VALIDATION REPORT
OF

REMEDIATION

HOUSE PLOTS 14 to 21
MIDLOTHIAN, NEW MILL
HOLMFIRTH, HD9 7LN

FOR

SIGNATURE HOMES (Yorkshire) LTD

REPORT REF: SIG 3454 VAL 14-21

Engineering Geologists and Environmental Scientists



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ASHTON BENNETT CONSULTANCY

Engineering Geologists & Environmental Scientists

June 2021

Ashton Bennett

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Quality Management

Project	House Plots14 to 21, Former Midlothian Site, New Mill Road, Holmfirth, HD9 7LN		
Client	Signature Homes (Yorkshire) Ltd		
Date	June 2021		
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	Tristan Bennett	BSc (Hons)	Engineer

1. INTRODUCTION

1.1 The report

Signature Homes (Yorkshire) Ltd have planning permission to construct 56 houses on a site formerly known as Midlothian in New Mill Road, Holmfirth, HD9 7LN. This report describes the Validation of the remediation undertaken beneath the house plots 14 to 21 inclusive in Phase I of the development to make the plots suitable for their proposed use. The report was commissioned by the client Signature Homes (Yorkshire) Ltd and was carried out by the Ashton Bennett Consultancy.

Phase I and Phase II Reports were undertaken on the site in 2008, 2015 and 2018 and a Remediation Statement compiled by Eastwood and Partners Consulting Engineers was agreed by Kirklees Council in 2019. The Remediation Statement described the remediation required on the site to render the site suitable for its proposed use for residential housing with gardens.

This Report describes the remediation undertaken on house plots 14 to 21 and validates that these house plots have been remediated in accordance with the Remediation Statement.

Photographs of the remediation are presented in Appendix A, environmental test results for validation and guidelines for environmental assessment and confirmation

of a MCERTS accredited laboratory for soil testing are presented in Appendix B. Gas membrane verification plan and validation reports are presented in Appendix C.

The information for this report is from sources recommended by the Institute of Civil Engineers (ICE), the Association of Geotechnical and Geoenvironmental Specialists (AGS), Construction Industry Research and Information Association (CIRIA) and the Department of the Environment Transport and the Regions (DETR). The report has been compiled in accordance with the latest ICE, DETR, Department of Environment, Food and Rural Affairs (DEFRA), British Standard Draft Documents and British Standards, CIRIA, CLR 11 & other CLEA Reports and Eurocode 7, and the Verification Requirements for Cover Systems, Technical Guidance for Developers, Landowners and Consultants, Yorkshire and Lincolnshire Pollution Advisory Group November 2017.

In addition, the scope of the investigation has used the extensive knowledge and experience of the staff of Ashton Bennett Consultancy to assess the data and to interpret the findings.

1.2 Site Address and Planning Reference

The site address is Signature Homes (Yorkshire) Ltd, New Mill Road, Holmfirth, HD9 7LN.

The Planning Reference is 2015/93824.

1.3 Responsible Persons

Mr John Hewitt of Signature Homes Yorkshire Ltd is responsible for site management.

This report was prepared by Frances A Bennett an engineering geologist who has a degree in Geology, a postgraduate qualification in Soil Mechanics and is a Chartered Geologist CGeol, Chartered Environmentalist CEnv and Chartered Water and Environmental Manager C.WEM with 45 years of experience in the fields of geology, geotechnical engineering, slope stability, hydrogeology, contamination, mining, waste disposal and site management.

2. THE SITE

2.1 Site Description

The proposed roadway lies within the site formerly known as Midlothian which lies to the west of the A635 New Mill Road, one mile north of Holmfirth town centre. The site measures circa 2.07 hectares and lies around National Grid Reference 414898E 409262N. The site topography generally slopes from 183m aOD in the south to 172m aOD in the north.

Access to the site is to the east of the site from the A635 New Mill Road.

The development site is bounded to the north by tennis courts and residential housing. The site is bounded to the west by a slope down to a footpath known as Berry Bank Lane with the former Holmfirth rail lines and the Sands Recreation Ground and River Holme at lower ground levels.

The site is bounded to the south by two houses with large gardens, and to the east by the A635 with residential houses and gardens beyond.

The existing main vehicular and pedestrian access to the site is from New Mill Road near the centre of the site frontage.

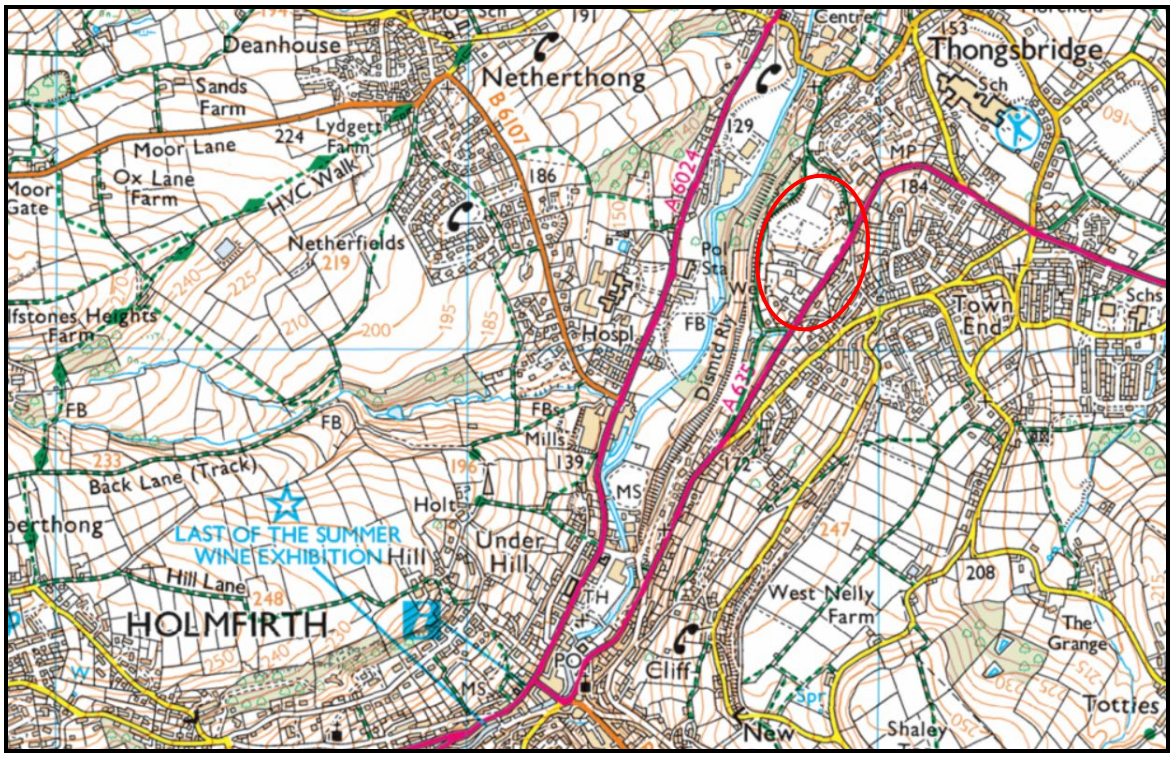

Figure 1 Site Location Plan

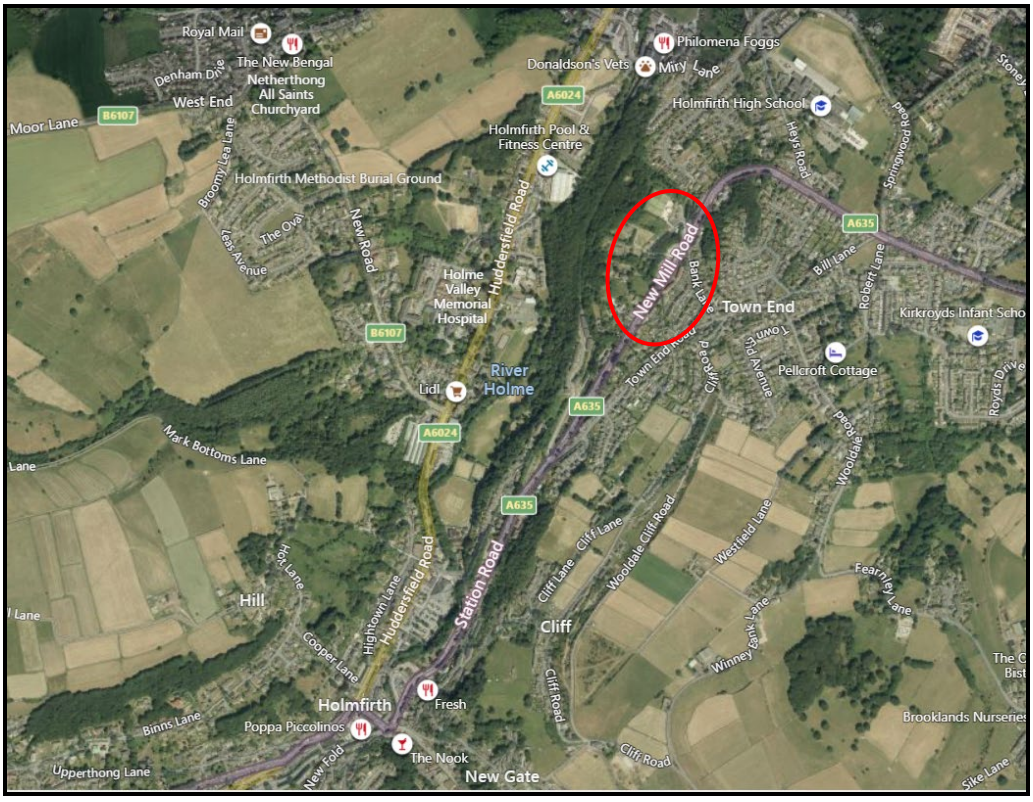

Figure 2 Aerial Site Location Plan

2.2 The Project

The project involves the demolition of all existing buildings on the site and construction of 56 houses in two phases of development as detailed on Figure 3.

The subject of this report is the validation of remediation and mitigating measures for House Plots 14 to 21 inclusive within Phase I of the development.

Figure 3 Site Plan

3. GEOLOGY

The geological maps of the British Geological Survey (BGS) at 1:10,560 scale, County series 260SE, indicate the site to be underlain by strata of the Millstone Grit Series. The Huddersfield White Rock Sandstone is indicated to underlie the majority of the site, with the Marsden Formation mudstone and siltstone beneath the eastern edge of the site. The Huddersfield White Rock is underlain by the Guiseley Grit to the west of the River Holme.

The strata are shown by the BGS map to dip at 8 degrees to the horizontal towards the east, with the Huddersfield White Rock overlain by the Rossendale Formation and the Rough Rock Sandstone east of the site. The Huddersfield White Rock Sandstone is indicated to be exposed along Berry Bank Lane with a height of 12ft or 3.3m of 'massive flaggy grit overlain by sandy shale and flags'.

No alluvial or other superficial deposits are indicated to be present. Made ground was generally recorded at depths of 0.10m to 0.40m in the ground investigations beneath house plots 14 to 21.

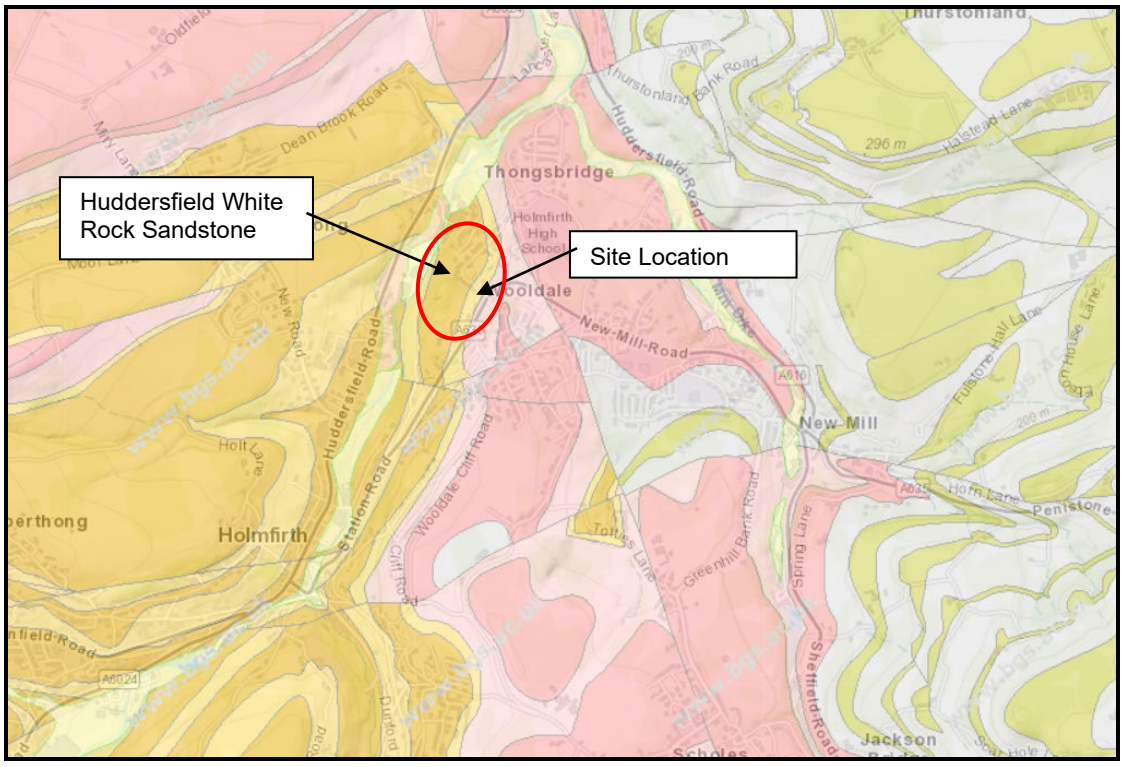

Figure 4 Site Geology Plan

4. REMEDIATION STRATEGY

4.1 Objectives

The objective of the Remediation Strategy was to ensure, according to the 1990 Environment Act the condition of the land is unlikely to cause pollution to the environment or harm to human health. The objective of the Remediation Strategy was to ensure an environmentally safe site for the construction and future use of the site for residential houses with gardens and with landscaped ground. The objectives include:

- To install gas protection measures in accordance with NHBC Amber 2 specification in all plots.
- To ensure that 600mm of clean inert physically suitable, permeable material, including at least 150mm of topsoil, is present within gardens and areas of soft landscaping where made ground remains. A geotextile membrane is to be included at the base of the capping layer.
- Upon identification of any additional or unexpected contamination, a suitable strategy to determine any remedial action is to be in place.
- To reduce the risks to construction workers, they should be aware of the presence of elevated levels of contaminants and ensure that appropriate personal protective equipment (PPE) is used and worn and the requisite working practices are adhered to. No further guidance with regard to this is considered necessary as part of this document.

4.2 Mitigation Proposals
4.2.1 Contamination

The concentrations of contaminants recorded at elevated levels in the ground investigations were localised throughout the made ground and were generally only mildly elevated above the respective assessment values. Several elevated concentrations were sporadically encountered and at significant depth below ground level.

The Remediation Implementation Plan stated that where made ground is to remain beneath private gardens or soft landscaped areas of the proposed development, the potential risks to human health presented by the made ground could be mitigated through the use of a capping layer of inert material which should be placed above the made ground.

The capping layer should be a minimum of 600mm in thickness. At least 150mm of this capping thickness should comprise topsoil to act as a growing medium for plants. A geotextile membrane should be included at the base of the capping to differentiate between the subsoil and the underlying made ground.

The placement of the capping layer will also mitigate against the slight risk to plant growth presented by elevated levels of phytotoxic metals within the soils.

4.2.2 Gas

Gas has been monitored on the site from the 1980s by Kirklees Council and by Consultants acting for Tesco Stores and for Prospect Estates between 2008 and 2018. The recent results indicated that low levels of carbon dioxide were present and methane was generally absent. Elevated levels of gas were recorded in three boreholes in the north west of the site with carbon dioxide levels up to 20.4% and methane up to 27.4%. A maximum flow of 0.7l/hr was recorded and the results indicate that the site is classified as 'Amber 2' under the NHBC traffic light classification system, assuming that the precast concrete floors with a ventilated void below would be used for all plots. Radon protection measures are not required.

5. REMEDIATION AND MITIGATION

The remediation comprised mitigating measures including the incorporation of a methane resistant membrane within construction of the houses, in accordance with the GeoShield Verification Plan presented in Appendix C, and in accordance with the NHBC Amber 2 traffic light classification.

A gas membrane to specification BS8485 :2015+2019 was installed to CIRIA 735. The building Type is Type A and the site is C53. The membrane was installed in accordance with the GeoShield Verification Plan and verified by GeoShield staff.

The substrata was prepared in accordance with manufacturers instructions and BS8485. Materials used were Visqueen standard gas barrier, Visqueen GR DPC, Visqueen double sided butyl tape and GR Foil tape and Lap Tape, Visqueen Pro

Detailing Tape and telescopic air vents. The specifications for these are presented in the Verification Plan in Appendix C.

The NHBC Amber '2' gas protection system requires 4.5 points and compliance is achieved by building a suspended block and beam floor with a ventilated subfloor void with a gas membrane on top. The ground gas membrane must meet the requirements of BS8485:2019 Table 7 and also the products specified in the plan. The 4.5 points were achieved with 2.5 points for the venting and 2 points for the gas membrane.

Photographs, records and details of the Geoshield validation for house plots 14 to 21 are included in Appendix C.

There were no special necessary requirements to control dust, noise, odours associated with the remediation. There was no requirement for control of water run off associated with remediation.

The front gardens will be hard covered. In the rear gardens an orange geotextile was laid on natural ground, overlain by 600mm of topsoil tested as uncontaminated, and covered in turf.

The topsoil was imported from a greenfield site at Hade Edge, Holmfirth known to the environmental engineer. Visual inspection indicated a good organic content making it suitable for growing. The topsoil was free of obvious contaminating materials with no odour, staining or free product. The topsoil was free from bricks and other waste materials, and there was no evidence of asbestos fibres. The donor site does not contain Japanese Knotweed. Test results for the topsoil as imported are presented in Report 90429 in Appendix B. The topsoil was found to be uncontaminated by heavy metals, PAH USEPA16, TPH CWGUK, asbestos fibres and to have acceptable levels of pH and sulphate for use on residential gardens. Approximately 400m3 of topsoil was used for the gardens.

The geotextile was an Abtex Orange, a permeable split tape woven polypropylene geotextile for use as a separator and marker layer in civil engineering. It has a mass of 62g/m2 and a tensile strength of 10/9kN.m2, it is 1500N CBR puncture resistant. A full specification is presented in Appendix B.

The rear gardens were covered in a geotextile and 600mm of topsoil before turfing. Visits were made to site to view the laying of the geotextile and photographs are presented in Appendix A. Testing was undertaken in the rear gardens of all plots to check 600mm thickness of topsoil above the geotextile and soil samples were collected for testing for potential contaminating compounds.

All laboratory testing of soil samples for validation as uncontaminated soil was carried out by a NAMAS MCERTS accredited laboratory.

Observations during the ground works to construct the houses did not detect any soil remaining in the ground with an unusual odour, colour or appearance that would suggest it was contaminated.

Photographs of the remediation of the rear gardens are presented in Appendix A.

6. VALIDATION

6.1 Geotextile and Depth of Topsoil

Validation of the geotextile laid in the rear gardens of house plots 14 to 21 was undertaken by daily inspection during placing and covering in topsoil. The geotextile was laid overlapping between plots. Figure 5 illustrates the geotextile beneath the first layer of topsoil. All the soil laid was topsoil and the thickness was confirmed by insertion of a metal rod of appropriate length. Photographs are presented in Appendix A.

Figure 5 Geotextile

6.2 Environmental Testing of Topsoil

6.2.1 Methodology

Of the soil samples collected, 9 samples were selected for testing, 8 from the gardens of House plots 14 to 21 and one from the topsoil stockpile. The soil samples were tested by Chemtech of County Durham, a MCERTS laboratory, for speciated Polyaromatic Hydrocarbons (PAH), speciated Total Petroleum Hydrocarbons (TPH), sulphate, pH, asbestos and heavy metals. Results are detailed in Tables 1, 2 and 3 and are presented in full in Appendix B.

In addition, one sample was tested from the topsoil stockpile and results are presented in Tables 4, 5 and 6 and in full in Appendix B.

All environmental test results are presented in full in Appendix B.

6.2.2 Environmental Assessment Guidelines

There are no definitive legal standards for contaminated land in the United Kingdom, although the Government Department of the Environment in the late 1970's published guidance on a restricted number of contaminants. Further guidance was published in March 2002 as the Contaminated Land Exposure Assessment (CLEA) by the Department of Environment, Food and Rural Affairs (DEFRA). These were withdrawn in August 2008 and new guidelines for some compounds were released in 2009. The UK Risk Assessment Framework is based on a tiered approach, Tier 1 being a risk screening or qualitative risk assessment, Tier 2 is a generic quantitative risk assessment and Tier 3 is a detailed quantitative risk assessment. Where the Tier 2 identifies a potentially unacceptable risk to human health either a Tier 3 Detailed Quantitative Risk Assessment (DQRA) is undertaken or risk management action recommended to remove the pathway and the risk.

For this site both a Tier 1 and Tier 2 assessment have been undertaken using generic assessment criteria and site specific assessment criteria based on CLEA 2009 and ATRISK 2019 which are based on the new CLEA guidance 2008 and 2009 (SC050021/SR3 (the CLEA Report) and SC050021/SR2 (the TOX report), SC050021/SR4, CLEA Software version 1.071 (2015) and toxicological reports and SGV technical notes (2009)). The figures used for assessment of lead are from DEFRA(2014b), Category 4 Screening Levels, which are based on the 'low level of toxicological concern (LLTC)'. C4SLs are 'estimates of contamination concentration in soil that present acceptable risk within the context of Part 2A'. In addition, assessment has used the LQM/CIEH S4ULs (2015) for Human Health Risk Assessment. The S4ULs are based on the principles of 'minimal' or 'tolerable' risk enshrined in SR2 (EA2009A), which has not been withdrawn and are based on the EA software. The guidance set out in these documents has been used to establish a conceptual model of the risks on the site.

The site will be used for residential use with plant uptake and landscaped ground. The risk assessment has used a scenario of residential use with plant uptake as the model for assessment. In deriving the SSVs a child has been chosen as the critical receptor with exposure over a lifetime being the most appropriate and conservative scenario.

The assessment of the risks to users on the site has been undertaken within the framework set out in guidance published by DEFRA and the Environment Agency for the assessment of risks to human health associated with chronic long term exposure to contaminated soils. The guidance set out in this documentation has been used to establish a conceptual model of the risks on the site following redevelopment.

The Contaminated Land Exposure Assessment (CLEA) model provides a means of establishing concentrations of contamination in soils at a site. If results exceed these concentrations, then further assessment or intervention by mitigation or remediation may be required to reduce risks to human health.

6.2.3 Environmental Test Results for House Plots 14 to 21

On June 10th 2021, 9 soil samples were collected from the rear gardens of house plots 14 to 21 and the topsoil stockpile. Samples were initially displaced and the hydrocarbon tests were out of time, so additional soil samples were collected on June 28th and tested for TPH, PAH and pH. There was no olfactory evidence of hydrocarbons during the soil sampling.

Results of tests on the soil samples collected from house plots14 to 21 are given in Tables 1, 2 and 3.

TABLE 1
Results of Tests for Heavy Metals

Metals	Units	Minimum Value	Maximum Value	ATRISK Contaminated Land Screening Values (SSV)
				Residential with plant uptake in mg/kg
Boron	mg/kg	<0.5	0.5	290
Mercury	mg/kg	<0.5	0.7	1.44
Nickel	mg/kg	10	12	136
Copper	mg/kg	20	22	4790
Selenium	mg/kg	0.7	1.0	375
Zinc	mg/kg	51	58	20,300
Chromium VI	mg/kg	<1	<1	20.5
Arsenic	mg/kg	9.7	11	37
Cadmium	mg/kg	0.2	0.4	22.1
Lead	mg/kg	51	60	200
pH		6.3	7.0	5-9
Asbestos		NAD	NAD	NAD
Sulphate	mg/l SO4	34	78	500

NAD = No asbestos detected

All tests undertaken for heavy metals were within guidelines for residential use of the site with plant uptake. Asbestos fibres were not detected and pH and sulphate were within acceptable levels.

TABLE 2
Results of Tests for Polyaromatic Hydrocarbons (PAH)

Polyaromatic Hydrocarbons	Units	Minimum Value	Maximum Value	ATRISK Contaminated Land Screening Values (SSV)
				Residential with plant uptake in mg/kg
Naphthalene	mg/kg	<0.02	0.07	12.2
Acenaphthylene	mg/kg	<0.02	0.12	920
Acenaphthene	mg/kg	<0.02	0.17	2760
Fluorene	mg/kg	<0.02	0.14	2610
Phenanthrene	mg/kg	0.17	1.92	440

Anthracene	mg/kg	0.03	0.17	26200
Fluoranthene	mg/kg	0.38	2.45	2980
Pyrene	mg/kg	0.34	1.94	2120
Benzo(a)anthracene	mg/kg	0.17	0.64	13
Chrysene	mg/kg	0.22	1.08	27
Benzo(b)fluoranthene	mg/kg	0.25	1.07	3.7
Benzo(k)fluoranthene	mg/kg	0.09	0.47	100
Benzo(a)pyrene	mg/kg	0.18	0.72	4.95
Indeno(1,2,3-cd)pyrene	mg/kg	0.15	0.71	41
Dibenz(a,h)anthracene	mg/kg	<0.02	0.10	0.3
Benzo(ghi)perylene	mg/kg	0.13	0.53	350
TOTAL PAH	mg/kg	2.10	12.20	

All PAHs results were within guidelines for use of the site for residential houses with plant uptake.

TABLE 3
Results of Tests for Total Petroleum Hydrocarbons (TPH)

Total Petroleum Hydrocarbons		Minimum Value mg/kg	Maximum Value mg/kg	ATRISK Contaminated Land Screening Values (SSV) Residential with plant uptake in mg/kg
Aromatic Hydrocarbons (mg/kg)	>C5-C7	<0.01	<0.01	0.871
	>C7-C8	<0.01	<0.01	780
	>C8-C10	<0.01	<0.01	232
	>C10-C12	<1	<1	468
	>C12-C16	<1	<1	830
	>C16-C21	<1	5	1040
	>C21-C35	2	6	1710
	>C35-C40	<1	<1	28400
Aliphatic Hydrocarbons (mg/kg)	>C5-C6	<0.1	<0.1	369
	>C6-C8	<0.1	<0.1	1240
	>C8-C10	<0.1	<0.1	204
	>C10-C12	<4	<4	1180
	>C12-C16	<4	8	4130
	>C16-C35	55	108	210,100
	>C35-C40	15	39	

All TPHs results were within guidelines for use of the site for residential with plant uptake.

6.2.4 Environmental Test Results for Topsoil Stockpile

The stockpile was tested for heavy metals, PAH speciated, TPH CWG UK, pH, sulphate and asbestos fibres. Test results are presented in Tables 4, 5 and 6 and detailed in full in Appendix B.

TABLE 4
Results of Tests for Heavy Metals

Metals	Units	Value	ATRISK Contaminated Land Screening Values (SSV)
			Residential with plant uptake in mg/kg
Boron	mg/kg	<0.5	290
Mercury	mg/kg	<0.5	1.44
Nickel	mg/kg	10	136
Copper	mg/kg	20	4790
Zinc	mg/kg	51	20,300
Selenium	mg/kg	0.7	375
Chromium VI	mg/kg	<1	20.5
Arsenic	mg/kg	9.2	37
Cadmium	mg/kg	0.2	22.1
Lead	mg/kg	50	200
pH	-	6.9	5-9
Sulphate	mg/l SO4	89	500
Asbestos	-	NAD	NAD

NAD = No Asbestos detected

All tests undertaken for heavy metals, pH and sulphate were within guidelines for residential use of the site with plant uptake. No asbestos fibres were detected in the samples.

Figure 6 Topsoil stockpile

TABLE 5
Results of Tests for Polyaromatic Hydrocarbons (PAH)

Polyaromatic Hydrocarbons	Units	Value	ATRISK Contaminated Land Screening Values (SSV)
			Residential with plant uptake in mg/kg
Naphthalene	mg/kg	<0.02	12.2
Acenaphthylene	mg/kg	<0.02	920
Acenaphthene	mg/kg	0.05	2760
Fluorene	mg/kg	0.03	2610
Phenanthrene	mg/kg	0.47	440
Anthracene	mg/kg	0.09	26200
Fluoranthene	mg/kg	0.84	2980
Pyrene	mg/kg	0.74	2120
Benzo(a)anthracene	mg/kg	0.34	13
Chrysene	mg/kg	0.43	27
Benzo(b)fluoranthene	mg/kg	0.46	3.7
Benzo(k)fluoranthene	mg/kg	0.18	100
Benzo(a)pyrene	mg/kg	0.31	4.95
Indeno(1,2,3-cd)pyrene	mg/kg	0.31	41
Dibenz(a,h)anthracene	mg/kg	0.04	0.3
Benzo(ghi)perylene	mg/kg	0.25	350
TOTAL PAH	mg/kg	4.53	

All tests undertaken for speciated Polyaromatic Hydrocarbons were within guidelines for residential use of the site with plant uptake.

TABLE 6
Results of Tests for Total Petroleum Hydrocarbons (TPH)

Total Petroleum Hydrocarbons		Value	ATRISK Contaminated Land Screening Values (SSV)
			Residential with plant uptake in mg/kg
Aromatic Hydrocarbons (mg/kg)		<0.01	0.871
	>C7-C8	<0.01	780
	>C8-C10	<0.01	232
	>C10-C12	<1	468
	>C12-C16	<1	830
	>C16-C21	3	1040
	>C21-C35	3	1710
	>C35-C40	<1	28400
Aliphatic Hydrocarbons (mg/kg)	>C5-C6	<0.1	369
	>C6-C8	<0.1	1240
	>C8-C10	<0.1	204
	>C10-C12	<4	1180
		5	4130
	>C16-C21	83	210100
	>C21-C35	83	
	>C35-C40	35	210100

All tests undertaken for speciated Total Petroleum Hydrocarbons were within guidelines for residential use of the site with plant uptake.

The soil samples from the gardens and the topsoil stockpile were all found to be uncontaminated according to guidelines by heavy metals, hydrocarbons, pH and sulphate and asbestos.

Tests for PAHs on soil samples showed none of the samples exceeded the guidelines for individual compounds and none exhibited free product and therefore all samples are considered uncontaminated in line with guidelines. Tests on soil samples for TPH all fell within guidelines for individual compounds. The results indicate the soils tested are not contaminated by hydrocarbons.

Based on the environmental test results on soil samples, the visual and olfactory evidence and the remediation and mitigating measures undertaken on site it is validated that the remediation of the gardens has taken place in accordance with the Remediation Statement.

The area remediated is fit for purpose according to the investigation and environmental testing and remediation undertaken and validated.

6.3 Gas Membrane and underfloor venting area

The validation of the installation of the gas membrane, taping and validation of the underfloor venting area was undertaken by GeoShield with all photographs and validation sheets presented in Appendix C.

Figure 7 Underfloor Venting Areas

7. SUMMARY

The remediation was validated by site inspection by GeoShield and Ashton Bennett, with site visits and laboratory testing in November 2020 and June and July 2021.

Contaminated soil was not detected beneath house plots 14-21. Any undetected contamination is unlikely to detrimentally affect sensitive receptors due to the hard standing cover over the site and the imported uncontaminated soil on the garden areas.

The remediation work to the rear gardens was validated by site visits by Ashton Bennett Consultancy and by selective laboratory environmental testing of soil samples and of imported topsoil and reporting of results to Planning Services, plus on site visual/olfactory observations during site visits.

Clean up standards were assessed against the latest ATRISK guidelines based on CLEA guidelines where published in 2017 and LQM/CIEH guidelines. Based on the soil testing there is no recorded contamination that has the potential to detrimentally harm sensitive receptors. The guidelines used are for land with residential use with plant uptake use in accordance with the guidelines of CLR11 (DEFRA).

Based on the site visits and environmental test results and the remediation and mitigating measures undertaken on site, it is validated that the remediation has taken place in accordance with the Remediation Statement. Any undetected

contamination is sealed with hardcover or a geotextile and 600mm of topsoil, thus breaking pathways for contamination to harm humans or the environment. The risk of the site causing harm has therefore been eliminated.

This Consultancy attended on an appropriate number of other occasions to check the nature of material exposed on the site and to validate the remediation including inspecting the laying of the geotextile and the assessment of laboratory tests on soil samples from the house gardens.

No material was removed from the site.

Standards for imported material were assessed against derived SSVs as detailed in Tables1 to 6 inclusive and as a risk assessment as to whether the material has the potential to harm sensitive receptors. The SSV guidelines used were for residential land use with plant uptake in gardens.

The risk assessment indicates there is a low risk of undetected contamination detrimentally affecting the future occupants and workmen or other users of the site in the future and a low risk of the environment and controlled waters being detrimentally affected as the garden areas have been sealed and any undetected contamination lies beneath sufficient topsoil cover.

The mitigating measures undertaken will prevent any undetected contamination from migrating and reaching sensitive receptors. The house plots 14 to 21 are fit for purpose according to the mitigating measures and validation of a gas membrane and underfloor venting in the houses and a geotextile and 600mm of tested as uncontaminated topsoil in the gardens.

8. GENERAL REMARKS

This report truly reflects the conditions found during the Validation of the remediation. Whilst the Validation and Remediation were undertaken in a professional manner taking due regard of additional information which became available as a result of ongoing research the results portrayed only pertain to the information attained and it is possible that other undetected information and undetected ground and gas conditions and undetected contamination and undetected mining may exist. The Validation was only undertaken within the house plots14 to 21 boundaries and should not be used for interpretation purposes elsewhere. These conclusions are only a brief summary of the report, and it is recommended that the Report SIG 3454 VAL 14-21 is read in full to ensure that all recommendations have been understood.

This report is provided for the sole use of the clients (Signature Homes(Yorkshire) Ltd) and no responsibility will be accepted by this Consultancy to any other parties who rely on this report entirely at their own risk. The copyright for this report is held by Ashton Bennett Consultancy and no reproduction of any part or all of the report can be undertaken or any other reproduction undertaken without the written approval of this Consultancy.

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