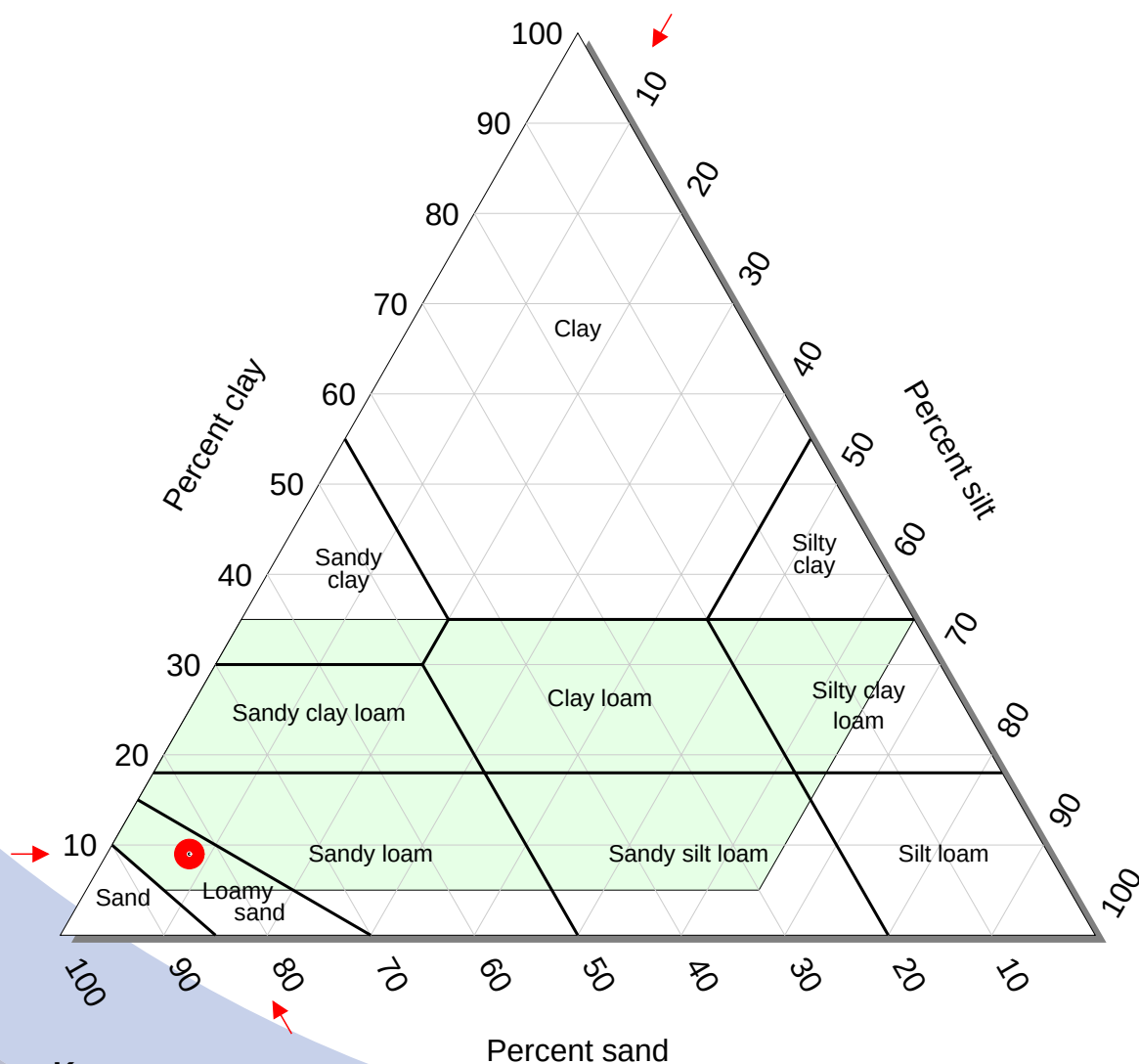
Client: STUART BALDWIN
(T283) SED SERVICES LTD
LANDGATE FARM
LANDGATE LANE
BRYN
WIGAN WN4 0EJ

Originator: SOIL

Lab ID: 34750 - 58265
Sample ID: SAMPLE 3
Sample Weight: 552g

Date Received: 16/12/2020
Date Reported: 11/01/2021

Fig. 1. Textural Class: Loamy Sand (compliant)



Key



Area within which texture of topsoil is required to fall.

TOPSOIL - CERTIFICATE OF COMPLIANCE



ANALYTICAL REPORT											
Report Number	34700-20	W918	SED SERVICES	Client HELSBY							
Date Received	16-DEC-2020		SED SERVICES LTD								
Date Reported	21-JAN-2021		LANDGATE FARM								
Project	SOIL		LANDGATE LANE								
Reference	ANDREW SCOTT		BRYN, WIGAN								
Order Number	10022538		WN4 0EJ								
Laboratory Reference		ENV 58249									
Sample Reference		HELSEBY									
Determinand	Unit	SOIL									
pH (Value)		8.6									
Available Phosphorus	mg/l	78 (5)									
Available Potassium	mg/l	1717 (7)									
Available Magnesium	mg/l	176 (4)									
Sand (2.00-0.063mm)	%	81									
Silt (0.063-0.002mm)	%	7									
Clay (<0.002mm)	%	12									
Total Nitrogen	% w/w	0.47									
Stones >50mm	%	0.0									
Stones 20-50mm	%	0.0									
Stones 2-20mm	%	18.7									
Conductivity (Sat CaSO4)	uS/cm	3875									
Available Sodium	mg/l	266									
Available Calcium	mg/l	1195									
Organic Matter by LOI	% w/w	9.2									
Organic Carbon	% w/w	5.3									
Neutralising Value as CaC03 equiv.	% w/w	4.3									
Neutralising Value as CaO equiv.	% w/w	2.4									
Copper	mg/kg	31.4									
Zinc	mg/kg	112									
Lead	mg/kg	52.9									
Arsenic	mg/kg	7.6									
Cadmium	mg/kg	0.33									
Nickel	mg/kg	<10									
Vanadium	mg/kg	11.9									



ANALYTICAL REPORT											
Report Number	34700-20	W918	SED SERVICES	Client HELSBY							
Date Received	16-DEC-2020		SED SERVICES LTD								
Date Reported	21-JAN-2021		LANDGATE FARM								
Project	SOIL		LANDGATE LANE								
Reference	ANDREW SCOTT		BRYN, WIGAN								
Order Number	10022538		WN4 0EJ								
Laboratory Reference		ENV 58249									
Sample Reference		HELSBY									
Determinand	Unit	SOIL									
Chromium	mg/kg	10.7									
Chromium Hexavalent	mg/kg	<0.2									
Mercury	mg/kg	<0.2									
Selenium	mg/kg	0.21									
Water Soluble Sulphate (1:2)	g/l	0.19									
Total Phenols Index	mg/kg	<1									
Total Cyanide	mg/kg	<1									
Easily liberated cyanide	mg/kg	<1									
MTBE	mg/kg	<0.05									
Benzene	mg/kg	<0.02									
Toluene	mg/kg	<0.2									
Ethylbenzene	mg/kg	<0.04									
m&p-Xylene	mg/kg	<0.2									
o-Xylene	mg/kg	<0.1									
Aliphatic TPH C5-C6	mg/kg	0.49									
Aliphatic TPH >C6-C8	mg/kg	0.68									
Aliphatic TPH >C8-C10	mg/kg	<0.05									
Aliphatic TPH >C10-C12	mg/kg	<10									
Aliphatic TPH >C12-C16	mg/kg	<10									
Aliphatic TPH >C16-C21	mg/kg	<10									
Aliphatic TPH >C21-C35	mg/kg	85.6									
Aliphatic TPH >C35-C44	mg/kg	30.0									
Aromatic TPH C5-C7	mg/kg	<0.05									
Aromatic TPH >C7-C8	mg/kg	<0.05									
Aromatic TPH >C8-C10	mg/kg	<0.05									



ANALYTICAL REPORT										
Report Number	34700-20	W918	SED SERVICES	Client HELSBY						
Date Received	16-DEC-2020		SED SERVICES LTD							
Date Reported	21-JAN-2021		LANDGATE FARM							
Project	SOIL		LANDGATE LANE							
Reference	ANDREW SCOTT		BRYN, WIGAN							
Order Number	10022538		WN4 0EJ							
Laboratory Reference		ENV 58249								
Sample Reference		HELSBY								
Determinand	Unit	SOIL								
Aromatic TPH >C10-C12	mg/kg	<10								
Aromatic TPH >C12-C16	mg/kg	<10								
Aromatic TPH >C16-C21	mg/kg	<10								
Aromatic TPH >C21-C35	mg/kg	94.2								
Aromatic TPH >C35-C44	mg/kg	44.2								
TPH [C5-C44]	mg/kg	255								
Total PAH [EPA-16]	mg/kg	5.4								
Naphthalene	mg/kg	<0.05								
Acenaphthylene	mg/kg	<0.05								
Acenaphthene	mg/kg	<0.05								
Fluorene	mg/kg	<0.05								
Phenanthrene	mg/kg	0.3								
Anthracene	mg/kg	<0.05								
Fluoranthene	mg/kg	1.0								
Pyrene	mg/kg	1.1								
Benzo[a]anthracene	mg/kg	0.5								
Chrysene	mg/kg	0.7								
Benzo[b]fluoranthene	mg/kg	0.5								
Benzo[k]fluoranthene	mg/kg	0.2								
Benzo[a]pyrene	mg/kg	0.5								
Indeno[1,2,3-cd]pyrene	mg/kg	0.3								
Dibenz[a,h]anthracene	mg/kg	<0.1								
Benzo[g,h,i]perylene	mg/kg	0.3								
Asbestos Screen		N.D.								
Dry Matter	% w/w	70.1								



ANALYTICAL REPORT											
Report Number	34700-20	W918	SED SERVICES	Client HELSBY							
Date Received	16-DEC-2020		SED SERVICES LTD								
Date Reported	21-JAN-2021		LANDGATE FARM								
Project	SOIL		LANDGATE LANE								
Reference	ANDREW SCOTT		BRYN, WIGAN								
Order Number	10022538		WN4 0EJ								
Laboratory Reference		ENV 58249									
Sample Reference		HELSBY									
Determinand	Unit	SOIL									
Total Visible Contaminants	%	0.00									
Number of Sharps	No.	0									
Total Fresh Weight	g	732.6									
Glass/Sharps	%	0.00									
Plastic	%	0.00									
Analysis Notes The sample submitted was of adequate size to complete all analysis requested. The results as reported relate only to the item(s) submitted for testing. The results are presented on a dry matter basis. [29~ Sample Storage A portion of the sample will be stored for 3 weeks from the reported date. Asbestos N.D. = A portion of the as-received sample was subcontracted for a visual screen. It has been reported that 'no asbestos has been detected in the representative sub-sample analysed.' Document Control This test report shall not be reproduced, except in full, without the written approval of the laboratory.											
Reported by <i>K. Hermanowska</i> Environmental Supervisor Natural Resource Management, a trading division of Cawood Scientific Ltd. Coopers Bridge, Braziers Lane, Bracknell, Berkshire, RG42 6NS Tel: 01344 886338 Fax: 01344 890972 email: enquiries@nrm.uk.com											



STUART BALDWIN
SED SERVICES LTD
LANDGATE FARM
LANDGATE LANE
BRYN
WIGAN WN4 0EJ

ANALYSIS REPORT ~ COMPOSTED MATERIAL

Customer information

Composting site Bryn Hall
Grade (particle size range) 0-25mm
Grade Type Principal
CA's Code SED-BH-00
Date sampled 07/12/2020
Batch age when sampled 8 Weeks
Producer's sample code BH200

Laboratory information

Received at lab 08/12/2020
Lab sample name BH200 0-25MM 8 WEEKS
Lab sample number 118757
Report by Gina Graham
Report date 06/01/2021 09:17am
Report number 33565

WATER EXTRACTABLE NUTRIENTS¹

Parameter	As received (fresh)		In dry matter		Method	Plant significance
	Result	Units	Result	Units	Reference	
NH4-N (ammonium-N)	<1	mg/l*	<1	mg/kg	BS EN 13652	Primary nutrients
NO3-N (nitrate-N)	<1	mg/l*	<1	mg/kg	BS EN 13652	
NH4-N plus NO3-N	<1	mg/l	<1	mg/kg	Calculated	
Phosphorus as P	N/D	mg/l	N/D	mg/kg	BS EN 13652	
Potassium as K	N/D	mg/l	N/D	mg/kg	BS EN 13652	
Calcium as Ca	N/D	mg/l	N/D	mg/kg	BS EN 13652	Secondary nutrients
Magnesium as Mg	N/D	mg/l	N/D	mg/kg	BS EN 13652	
Sulphur as S	N/D	mg/l	N/D	mg/kg	BS EN 13652	
Boron as B	N/D	mg/l	N/D	mg/kg	BS EN 13652	Trace nutrients
Copper as Cu	N/D	mg/l	N/D	mg/kg	BS EN 13652	
Iron as Fe	N/D	mg/l	N/D	mg/kg	BS EN 13652	
Manganese as Mn	N/D	mg/l	N/D	mg/kg	BS EN 13652	
Molybdenum as Mo	N/D	mg/l	N/D	mg/kg	BS EN 13652	
Zinc as Zn	N/D	mg/l	N/D	mg/kg	BS EN 13652	
Chloride as Cl	135	mg/l	1769	mg/kg	BS EN 13652	See footnote 2
Sodium as Na	N/D	mg/l	N/D	mg/kg	BS EN 13652	

1 Water extractable values are a measure of nutrient concentrations immediately available to plants.

2 Sodium together with chloride, influences nutrient uptake by plants and can inhibit this at high concentrations.

N/D = Not Determined, N/A = Not Applicable, U/S = Unsuitable Sample

* The QP Manager (the 'web tool') requires the test result associated with this unit.



STUART BALDWIN
SED SERVICES LTD
LANDGATE FARM
LANDGATE LANE
BRYN
WIGAN WN4 0EJ

ANALYSIS REPORT ~ COMPOSTED MATERIAL

Customer information

Composting site Bryn Hall
Grade (particle size range) 0-25mm
Grade Type Principal
CA's Code SED-BH-00
Date sampled 07/12/2020
Batch age when sampled 8 Weeks
Producer's sample code BH200

Laboratory information

Received at lab 08/12/2020
Lab sample name BH200 0-25MM 8 WEEKS
Lab sample number 118757
Report by Gina Graham
Report date 06/01/2021 09:17am
Report number 33565

TOTAL NUTRIENTS¹

Parameter	As received (fresh)		In dry matter		Method	Plant significance
	Result	Units	Result	Units	Reference	
Nitrogen As N	N/D	mg/l	N/D	mg/kg	Modified Kjeldahl,	Primary nutrients
	N/A	% m/m	N/A	% m/m*	BS EN 13654-1	
	671	mg/l	8790	mg/kg	Dumas, BS EN	
	0.13	% m/m	0.88	% m/m	13654-2 ²	
Phosphorus as P	150	mg/l	1972	mg/kg	BS EN 13650	
	0.03	% m/m	0.20	% m/m*	BS EN 13650	
Potassium as K	230	mg/l	3019	mg/kg	BS EN 13650	
	0.05	% m/m	0.30	% m/m*	BS EN 13650	
Calcium as Ca	1266	mg/l	16598	mg/kg	BS EN 13650	Secondary nutrients
	0.25	% m/m	1.66	% m/m	BS EN 13650	
Magnesium as Mg	209	mg/l	2742	mg/kg	BS EN 13650	
	0.04	% m/m	0.27	% m/m	BS EN 13650	
Sulphur as S	105	mg/l	1374	mg/kg	BS EN 13650	Trace nutrients
	0.02	% m/m	0.14	% m/m*	BS EN 13650	
Boron as B	0.6	mg/l	7.8	mg/kg	BS EN 13650	
Copper as Cu	2.34	mg/l	30.7	mg/kg	BS EN 13650	
Iron as Fe	517	mg/l	6776	mg/kg	BS EN 13650	
Manganese as Mn	25.1	mg/l	329	mg/kg	BS EN 13650	
Molybdenum as Mo	N/D	mg/l	N/D	mg/kg	BS EN 13650	
Zinc as Zn	8.62	mg/l	113	mg/kg	BS EN 13650	
Sodium as Na	24.6	mg/l	323	mg/kg	BS EN 13650	See footnote 3

1 This method uses hydrochloric- and nitric-acid extractant ("aqua regia:") and approximates "total" rather than "bioavailable" concentrations of the above elements.

2 Unsuitable for materials containing free ammonia because this may be lost when samples are flushed with oxygen during the procedure, e.g. if compost sample contains > 500 mg/l ammonium.

3 Together with chloride, influences nutrient uptake by plants and can inhibit this at high concentrations.

N/D = Not Determined, N/A = Not Applicable, U/S = Unsuitable Sample

* The QP Manager (the 'web tool') requires the test result associated with this unit.



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ANALYSIS REPORT ~ COMPOSTED MATERIAL

Customer information

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Grade Type Principal
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Producer's sample code BH200

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POTENTIALLY TOXIC ELEMENTS¹ AND UNDESIRABLES

Parameter	As received (fresh)		In dry matter				Method reference
	Result	Units	Result	Pas100 upper limit	Units	Pass or Fail	
Arsenic as As	N/D	mg/l	N/D	N/A	mg/kg	N/A	
Cadmium as Cd	0.04	mg/l	0.48	1.50	mg/kg*	Pass	BS EN 13650
Chromium as Cr	1.09	mg/l	14.2	100.00	mg/kg*	Pass	BS EN 13650
Copper as Cu	2.34	mg/l	30.7	200.00	mg/kg*	Pass	BS EN 13650
Fluoride as F	N/D	mg/l	N/D	N/A	mg/kg	N/A	
Lead as Pb	1.24	mg/l	16.2	200.00	mg/kg*	Pass	BS EN 13650
Mercury as Hg	<0.1	mg/l	<0.1	1.00	mg/kg*	Pass	BS ISO 16772
Molybdenum as Mo	N/D	mg/l	N/D	N/A	mg/kg	N/A	BS EN 13650
Nickel as Ni	0.75	mg/l	9.85	50.00	mg/kg*	Pass	BS EN 13650
Selenium as Se	N/D	mg/l	N/D	N/A	mg/kg	N/A	
Zinc as Zn	8.62	mg/l	113	400.0	mg/kg*	Pass	BS EN 13650
Oils, Fats and Grease	N/D	mg/kg	N/D	N/A	mg/kg	N/A	

¹ Zinc and Copper are required by plants but, similarly as with other PTEs, can be toxic to some plant species at high concentrations. Such effects are influenced by other factors, so may not necessarily occur if corresponding PTE upper limits are exceeded. Check plant response test results for any toxic effects.

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PHYSICO-CHEMICAL PROPERTIES

Parameter	As received (fresh)		In dry matter		Method
	Result	Units	Result	Units	Reference
Bulk Density ¹	508	g/l*		g/l	BS EN 12580
Oven Dry Matter	15.0	% m/m	N/A		BS EN 13040
Moisture	85.0	% m/m	N/A		
Organic Matter (Loss On Ignition)	5.4	% m/v	70.9	% m/m*	BS EN 13039
Organic Carbon (LOI / 1.72)	N/A		41.2	% m/m*	Calculated
pH	6.2	N/A*	N/A		BS EN 13037
Electrical Conductivity	127	uS/cm @ 20 C	N/A		BS EN 13038
	0.13	mS/cm @ 20 C	N/A		
Liming potential	N/D	% m/m CaO	N/D	% CaO	See Footnote 2

1 Bulk density in dry matter is termed 'Dry Weight Density' and expressed in (g/l).

DWD = fresh bulk density (g/l) - volumetric moisture content (g/l)

2 'The Fertilisers (Sampling and Analysis) Regulations 1996' Schedule 2, Part II, Section 6 - 'Determination of the neutralising value of liming materials'. Method adaptation: the stage of passing the sample through a 1 mm sieve is omitted and results are expressed as % by weight of CaO on the undried sample, as received.

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If we are unable to accurately measure the density of the sample due to its non-homogeneous state, the density will be assumed to be 700 g/l.



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PATHOGENS

Parameter	As received (fresh)				Method Reference
	Result	PAS 100 upper limit	Unit	Pass or Fail	
E. coli at 44 C ³	<10	1000	CFU/g	Pass	BS ISO 16649-2
Salmonella spp at 37 C ³	Absent	Absent	Abs/Pres	Pass	BS EN 6579

STABILITY / MATURITY

Parameter	As received (fresh)				Method Reference
	Result	PAS 100 upper limit	Unit	Pass or Fail	
Carbon dioxide (evolution rate) ³	1.9	16.0	mg CO ₂ / g organic matter / day	Pass	WRAP ORG0020
Proportion of particles < 20 mm ³	100	N/A	% g/g	N/A	

Parameter	As received (fresh)				Method Reference
	Result	Units	Result	Units	
NH ₄ -N : NO ₃ -N (ratio)	N/A	:1	N/D	:1	Calculated
Carbon : Nitrogen (ratio)	N/A		46.9	:1	Calculated
Self-heating (Dewer flask)	N/D	Max deg C increase	N/D		See footnote 1
Nitrogen Drawdown Index	N/D	None	N/D		AS 3743-2003 ²

1 Methods book for the analysis of compost, Bundesgutegemeinschaft Kompost e. V., 2002.
ISBN 3-928179-33-0 (English translation, 2003)

2 Australian standard (2003), Appendix E, Potting Mixes. The Nitrogen Drawdown Index AS 3743 - 2003.
(Indicates likelihood of nitrogen lock-up.)

3 Determinand has been analysed by a subcontractor approved and audited by the Appointed Laboratory (NRM)

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PLANT RESPONSE ~ GERMINATION AND GROWTH OF TOMATO PLANTS AND WEEDS

Method as per PAS 100:OFW004-006

Parameter	Peat unamended	Compost unamended	Unit
Quantity 'Selected before sieving'	981	1037	g
Quantity 'Sieved, particles < 10 mm'	981	1023	g
Proportion of particles < 10 mm'	100	99	% g/g
Electrical conductivity	24	127	uS cm
Bulk density	218	508	g/l
Mass dolomitic limestone mixed in	18	13.5	g
Mass fertiliser mixed in	4.8	4.8	g

Parameter	Peat control For 3 trays	Compost-peat test For 3 trays	Unit
Quantity of sieved peat	4.50	3.375	litres prepared
Quantity of sieved compost	0.00	1.125	litres prepared
Substrate(s) ratio (vol : vol)	4.50 : 0.00	3.00 : 1.00	peat:compost



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PLANT RESPONSE ~ GERMINATION AND GROWTH OF TOMATO PLANTS AND WEEDS

Method as per PAS 100:OFW004-006

Parameter	Peat control			Compost-peat test			Overall	Unit
	Tray 1	Tray 2	Tray 3	Tray 1	Tray 2	Tray 3		
Weed plants PAS 100 upper limit Pass or Fail	0	0	0	0	0	0	0 0.0 Pass	per litre compost as received
Germinated tomato plants 10 days after sowing 14 days after sowing 28 days after sowing PAS 100 minimum performance Pass or Fail 14 day total for all 3 trays	10 10 10 30	10 10 10 	10 10 10 	10 10 10 	10 10 10 	10 10 10 	100.0 100.0 100.0 80.0 Pass Test Valid	test as % of controls
Tomato plant growth after 28 days sowing Total mass per tray (g) Average mass per plant (g) PAS 100 minimum performance Pass or Fail Average tomato plant mass	33.74 3.37 3.45	35.51 3.55 	34.42 3.44 	36.56 3.66 	38.32 3.83 	34.05 3.41 	105.1 105.2 80.0 Pass Test Valid	
Observations at any time during test								
Abnormal Tomato Plants								
Description of Abnormalities:		No abnormal tomato plants in any tray.						
Abnormalities in plants grown in test sample trays that are not present in plants grown in control trays:		Absent						
Assessment of Test Validity								
Abnormalities in plants grown in control trays:		Absent						
Valid if abnormalities absent in plants grown in control trays:		Test Valid						
Additional factors affecting the report:		None.						

All of the above tests have been analysed by a subcontractor approved and audited by the Appointed Laboratory (NRM)



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PHYSICAL CONTAMINANTS (air-dry sample)

Sieve apertures	Glass	Metal	Plastic	Other ²	Description	Total ³	of which sharps ⁴	Stones ⁵	Method Reference
mm	g	g	g	g		g	g	g	
31.5	Zero	Zero	Zero	Zero		Zero	Zero	Zero	AfOR MT, PC&S ¹
16.0	Zero	Zero	Zero	Zero		Zero	Zero	Zero	
12.5	Zero	Zero	Zero	Zero		Zero	Zero	Zero	
8.0	Zero	Zero	Zero	Zero		Zero	Zero	1.53	
4.0	Zero	Zero	Zero	Zero		Zero	Zero	1.44	
2.0	Zero	Zero	Zero	Zero		Zero	Zero	Zero	
1.0	N/D	N/D	N/D	N/D	N/A	N/D	N/D	N/D	
Pan	N/D	N/D	N/D	N/D	N/A	N/D	N/D	N/D	
% of total sample > 2 mm	0.00	0.00	0.00	0.00		0.00	0.00	N/A	
% of total sample > 4 mm	N/A	N/A	N/A	N/A		N/A	N/A	1.33	
PAS 100 upper limit for 'mulch'			0.12			0.25	R	10.0	
Pass or Fail			Pass			Pass	R	Pass	
for other than 'mulch'			0.12			0.25	R	8.0	
Pass or Fail			Pass			Pass	R	Pass	

A = Paper/Card B = Textile C = Matting D = String G = Wool H = Cigarette Butt

1 State whether with modification, i.e. sieves added or omitted

2 Any different physical contaminant type; name in 'Description'

3 'Total' is for glass, metal, plastic and 'other'. N.B.: excludes stones

4 Sharps > 2mm, or any inorganic physical contaminant type (excludes woody fragments)

5 Stones and other consolidated mineral contaminants

R Refer to composter's quality policy for upper limit allocation to the compost grade and intended market / end use, and evaluate sharps result against that limit.

N/D = Not Determined, N/A = Not Applicable, U/S = Unsuitable Sample



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PARTICLE SIZE DISTRIBUTION (air-dry sample)

Sieve apertures mm	Sample Retained g	of which Compost Retained g	Cumulative		Method Reference
			Retained %	Passing %	
31.5	0.00	0.00	0.0	100.0	AfOR MT, PC&S ¹
16.0	23.17	23.17	10.5	89.5	
12.5	10.66	10.66	15.3	84.7	
8.0	17.81	16.28	22.7	77.3	
4.0	58.64	57.20	48.6	51.4	
2.0	30.18	30.18	62.3	37.7	
1.0	34.14	34.14	77.7	22.3	
Pan	49.18	49.18	100.0	0.0	
Total	223.8	220.8			

1 State whether with modification, i.e. sieves added or omitted

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SUMMARY ~ PAS100 "PASS" OR "FAIL"

Parameter	Result	PAS 100 upper limit	Unit	Pass or Fail	Method Reference
E. coli ¹	<10	1000	CFU/g	Pass	BS ISO 16649-2
Salmonella spp ¹	Absent	Absent	Absent/Present	Pass	BS EN 6579
Cadmium as Cd	0.48	1.50	mg/kg	Pass	BS EN 13650
Chromium as Cr	14.2	100.00	mg/kg	Pass	BS EN 13650
Copper as Cu	30.7	200.00	mg/kg	Pass	BS EN 13650
Lead as Pb	16.2	200.00	mg/kg	Pass	BS EN 13650
Mercury as Hg	<0.1	1.00	mg/kg	Pass	BS ISO 16772
Nickel as Ni	9.85	50.00	mg/kg	Pass	BS EN 13650
Zinc as Zn	113	400.00	mg/kg	Pass	BS EN 13650
CO ₂ (stability) ¹	1.9	16.0	mg/g OM / d	Pass	WRAP ORG0020
Weed plants ¹	0	0	number growing	Pass	PAS100:OFW004-006
Glass,metal,plastic and other	0.00	0.25	% of 'air-dry' sample	Pass	PAS100:2005, Annex E
Plastic	0.00	0.12	> 2mm	Pass	
Stones in "mulch"	1.33	10	% of 'air-dry' sample	Pass	
Stones in other than "mulch"	1.33	8	> 4mm	Pass	

Parameter	Result	PAS 100 min.	Unit	Pass or Fail	Method Reference
Plants germinated	100.0	80	no. of plants, test as % of controls	Pass	PAS100:OFW004-006
Plant top growth	105.2	80	average g / plant, tests as % of controls	Pass	
Tomato plant abnormalities	Absent	Absent	Abnormal tomato plants in test trays	Pass	

¹ Determinand has been analysed by a subcontractor approved and audited by the Appointed Laboratory (NRM)

OVERALL ASSESSMENT

Pass if all above results are 'Pass' and weed propagules and phytotoxins test is valid.

Fail if any of above results are 'Fail'.



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SUMMARY ~ PAS100 "PASS" OR "FAIL"

Validity of the Plant Response Test

Parameter	Result	Validity Criterion	Outcome
Germination of tomato seeds sown in control trays	30	>=27 tomato plants in control trays by 14 days after sowing	Valid
Tomato plant top growth in control trays	3.45	>2.00g per tomato plant in control trays	Valid
Abnormal tomato plants in control trays	Absent	No abnormal tomato plants in control trays	Valid

OVERALL ASSESSMENT

Pass if all above results are 'Pass' and weed propagules and phytotoxins test is valid.
Fail if any of above results are 'Fail'.

The sample was dispatched on the same day as sampling
The sample was received within 48 hours after dispatch.
The compost was received in a cool box with ice packs