# REMEDIATION AND ENABLING WORKS VALIDATION REPORT

## Land to the rear of Suncroft, Warkworth, Northumberland, NE65 0PX

**Prepared for:**

**Mr & Mrs Walton**

**Report Ref: 22-1214-VAL**
**Date Issued: July 2023**

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| | |
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| PROJECT NUMBER | 22-1214 |

IMS Template Reference
QR005-1

| EXECUTIVE SUMMARY | |
|---|---|
| **Site Address** | Land to the rear of Suncroft, Station Road, Warkworth, NE65 0XP. |
| **Grid Reference** | E424780, N606370. |
| **Site Area** | ~0.18 Ha. |
| **Stated Objective** | The primary purpose of this report is to document the implementation and subsequent validation of regulatory compliant Build Phase mitigation measures completed as part of the construction of a residential development at the site located at Suncroft, Warkworth in accordance with the approved ERGO Remediation Strategy (Ref: 22-1214-REM, dated May 2022). |
| **Site Remediation Works** | The validation of the Enabling Works items was completed by ERGO as specified within the ERGO Enabling Works Validation Report (ref: 22-1214-REM). It is understood that this report has been submitted and approved by the Council with no significant issues understood to have been raised following this report. |

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# 1. INTRODUCTION

## 1.1 Background

This report details the Validation of the Build Phase Remediation operations that were undertaken by ALCC Limited on behalf of their client under the supervision of ERGO to facilitate the preparation of the residential development of a parcel of land located to the rear of Suncroft, Warkworth; herein referred to as **the site**.

ERGO were appointed by ALCC Limited as independent Geo-Environmental Consultant for the validation of build phase site remediation items and the subsequent production of a suitably detailed report to ensure the discharge of relevant planning conditions and requirements for Building Control and warranty providers. ERGO have previously validated the remediation and enabling works package (ref: 22-1214-REM).

The development area is c.0.18ha in size and is situated to the rear of Suncroft, located off Station Road in the north of Warkworth (see ERGO drawing ref: 22-1214-001 within Appendix III). For the avoidance of doubt, ERGO can confirm that the parcel of land refers to the red-line boundary as indicated in Figure 1.1 below.

*Figure 1.1 Site Location Plan – Land to the rear of Suncroft, Warkworth*

## 1.2 Site Location / Setting

| | |
|---|---|
| **SITE ADDRESS** | Land to the rear of Suncroft, Station Road, Warkworth, NE65 0XP. |
| **NATIONAL GRID REFERENCE** | E424780, N606370. |
| **SITE AREA** | ~0.18 Ha. |

Prior to the commencement of works, the site comprised an undeveloped area of relatively flat, grassy land to the rear of existing residential properties.

Historic mapping suggests the site generally comprised open ground, the north-eastern area was occupied by a 'quarry' in c.1855. By c.1923, the quarry is shown to have expanded and occupied the majority of the site (approx. 90%). By c.1981, the site was in use as a builder's yard with several structures noted in the south-western site area though noted to have been cleared by c.2013.

## 1.3 Development

Mr and Mrs Walton have constructed 2no. residential dwellings with associated gardens, garages, access road and infrastructure.

The detailed development layout for the site is presented within Drawing No. 22-1214-002 included within Appendix III. A snapshot of the development plan is shown in Figure 1.2.

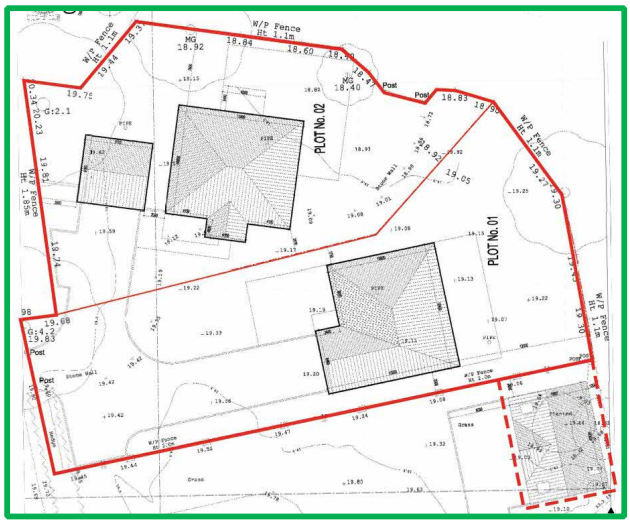



*Figure 1.2 Proposed Development Plan*

## 1.4 Summary of Parties Involved

| NAME OF PARTY | FUNCTION / INTEREST |
|---|---|
| Land Owner | Mr and Mrs Walton |
| Developer | Mr and Mrs Walton |
| Geo-Environmental Consultant | ERGO. |
| Main Contractor | D.P. Builders Ltd. |
| Remediation Contractor | D.P. Builders Ltd. |
| Human Health Regulator / Local Planning Authority | Northumberland County Council. |
| Controlled Waters Regulator | Environment Agency. |

## 1.5 Limitations

The limitations of this report are presented in Appendix I.

## 1.6 Confidentiality

ERGO has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from ERGO; a charge may be levied against such approval.

# 2. CONTAMINATION, REMEDIATION & ENABLING WORKS REQUIREMENTS

## 2.1 Summary of Contamination Issues

### *2.1.1 Human Health*

The Tier I human health risk assessments completed by Intersoil (2013) and Arc Environmental (2021), determined that concentrations of the following determinants exceed guideline values for a residential end use:

- Arsenic;
- Lead;
- Benzo(b)Fluoranthene;
- Benzo(a)Pyrene; and,
- Dibenzo(a,h)Anthracene.

Asbestos was not identified within any of the soil samples submitted for chemical analysis.

In the case of Heavy Metals and non-volatile PAH compounds the viable exposure pathway is associated with direct contact, inhalation of particulates, consumption of homegrown vegetables and ingestion of soil. The proposed development of the site will include hard cover and the importation and placement of certified subsoil and topsoil within a validated clean cover system in areas of private gardens and landscaping, thus removing potential pathways associated with direct contact and ingestion thereby mitigating potential risks.

### *2.1.2 Controlled Waters*

The site is underlain by a Secondary Undifferentiated Aquifer (bedrock), the river coquet is located 100m south of the site and a tributary is located 50m east of the site boundary.

The previous Conceptual Site Models identified a low risk to controlled water receptors due to the low permeability predominantly cohesive drift deposits and the absence of groundwater abstraction within the vicinity of the site.

Based on the above, there is considered to be no significant level of risk to the controlled water receptors.

Notwithstanding the above, precautions are detailed herein to mitigate potential impacts of unforeseen mobile contamination encountered during the subsequent works.

### *2.1.3 Ground Gas*

The ground gas assessment as detailed within ERGO Gas Protection Verification Strategy (Ref: 22-1214-r01, dated May 2022) and the previous ARC report (2021) indicated that the site is Characteristic Situation 2/Amber 1.

This assessment was confirmed during the completed ground gas monitoring which identified elevated carbon dioxide (>5%) and depleted oxygen (<19%). The location of the site is within the Northumberland Coalfield in accordance with the guidance followed by Northumberland County Council.

ERGO Ground Gas Mitigation Verification Strategy sets out the validation requirements which is understood to have been accepted by Northumberland County Council.

## 2.2 Correspondence with Regulatory Authorities

### *2.2.1 Local Planning Authority – Human Health*

ERGO has submitted our Remediation & Enabling Works Strategy (Ref: 22-1214-REM) dated May 2022 which clearly defines the protocols required for the legislatively compliant development to include protective measures ensuring no unacceptable level of risk is posed to future site end users.

### *2.2.2 Environment Agency – Controlled Water & Wider Environ*

The EA act as a statutory consultee of Northumberland County Council Planning Authority and in this instance no consultation correspondence has been supplied by Northumberland County Council and as such, we presume the EA have no further requirements with respect to controlled waters.

## 2.3 Summary of Remediation & Enabling Works Objectives

The proposed remediation activities were detailed within the ERGO Remediation Strategy and Enabling Works Plan (22-1214-REM; dated May 2022).

This report has been prepared to document the completion of all necessary land remediation and enabling works and to record the presence of any variation in ground conditions or previously unidentified sources of potential contamination, environmental impact or potential nuisance to the wider environ. Table 2.1 outlines the Enabling works objectives.

**Table 2.1 Enabling Works Objectives**

| ENABLING WORKS NO. | GENERAL OVERVIEW OF OBJECTIVES |
|---|---|
| EW-1 | Pre-Commencement Regulatory Compliance |
| EW-2 | Environment & Nuisance Control |
| EW-3 | Identification, Isolation and Treatment of Invasive Plants |
| EW-4 | Site Clearance Operations |
| EW-5 | Importation of Bulk Fill |
| EW-6 | Preparations of Gardens for Cover System |
| EW-7 | Provision of Subsoil & Topsoil |
| EW-8 | Removal of Excess Soil |
| EW-9 | Independent Validation- Watching Brief |
| EW-10 | Remedial Verification Report |

**Second Phase Remediation & Enabling Works – Build Phase**

A second post demolition phase of works will be required to ensure the proposed development is constructed in a manner that incorporates the required mitigation measures to ensure the development is compliant with UK Building Regulations and the Local Authority Planning requirements.

Once the ground has been stabilised and rendered suitable for development, the builder will be required to undertake a second phase of remediation works to mitigate the identified theoretical risk to human health:

- Installation of appropriate pipework subject to the completion of a UKWIR assessment;
- The installation and validation of appropriate ground gas mitigation measures to be compliant with the completed ground gas risk assessment (prepared separately);
- Placement and validation of a suitable clean cover system within all areas of soft landscaped areas.

## 3. DETAILED REMEDIATION ACTIVITIES

The focus of the remediation works is to address the contaminant issues previously identified within the site investigations that presented an unacceptable risk to human health following the redevelopment of the site.

For completeness, each of the required activities outlined above in Section 2.4 has been discussed below within the context of the actual remediation works that were undertaken onsite.

| **EW-1 Pre Commencement Regulatory Compliance** |
|---|
| **Overview of Works**<br>Prior to commencement of works onsite, all reports relating to the assessment of risk to contaminated land were submitted to the regulatory authorities and gained written approval of the required actions. |
| **EW-2 Environment and Nuisance Control** |
| **Overview of Works**<br>ERGO can confirm that all works were managed in such a way so as to ensure that no significant environmental nuisance was created. |
| **EW-3 Identification, Isolation and Treatment of Invasive Species** |
| **Overview of Works**<br>In accordance with the agreed Remediation and Enabling Works Strategy, ALCC Ltd acting as the contractor appointed a specialist to assess the site and confirm that invasive species were not present within the site boundary or adjacent to the site boundary requiring subsequent treatment.<br>It is understood that no evidence of invasive species was identified and no remediation works were subsequently required to be completed. |
| **EW-4 Site Clearance Operations** |
| **Overview of Works**<br>General site clearance & provision of welfare, offices and site security were enacted as per the contractual requirements.<br>All vegetation and root networks were removed in a controlled manner and stockpiled/removed from site in accordance with the Waste Permitting Regulations and the requirements of NHBC/LABC. |
| **EW-5 Importation of Bulk Fill** |
| **Overview of Works**<br>ERGO can confirm no requirement to import materials for bulk fill was required to achieve proposed site levels was necessary. All bulk fill materials were site won and comprised natural and reworked soils suitable for the proposed end use. |
| **EW-6 Preparation of Gardens for Cover System** |
| **Overview of Works**<br>ERGO can confirm that gardens were suitably prepared for the clean cover system.<br>All proposed soft landscaping areas were reduced to 600mmbgl. to facilitate the placement of a suitable clean cover system. |
| **EW-7 Provision of Subsoil and Topsoil** |
| **Overview of Works**<br>Topsoil and Subsoil materials were imported to the site from a greenfield site is Amble, testing was provided by ALCC Ltd which confirmed suitability. Results are enclosed. |

**EW-8 Removal of Excess Soil**

**Overview of Works**

Excess soils were suitably removed from the site and disposed of accordingly, copies of the waste tickets provided by ALCC Ltd are enclosed for reference.

**EW-9 Independent Validation – Watching Brief**

**Overview of Works**

ERGO attended the site on several occasions during the remediation and enabling works and subsequent build phase program to inspect the works completed and ensure compliance with the Remediation Statement.

**EW-10 Remedial Verification Report**

**Overview of Works**

This report has been created and document all actions undertaken by the Remediation Contractor, on behalf of Mr & Mrs Walton under the supervision of ERGO as an independent party during the remediation phase.

This report should be submitted to the Council to confirm all required mitigation measures outlined within the ERGO Remediation and Enabling Works Strategy have been satisfactorily completed.

**BPW1 Installation of appropriate pipework**

**Overview of Works**

It is understood that a UKWIR assessment was completed separately by others, details are understood to be available from ALCC Ltd.

**BPW2 Installation and Validation of suitable ground gas protection measures**

**Date of Works Undertaken**

November 2022 – June 2023

**Report**

22-1214-GVAL1 ERGO Ground Gas Protection Measures Validation Report

**Overview of Works**

A Gas Verification Strategy was prepared by ERGO to detail mitigation measures against potential relevant risks which was accepted by Northumberland County Council.

Following this, ERGO attended site on several occasions as required to inspect and validate the installation of the required Gas Mitigation Measures. ERGO report ref: 22-1214-GVAL1, enclosed, documents the appropriate installation of these measures.

**BPW3 Placement of Cover System within Garden Plots & Landscaped Areas**

**Report**

22-1214-GV ERGO Garden Validation Letter Report.

**Overview of Works**

ERGO have attended the site to validate the placement of subsoil and topsoil material within all garden plots. ERGO can confirm the suitability of the material placed and the placement of the material complies with the agreed Remediation Statement.

Further details are presented in ERGO Report 22-1214-GV enclosed.

## 4. CONCLUSION AND RECOMMENDATIONS

ERGO confirm the validation of the outstanding build phase remediation items have been completed in accordance agreed ERGO Remediation and Enabling Works Strategy for the regeneration of Land to the rear of Suncroft, Warkworth.

ERGO can confirm that the works have been implemented in accordance with the agreed Remediation Strategy with all materials managed in such a way as to ensure that the completed works posed no risk to construction operatives or the wider environ.

ERGO can also confirm that based on the observations and testing to date, all materials which remain in-situ and those imported for use within the scheme pose no unacceptable degree of potential risk to the identified receptors within the context of the previously completed developed Conceptual Site Model (CSM) and as such the site is deemed suitable for use.

**END OF REPORT**

# APPENDIX I
# LIMITATIONS

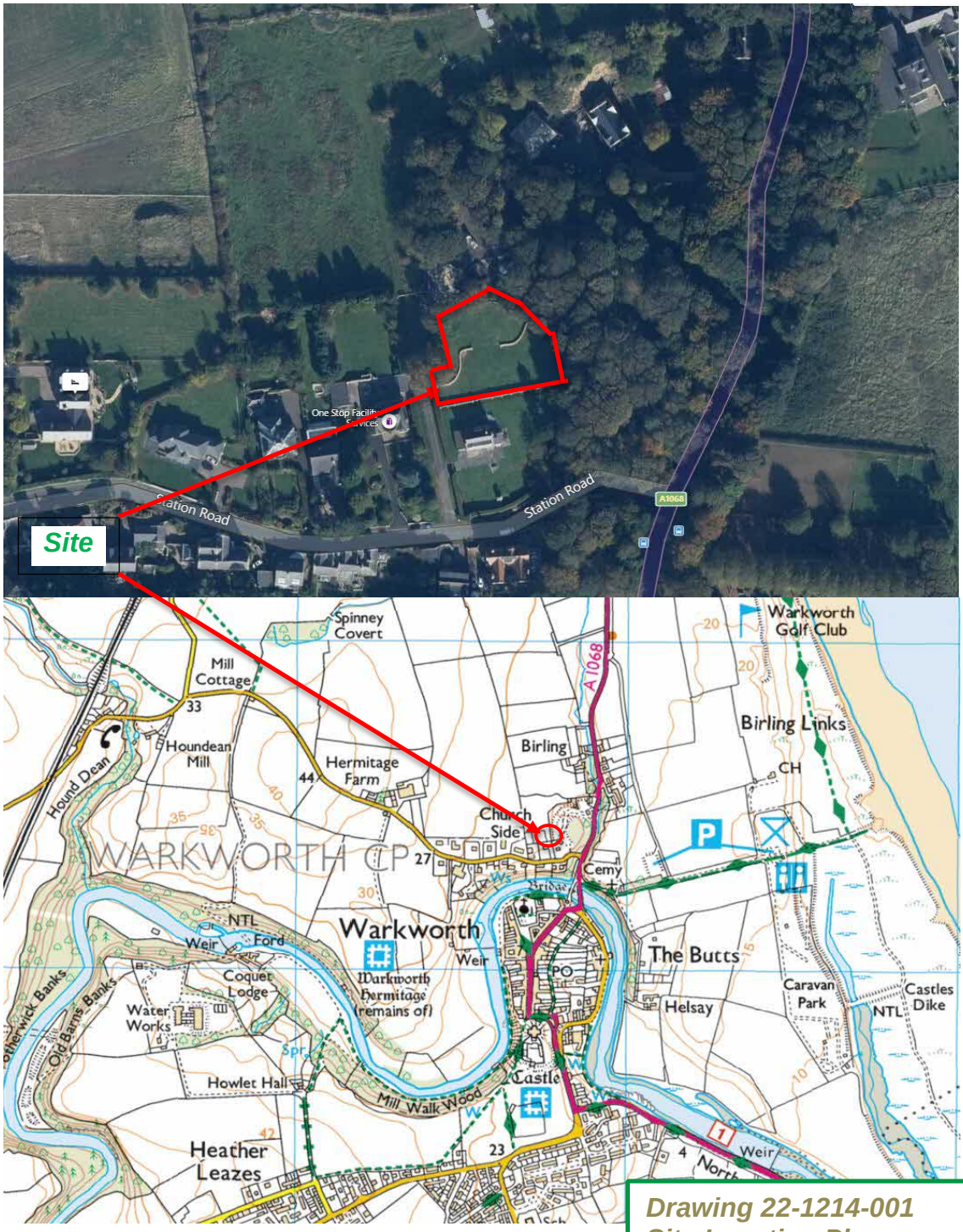
1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between ERGO and the Client as indicated in Section 1.2.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not be made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. ERGO cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by ERGO is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by ERGO in this connection without their explicit written agreement there to by ERGO.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

# APPENDIX II
# GLOSSARY

## TERMS

| | | | |
|---|---|---|---|
| **AST** | Above Ground Storage Tank | **SGV** | Soil Guideline Value |
| **BGS** | British Geological Survey | **SPH** | Separate Phase Hydrocarbon |
| **BSI** | British Standards Institute | **TPH CWG** | Total Petroleum Hydrocarbon (Criteria Working Group) |
| **BTEX** | Benzene, Toluene, Ethylbenzene, Xylenes | **SPT** | Standard Penetration Test |
| **CIEH** | Chartered Institute of Environmental Health | **SVOC** | Semi Volatile Organic Compound |
| **CIRIA** | Construction Industry Research Association | **UST** | Underground Storage Tank |
| **CLEA** | Contaminated Land Exposure Assessment | **VCCs** | Vibro Concrete Columns |
| **CSM** | Conceptual Site Model | **VOC** | Volatile Organic Compound |
| **DNAPL** | Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB) | **WTE** | Water Table Elevation |
| **DWS** | Drinking Water Standard | **m** | Metres |
| **EA** | Environment Agency | **km** | Kilometres |
| **EQS** | Environmental Quality Standard | **%** | Percent |
| **GAC** | General Assessment Criteria | **%v/v** | Percent volume in air |
| **GL** | Ground Level | **mb** | Milli Bars (atmospheric pressure) |
| **GSV** | Gas Screening Value | **l/hr** | Litres per hour |
| **HCV** | Health Criteria Value | **µg/l** | Micrograms per Litre (parts per billion) |
| **ICSM** | Initial Conceptual Site Model | **ppb** | Parts Per Billion |
| **LNAPL** | Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene) | **mg/kg** | Milligrams per kilogram (parts per million) |
| **ND** | Not Detected | **ppm** | Parts Per Million |
| **LMRL** | Lower Method Reporting Limit | **mg/m$^3$** | Milligram per metre cubed |
| **NR** | Not Recorded | **m bgl** | Metres Below Ground Level |
| **PAH** | Polycyclic Aromatic Hydrocarbon | **m bcl** | Metre Below Cover Level |
| **PCB** | Poly-Chlorinated Biphenyl | **mAOD** | Metres Above Ordnance Datum (sea level) |
| **PID** | Photo Ionisation Detector | **kN/m$^2$** | Kilo Newtons per metre squared |
| **QA** | Quality Assurance | **µm** | Micro metre |
| **SGV** | Soil Guideline Value | | |
| | | | |

# APPENDIX III
# DRAWINGS




*Drawing 22-1214-001*
*Site Location Plan*

ERGO

# APPENDIX IV
# REMEDIATION TARGET VALUES

## Remediation Validation Target Values

| Determinand | Units | Within 1150mm Cover System (Garden) |
|---|---|---|
| **Asbestos** | %v/v | **NFD** |
| **Arsenic** | mg/kg | **37** |
| **Cadmium** | mg/kg | **11** |
| **Chromium (VI)** | mg/kg | **6.1** |
| **Lead** | mg/kg | **200** |
| **Mercury** | mg/kg | **40** |
| **Nickel** | mg/kg | **130** |
| **Selenium** | mg/kg | **250** |
| **Copper** | mg/kg | **2400** |
| **Zinc** | mg/kg | **3700** |
| **Naphthalene** | mg/kg | **2.3** |
| **Acenaphthylene** | mg/kg | **170** |
| **Acenaphthene** | mg/kg | **210** |
| **Fluorene** | mg/kg | **170** |
| **Phenanthrene** | mg/kg | **95** |
| **Anthracene** | mg/kg | **2400** |
| **Fluoranthene** | mg/kg | **280** |
| **Pyrene** | mg/kg | **620** |
| **Benzo(a)Anthracene** | mg/kg | **7.2** |
| **Chrysene** | mg/kg | **15** |
| **Benzo(b)Fluoranthene** | mg/kg | **2.6** |
| **Benzo(k)Fluoranthene** | mg/kg | **77** |
| **Benzo(a)Pyrene** | mg/kg | **2.2** |
| **Indeno(123-cd)Pyrene** | mg/kg | **27** |
| **Dibenzo(ah)Anthracene** | mg/kg | **0.24** |
| **Benzo(ghi)Perylene** | mg/kg | **320** |
| **TPH $C_5$-$C_6$ (aliphatic)** | mg/kg | **42** |
| **TPH $C_6$-$C_8$ (aliphatic)** | mg/kg | **100** |
| **TPH $C_8$-$C_{10}$ (aliphatic)** | mg/kg | **27** |
| **TPH $C_{10}$-$C_{12}$ (aromatic)** | mg/kg | **74** |
| **TPH $C_{12}$-$C_{16}$ (aromatic)** | mg/kg | **140** |
| **TPH $C_{16}$-$C_{21}$ (aromatic)** | mg/kg | **260** |
| **TPH $C_{21}$-$C_{35}$ (aromatic)** | mg/kg | **1100** |

Asbestos will be screened visually on-site by a qualified environmental consultant and where potential ACM is identified representative samples will be subject to quantitative analysis of % volume by weight. Should any ACM be identified within the soil matrices, further detailed % assessment would be required when the reported laboratory result exceeds the limit of detection for the analytical method at 0.01% by volume (weight).

Excludes matrices where free product is observed;

# APPENDIX V
# GARDEN VALIDATION REPORTS

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Ref: 22-1214-GV
Date: 24th July 2023

**Andy Laurie**
**ALCC Limited**
Unit 12,
Rake House Farm,
Rake Lane,
North Tyneside,
NE29 8EQ

**BY Email**

Dear Andy,

## Garden Areas Validation – Suncroft, Warkworth

### Introduction

ERGO understands that gardens have been completed within Plots 1 and 2 at the Suncroft, Warkworth site. in line with the previously completed and approved ERGO Remediation Strategy (Ref: 22-1214-REM, dated May 2022), plots were inspected to ensure the appropriate clean cover system.

A 600mm cover system is required where Made Ground remains at formation level within proposed garden areas, using certified material with appropriate validation within proposed garden areas.

The garden validation has been undertaken as per the specification detailed in the ERGO Remediation Strategy report.

ERGO were instructed by ALCC Limited to attend the site and inspect the depth of the clean cover later within garden plots.

### Objectives

For the avoidance of doubt ERGO can confirm that our schedule of works will include the following key attributes:

- Attendance onsite by suitably qualified ERGO Engineers to inspect the thickness of the clean cover layer within the required plots; and,
- Production of a Letter Report detailing the findings of the inspection of the clean cover layer within the residential development gardens.

### Validation Works

ERGO completed the works in accordance with the approved ERGO Remediation Strategy inspecting plots 1-2 and can confirm that the majority of plots generally comprised at least 150mm of grey sandy slightly gravelly topsoil overlying a firm brown sandy slightly gravelly clay with gravels of sandstone and mudstone to depths of 600mbgl.

### Chemical Suitability

The chemical suitability of the materials has been assessed with chemical testing provided by the DP Builders Ltd.

ERGO understands the donor site to be a greenfield site located within Amble, no further details have been provided.

The results of the testing have been compared against the site-specific remediation targets summarised within the ERGO Remediation Strategy report. Sample descriptions are described above with copies of the chemical testing enclosed and results summarised within Table 1 below.

***Table 1 Summary of Toxicity Assessment for a Private Garden***

| DETERMINANT | UNIT | GAC | N | MC | LOC. OF EX | PATHWAY | ASSESSMENT |
|---|---|---|---|---|---|---|---|
| Asbestos Identification | - | Present | 3 | NFD | N/A | 4 | No Further Action |
| Arsenic | mg/kg | 37 | 3 | 3.7 | N/A | 1 | No Further Action |
| Cadmium | mg/kg | 11 | 3 | <0.2 | N/A | 1 | No Further Action |
| Chromium (VI) | mg/kg | 6.1 | 3 | <4.0 | N/A | 1 | No Further Action |
| Lead | mg/kg | 200 | 3 | 35 | N/A | 1 | No Further Action |
| Mercury | mg/kg | 40 | 3 | <0.3 | N/A | 2 | No Further Action |
| Nickel | mg/kg | 130 | 3 | 27 | N/A | 1 | No Further Action |
| Selenium | mg/kg | 250 | 3 | <1.0 | N/A | 1 | No Further Action |
| Copper | mg/kg | 2400 | 3 | 46 | N/A | 1 | No Further Action |
| Zinc | mg/kg | 3700 | 3 | 72 | N/A | 1 | No Further Action |
| Naphthalene | mg/kg | 2.3 | 3 | 0.31 | N/A | 2 | No Further Action |
| Acenaphthylene | mg/kg | 170 | 3 | <0.05 | N/A | 3 | No Further Action |
| Acenaphthene | mg/kg | 210 | 3 | 0.46 | N/A | 1 | No Further Action |
| Fluorene | mg/kg | 170 | 3 | 0.68 | N/A | 1 | No Further Action |
| Phenanthrene | mg/kg | 95 | 3 | 3.0 | N/A | 3 | No Further Action |
| Anthracene | mg/kg | 2400 | 3 | 0.83 | N/A | 3 | No Further Action |
| Fluoranthene | mg/kg | 280 | 3 | 2.6 | N/A | 3 | No Further Action |
| Pyrene | mg/kg | 620 | 3 | 2.0 | N/A | 3 | No Further Action |
| Benzo(a)Anthracene | mg/kg | 7.2 | 3 | 1.1 | N/A | 3 | No Further Action |
| Chrysene | mg/kg | 15 | 3 | 1.1 | N/A | 3 | No Further Action |
| Benzo(b)Fluoranthene | mg/kg | 2.6 | 3 | 0.96 | N/A | 3 | No Further Action |
| Benzo(k)Fluoranthene | mg/kg | 77 | 3 | 0.45 | N/A | 3 | No Further Action |
| Benzo(a)Pyrene | mg/kg | 2.2 | 3 | 0.76 | N/A | 3 | No Further Action |
| Indeno(123-cd)Pyrene | mg/kg | 27 | 3 | 0.38 | N/A | 3 | No Further Action |
| Dibenzo(a,h)Anthracene | mg/kg | 0.24 | 3 | <0.05 | N/A | 3 | No Further Action |
| Benzo(ghi)Perylene | mg/kg | 320 | 3 | 0.38 | N/A | 3 | No Further Action |
| TPH C5-C6 (aliphatic) | mg/kg | 42 | 3 | <0.001 | N/A | 2 | No Further Action |
| TPH C6-C8 (aliphatic) | mg/kg | 100 | 3 | <0.001 | N/A | 2 | No Further Action |
| TPH C8-C10 (aliphatic) | mg/kg | 27 | 3 | <0.001 | N/A | 2 | No Further Action |
| TPH C10-C12 (aromatic) | mg/kg | 74 | 3 | <1.0 | N/A | 2 | No Further Action |
| TPH C12-C16 (aromatic) | mg/kg | 140 | 3 | 4.0 | N/A | 2 | No Further Action |
| TPH C16-C21 (aromatic) | mg/kg | 260 | 3 | 12 | N/A | 1 | No Further Action |
| TPH C21-C35 (aromatic) | mg/kg | 1100 | 3 | 17 | N/A | 1 | No Further Action |

**Notes**

Main Exposure Pathways: 1 = Soil Ingestion, 2 = Vapour Inhalation (indoor), 3 = Dermal Contact & Ingestion, 4 = Dust Inhalation. Abbreviations: GAC = General Assessment Criteria, n = number of samples, MC = Maximum Concentration; Loc of Ex = Location of Exceedance; NFD = No Fibres Detected

The Tier 1 GAC for the hydrocarbon fraction is derived from the CIEH assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. ERGO has utilised the Tier 1 values for aliphatic compounds for the volatile and semi volatile fractions ($C_5$-$C_{12}$) and the Tier 1 values for aromatic compound for the non-volatile fractions ($C_{12}$-$C_{35}$). The comparison of a total (aliphatic/aromatic) compounds to an individual fraction is considered to be a conservative approach and satisfactory for the protection of human health.

Based on the results above, no elevated concentrations of potential contaminants of concern have been identified within the sampled gardens when compared with Tier I GACs for a residential end use. Based on this assessment along with the visual soil description, the material placed within the plots has been deemed suitable for reuse within residential gardens with no significant potential unacceptable level of risk to human health for future residential end users and construction workers.

## Conclusion

It is considered that within plots 1 and 2, the cover system has been installed in accordance with the agreed Remediation Strategy.

I trust this information is satisfactory to your requirements, and should I be able to be of any further assistance, please do not hesitate to contact me.

Yours sincerely,

**For and on behalf of ERGO Ltd**

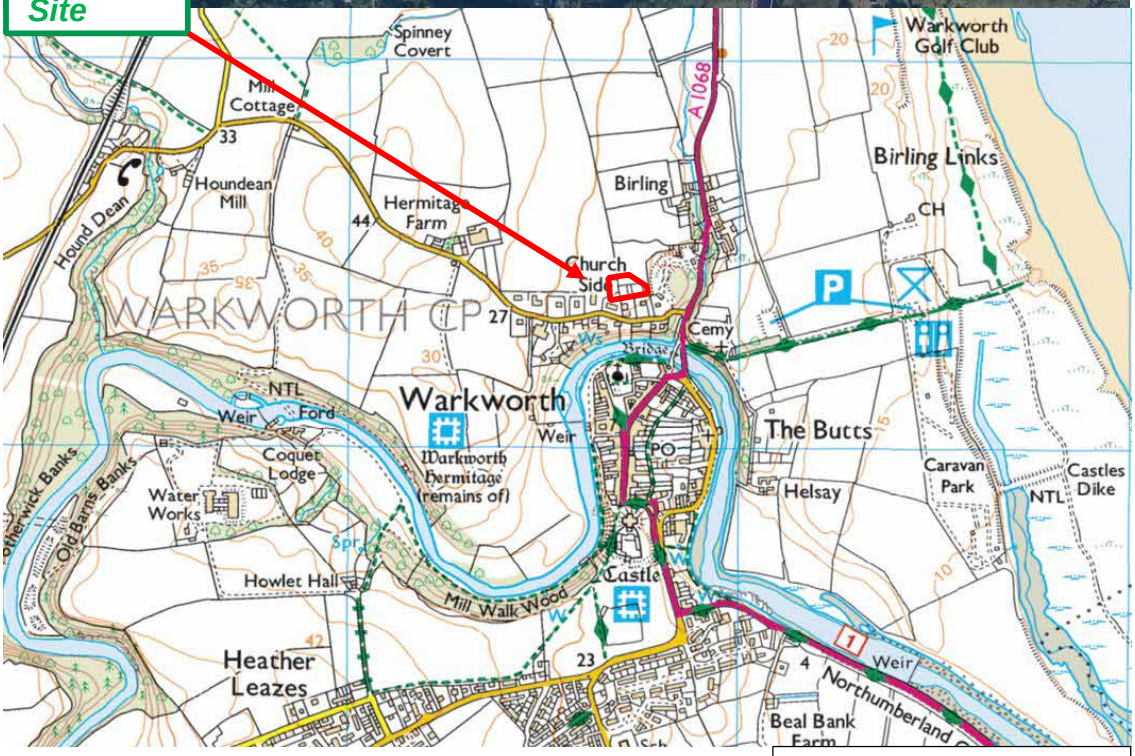
**Phil Craigie**
Geo-Environmental Consultant

Enclosed:

ERGO Drawings
Photographs
Chemical Testing

# ERGO Drawings


Site




**Drawing 22-1214-001**
**Site Location Plan**

ERGO

# Photographs

**PLATE 1 – GENERAL PLACEMENT OF MATERIALS WITHIN PLOT 1**

**PLATE 2 – DEPTH VALIDATION IN REAR GARDEN OF PLOT 1**

**PLATE 3 – GENERAL PLACEMENT OF MATERIALS WITHIN PLOT 2**


**PLATE 4 – DEPTH VALIDATION IN REAR GARDEN OF PLOT 2**

# Chemical Testing Results

Analytical Report Number: 21-85389
Project / Site name: Amble

| Lab Sample Number | | | | | 1929328 | 1929329 | 1929330 |
|---|---|---|---|---|---|---|---|
| Sample Reference | | | | | T.P. | T.P. | T.P. |
| Sample Number | | | | | T/S | S/S | BOTTOM |
| Depth (m) | | | | | 0.30 | 0.60 | 1.50 |
| Date Sampled | | | | | 27/02/2023 | 27/02/2023 | 27/02/2023 |
| Time Taken | | | | | None Supplied | None Supplied | None Supplied |
| Analytical Parameter (Soil Analysis) | Units | Limit of detection | Accreditation Status | HH GAC Houses with Gardens | | | |
| Stone Content | % | 0.1 | NONE | | < 0.1 | < 0.1 | < 0.1 |
| Moisture Content | % | 0.01 | NONE | | 11 | 10 | 6.2 |
| Total mass of sample received | kg | 0.001 | NONE | | 0.30 | 0.30 | 0.30 |
| Asbestos in Soil | Type | N/A | ISO 17025 | | Not-detected | Not-detected | Not-detected |
| **General Inorganics** | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | | 8.0 | 7.6 | 8.3 |
| Organic Matter | % | 0.1 | MCERTS | | 3.7 | 2.6 | 0.7 |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | | 2.1 | 1.5 | 0.4 |
| Loss on Ignition @ 450oC | % | 0.2 | MCERTS | | 6.6 | 4.7 | 2.2 |
| **Speciated PAHs** | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | 5.6 | < 0.05 | 0.31 | < 0.05 |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | 420 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene | mg/kg | 0.05 | MCERTS | 510 | < 0.05 | 0.46 | < 0.05 |
| Fluorene | mg/kg | 0.05 | MCERTS | 400 | < 0.05 | 0.68 | < 0.05 |
| Phenanthrene | mg/kg | 0.05 | MCERTS | 220 | 0.41 | 3.0 | 0.36 |
| Anthracene | mg/kg | 0.05 | MCERTS | 5400 | < 0.05 | 0.83 | < 0.05 |
| Fluoranthene | mg/kg | 0.05 | MCERTS | 560 | 0.48 | 2.6 | 0.53 |
| Pyrene | mg/kg | 0.05 | MCERTS | 1200 | 0.38 | 2.0 | 0.43 |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | 11 | < 0.05 | 1.1 | 0.29 |
| Chrysene | mg/kg | 0.05 | MCERTS | 22 | < 0.05 | 1.1 | 0.22 |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | 3.3 | < 0.05 | 0.96 | < 0.05 |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | 93 | < 0.05 | 0.45 | < 0.05 |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | 2.7 | < 0.05 | 0.76 | < 0.05 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 36 | < 0.05 | 0.38 | < 0.05 |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | 0.28 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | 340 | < 0.05 | 0.38 | < 0.05 |
| **Total PAH** | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | | 1.27 | 15.0 | 1.83 |
| **Heavy Metals / Metalloids** | | | | | | | |
| Antimony (aqua regia extractable) | mg/kg | 1 | ISO 17025 | 550 | 2.8 | 3.7 | 2.5 |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 37 | 9.7 | 6.6 | 7.8 |
| Barium (aqua regia extractable) | mg/kg | 1 | MCERTS | 625 | 170 | 100 | 74 |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | 11 | < 0.2 | < 0.2 | < 0.2 |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | 6 | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 910 | 31 | 27 | 35 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 200 | 46 | 29 | 31 |
| Iron (aqua regia extractable) | mg/kg | 40 | MCERTS | 80000 | 32000 | 39000 | 44000 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 200 | 35 | 23 | 16 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | 40 | < 0.3 | < 0.3 | < 0.3 |
| Molybdenum (aqua regia extractable) | mg/kg | 0.25 | MCERTS | 640 | 0.77 | 0.55 | 0.86 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 110 | 27 | 23 | 24 |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | 250 | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable) | mg/kg | 1 | MCERTS | 410 | 64 | 95 | 110 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 300 | 72 | 68 | 68 |

Analytical Report Number: 21-85389
Project / Site name: Amble

| Lab Sample Number | | | | | 1929328 | 1929329 | 1929330 |
|---|---|---|---|---|---|---|---|
| Sample Reference | | | | | T.P. | T.P. | T.P. |
| Sample Number | | | | | T/S | S/S | BOTTOM |
| Depth (m) | | | | | 0.30 | 0.60 | 1.50 |
| Date Sampled | | | | | 27/02/2023 | 27/02/2023 | 27/02/2023 |
| Time Taken | | | | | None Supplied | None Supplied | None Supplied |
| Analytical Parameter (Soil Analysis) | Units | Limit of detection | Accreditation Status | HH GAC Houses with Gardens | | | |
| **Monoaromatics & Oxygenates** | | | | | | | |
| Benzene | µg/kg | 1 | MCERTS | | < 1.0 | < 1.0 | < 1.0 |
| Toluene | µg/kg | 1 | MCERTS | 0.087 | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene | µg/kg | 1 | MCERTS | 130 | < 1.0 | < 1.0 | < 1.0 |
| p & m-xylene | µg/kg | 1 | MCERTS | 47 | < 1.0 | < 1.0 | < 1.0 |
| o-xylene | µg/kg | 1 | MCERTS | 58 | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | 60 | < 1.0 | < 1.0 | < 1.0 |
| **Petroleum Hydrocarbons** | | | | | | | |
| TPH-CWG - Aliphatic >EC5 - EC6 | mg/kg | 0.001 | MCERTS | 78 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC6 - EC8 | mg/kg | 0.001 | MCERTS | 230 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | 65 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC10 - EC12 | mg/kg | 1 | MCERTS | 330 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >EC12 - EC16 | mg/kg | 2 | MCERTS | 2400 | < 2.0 | < 2.0 | 9.7 |
| TPH-CWG - Aliphatic >EC16 - EC21 | mg/kg | 8 | MCERTS | 9200 | < 8.0 | < 8.0 | 23 |
| TPH-CWG - Aliphatic >EC21 - EC35 | mg/kg | 8 | MCERTS | 9200 | < 8.0 | < 8.0 | 41 |
| TPH-CWG - Aliphatic (EC5 - EC35) | mg/kg | 10 | MCERTS | | < 10 | < 10 | 74 |
| TPH-CWG - Aromatic >EC5 - EC7 | mg/kg | 0.001 | MCERTS | 140 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC7 - EC8 | mg/kg | 0.001 | MCERTS | 290 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | 330 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC10 - EC12 | mg/kg | 1 | MCERTS | 330 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >EC12 - EC16 | mg/kg | 2 | MCERTS | 2400 | < 2.0 | 4.0 | < 2.0 |
| TPH-CWG - Aromatic >EC16 - EC21 | mg/kg | 10 | MCERTS | 540 | < 10 | 12 | < 10 |
| TPH-CWG - Aromatic >EC21 - EC35 | mg/kg | 10 | MCERTS | 1500 | < 10 | 17 | < 10 |
| TPH-CWG - Aromatic (EC5 - EC35) | mg/kg | 10 | MCERTS | | < 10 | 33 | < 10 |
| **PCBs by GC-MS** | | | | | | | |
| PCB Congener 28 | mg/kg | 0.001 | MCERTS | | < 0.001 | < 0.001 | < 0.001 |
| PCB Congener 52 | mg/kg | 0.001 | MCERTS | | < 0.001 | < 0.001 | < 0.001 |
| PCB Congener 101 | mg/kg | 0.001 | MCERTS | | < 0.001 | < 0.001 | < 0.001 |
| PCB Congener 118 | mg/kg | 0.001 | MCERTS | | < 0.001 | < 0.001 | < 0.001 |
| PCB Congener 138 | mg/kg | 0.001 | MCERTS | | < 0.001 | < 0.001 | < 0.001 |
| PCB Congener 153 | mg/kg | 0.001 | MCERTS | | < 0.001 | < 0.001 | < 0.001 |
| PCB Congener 180 | mg/kg | 0.001 | MCERTS | | < 0.001 | < 0.001 | < 0.001 |
| **Total PCBs by GC-MS** | | | | | | | |
| Total PCBs | mg/kg | 0.007 | MCERTS | | < 0.007 | < 0.007 | < 0.007 |

U/S = Unsuitable Sample  I/S = Insufficient Sample


Key:

Notes:

| P1 | - | 05.06.2022 | DRAFT | RB | JN |
|---|---|---|---|---|---|
| Phase | Revision | Date | Issue | Drawn | Authorised |

| Client: | Job No: | Date: |
|---|---|---|
| Andy Laurie, ALCC Limited | 22-1214 | 05.06.2022 |
| | Drawing No: 002 | Scale: NTS |
| Job Title: Suncroft, Warkworth | Drawing Title: Proposed Development Plan | |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# APPENDIX VI
# GAS VALIDATION REPORTS

ERGO

ENVIRONMENTAL LTD

# GROUND GAS PROTECTION MEASURES VALIDATION REPORT

## Land to the rear of Suncroft, Warkworth, Northumberland

**Prepared for:**

**Mr and Mrs Walton**

**Report Ref: 22-1214-GVAL1**
**Date Issued: February 2023**

**ERGO LIMITED**

Hoults Yard,
Walker Road,
Newcastle upon Tyne,
NE6 2HL

Tel : + 00 (0) 191 389 6200
http:\\www.ergoenvironmental.com

Registered in England
No.: 11162116

# QUALITY ASSURANCE

| | |
|---|---|
| REMARKS | Final |
| DATE | February 2023 |
| PREPARED BY | P Craigie |
| QUALIFICATIONS | Beng |
| SIGNATURE | [redacted] |
| CHECKED BY | J Malley |
| QUALIFICATIONS | MSc, BSc, MCIWEM, C.WEM |
| SIGNATURE | [redacted] |
| AUTHORISED BY | J Nairn |
| QUALIFICATIONS | MSc, BSc, MIENvSc, CEnv, FGS |
| SIGNATURE | [redacted] |
| PROJECT NUMBER | 22-1214 |

QR007-1

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## APPENDICES

**Appendix I** Limitations
**Appendix II** Glossary
**Appendix III** Drawings
*ERGO Drawing No 22-1214-001* - Site Location Plan
*ERGO Drawing No 22-1214-002* - Proposed Site Layout Plan
*Heddon Structures Ltd Drawing No 0458-DR-S-004* – Foundation Sections
**Appendix IV** Gas Membrane and Filoseal Data Sheets
**Appendix V** Gas Validation Record Sheet

# 1. INTRODUCTION

## 1.1 Introduction

ERGO have been appointed by Mr & Mrs Walton to validate the adequate installation of required ground gas mitigation items within proposed plots at the site.

This report includes validation of the specific details of gas protection measures installed within the properties, to fully protect the future site residents as outlined within the ERGO Gas Verification Strategy Report.

## 1.2 Site Setting

| | |
|---|---|
| **Site Address** | Land to the Rear of Suncroft, Station Road, Warkworth, NE65 0XP. |
| **National Grid Reference** | E424780, N606370. |

## 1.3 Proposed Development

ERGO understands that Mr and Mrs Walton intend to develop the site with 2no. residential dwellings and garages with associated infrastructure and access road.

A proposed development plan is indicated within ERGO Drawing 22-1214-002 within Appendix III. A snapshot of the proposed development is presented within Figure 1.1 below.

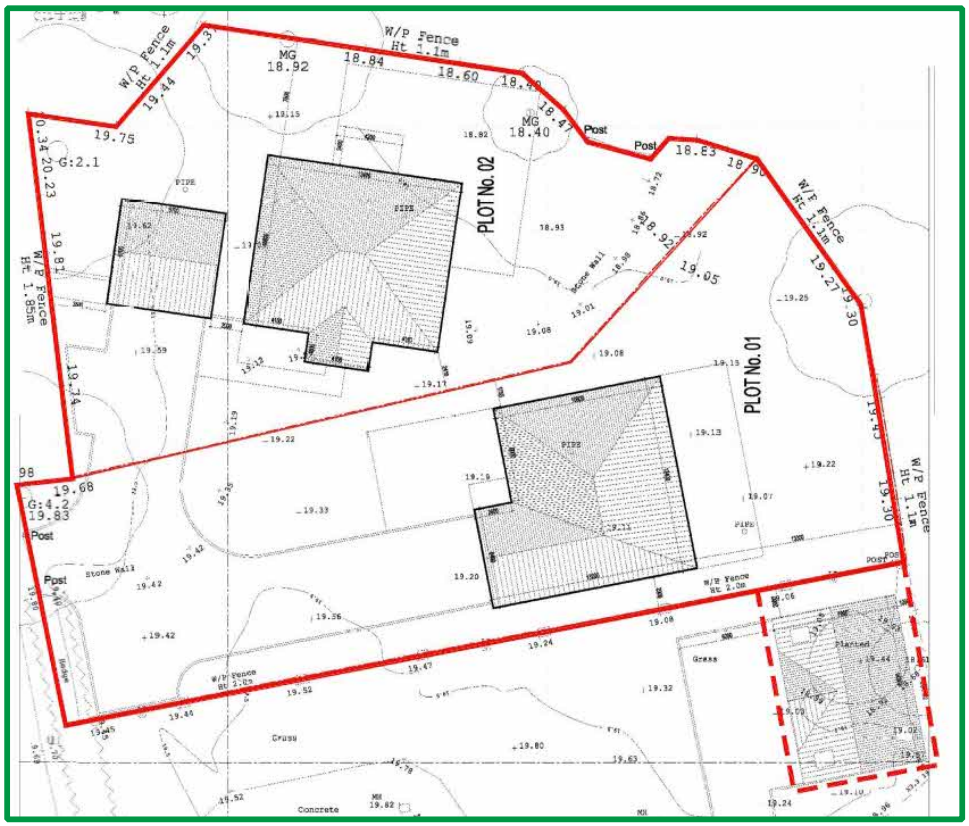



***Figure 1.1 Snapshot of Proposed Development***

## 1.4 Objectives

The objectives of the Verification Reporting are to:

- Document, validate and verify the installation of appropriate ground gas mitigation measures within the constructed properties to mitigate potential risks in accordance with the agreed Ground Gas Verification Strategy.

## 1.5 Sources of Information

The following reports have been reviewed to complete this Validation Report:

**Intersoil –** *Environmental Study* Ref: 12023/amd2, dated June 2013.

**Intersoil –** *Environmental Soils Investigation Report*. Ref: 20003, dated January 2020.

**ARC Environmental –** *Preliminary Data Sheet* Ref: Report No.20-610, dated May 2021.

**ERGO –** Ground Gas Verification Strategy Ref: 22-1214-R01, dated May 2022.

The following guidance documents have been reviewed to complete this Verification Strategy:

- BS 8485:2015 (+A1 2019), 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings';
- CIRIA C735 (2014), 'Good practice on the testing and verification of protection systems for buildings against hazardous ground gases';
- YALPAG Technical Guidance for Developers, Landowners and Consultants, 'Verification Requirements for Gas Protection Systems';
- ASTM D4437/D4437M (2018), 'Standard Practice for Non-destructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheer Geomembranes'.

## 1.6 Limitations

For the avoidance of doubt, works associated with the installation of Filoseal around service penetrations was beyond the scope of agreed works with confirmation available from the Developer.

## 1.7 Confidentiality

ERGO has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from ERGO; a charge may be levied against such approval.

## 2. SUMMARY OF PREVIOUS ASSESSMENTS

The previous investigation by ARC Environmental suggested the site be classified as Gas Characteristic Situation 2/Amber 1 following a review of the completed ground gas monitoring data identifying elevated carbon dioxide levels (>5%) and depleted oxygen levels (19%).

This assessment is understood to have been accepted by Northumberland County Council.

ERGO subsequently produced a Ground Gas Verification Strategy Report (Ref: 22-1214-r01, dated May 2022) to mitigate potential risks. This strategy has been accepted by Northumberland County Council.

# 3. VALIDATION SPECIFICATION

## 3.1 Site Works

ERGO Ltd have attended the site on 4no. separate occasions between 10th June 2022 and 24th February 2023 to verify the condition of the membrane installed within Plots 1-2 and the associated garage in accordance with the ERGO Gas Verification Strategy ref: 22-1214-r01, dated May 2022.

Works were undertaken in accordance with the outlined detailed design specification for foundations as indicated within Hedley Structures Drawing 0458-DR-S-004-Rev4, enclosed within Appendix III.

The visits were undertaken to coincide with the completion of each set of plots and immediately prior to the laying of insultation and pouring of the concrete screed.

## 3.2 Membrane Specification

In accordance with the outlined specification, ERGO can confirm that the Visqueen Gas Barrier Gas Membrane, complaint with BS 8485:2015 + A1:2019, was used within the plots.

A product data sheet is available within Appendix IV.

## 3.3 Filoseal Specification

In accordance with the outlined specification, ERGO can confirm that Filoseal was used within the plots.

A product data sheet is available within Appendix IV.

## 3.4 Verifiers

3no. trained ERGO Verifiers attended site to inspect the works undertaken. Details pertaining the verifiers, their experience and qualifications are detailed below:

- Jonathan Malley BSc, MSc, MCIWEM C.WEM – Associate Director

Jonathan has 7 years of experience within the Geo-Environmental Sector. He has completed Ground Gas Risk Assessments for sites, documented appropriate mitigation items and verified the adequate installation of these measures on numerous projects.

Jonathan attended the CL:AIRE Gas Verification course in February 2019.

- Kevin Flannigan BSc (Hons) – Senior Design Manager

Kevin has over 15 years of experience within the Construction Industry as an Architectural Technologist.

Kevin attended the CL:AIRE Gas Verification course in January 2023

Further details and case studies for the verifier(s) can be made available on request.

- Jess Campbell BSc (Hons) – Geo-Environmental Consultant

Jess has 4 years of experience within the Geo-Environmental Sector. She has completed Ground Gas Risk Assessments for sites, documented appropriate mitigation items and verified the adequate installation of these measures on numerous projects.

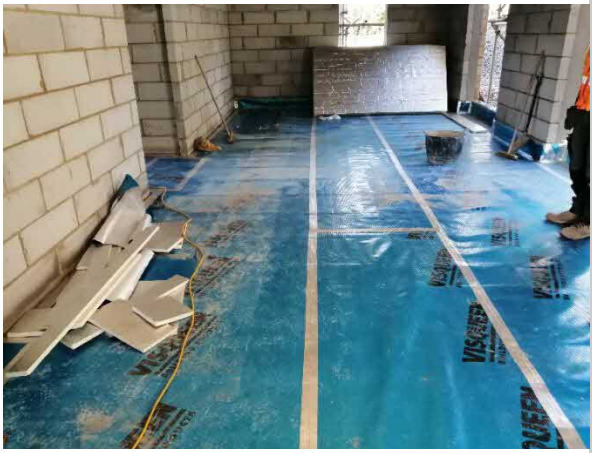
Jess attended the PA Geotechnical Gas Verification course in November 2021.

Further details and case studies for the verifier(s) can be made available on request.

## 4. GENERAL CONDITION OF MEMBRANE

The membrane comprised a Visqueen Gas Barrier gas membrane resistant to carbon dioxide and low levels of methane. The photographs show the general condition of the plot membranes prior to the laying insulation and pouring the concrete screed. Plot were swept prior to the laying of the gas membrane. Installation was completed by means of perimeter and infill.

Where damage was observed during the inspection, suitable repair was undertaken as necessary under supervision by ERGO to ensure the membrane was installed appropriately. ERGO can confirm there were no holes or rips in the membrane prior to the laying of insulation and pouring of the concrete.

| PLATE 1 | PLATE 2 |
|---|---|
|  |  |
| General overviews of membrane at Plot 1 following internal placement. No materials were stored on the membrane which had the potential to cause damage. | |
| **PLATE 3** | **PLATE 4** |
|  |   |
| General overviews of membrane at Plot 2 following internal placement. No materials were stored on the membrane which had the potential to cause damage. | |

| PLATE 5 | PLATE 6 |
| --- | --- |
|  |  |
| General overviews of membrane within the garden following internal placement. No materials were stored on the membrane which had the potential to cause damage. | |

## 5. VERIFICATION OF JOINTS & CORNER UNITS

All external joints were inspected and ERGO can confirm that the membrane was overlapped and taped appropriately. Where evidence of incorrectly sealed gas membrane joints was encountered, contractors were supervised whilst adequate repairs were undertaken. Photos detailing examples of the quality of works under are displayed below.

| PLATE 7 | PLATE 8 |
|---|---|
|  |  |
| General condition of membrane of corner units and joints within Plots 1-2. | |

| PLATE 9 | PLATE 10 |
|---|---|
|  |  |
| General condition of membrane of corner units and joints within Plots 1-2. Note protection placed during works within Plate 9. | |

| PLATE 11 | PLATE 12 |
| --- | --- |
|  |  |
| General condition of membrane of corner units and joints within the garage plot. | |

## 6. VERIFICATION OF SUBFLOOR VOIDS AND VENTILATION

Plots were installed with an adequate number of ventilation blocks and can confirm that they appear to be clear of debris and unimpeded. Photos detailing examples of the quality of works are displayed below.

| PLATE 13 | PLATE 14 |
|---|---|
|  |  |
| Periscopic ventilation bricks shown to be free of obstructions in Plots 1-2. | |

| PLATE 15 | PLATE 16 |
|---|---|
|  |  |
| Periscopic ventilation bricks shown to be free of obstructions in Plot 1. | |

| PLATE 17 | PLATE 18 |
| --- | --- |
|  |  |
| Showing the sub-floor areas to be clear of waste and/or obstruction. ERGO can confirm a 225mm void was apparent within each substructure. | |

## 7. VERIFICATION OF SERVICE ENTRIES

Service entries were present within the footprint of all plots, adjacent to periphery walls. ERGO inspected each one and can confirm that the service entries have been adequately sealed against the membrane.

| PLATE 19 | PLATE 20 |
|---|---|
|  |  |
| Membrane sealed around service entries within Plot 1. ERGO can confirm these service entries were adequately sealed. | |
| **PLATE 21** | **PLATE 22** |
|  |  |
| Membrane sealed around service entries within Plot 2. ERGO can confirm these service entries were adequately sealed. | |

| **PLATE 23** | |
|---|---|
|  | |
| Membrane sealed around service entries within the garage plot. ERGO can confirm these service entries were adequately sealed. | |

Following conversation with the Developer, ERGO understand the service penetrations to have been adequately installed with Filoseal products. Details of the installation are available from the developer.

## 8. CONCLUSIONS

ERGO can confirm that all plots have been installed with gas protection measures in line with Characteristic Situation 2/Amber 1 and in accordance with the approved ERGO Gas Verification Strategy, ref 22-1214-r01.

Based on the information provided within this report, the site inspections and photographic evidence, ERGO can confirm that the structures covered by the report were installed with gas protection measures in accordance with Characteristic Situation 2/Amber 1 to an acceptable level of workmanship.

ERGO confirm that they visited site immediately prior to the pouring of the concrete and confirm that there were no holes or rips in the membrane prior to the pouring of the concrete.

**END OF REPORT**

# APPENDIX I
# LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between ERGO and the Client as indicated in Section 1.2.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not be made known or accessible.

5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.

6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.

8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

9. ERGO cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by ERGO is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by ERGO in this connection without their explicit written agreement there to by ERGO.

10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

# APPENDIX II
# GLOSSARY

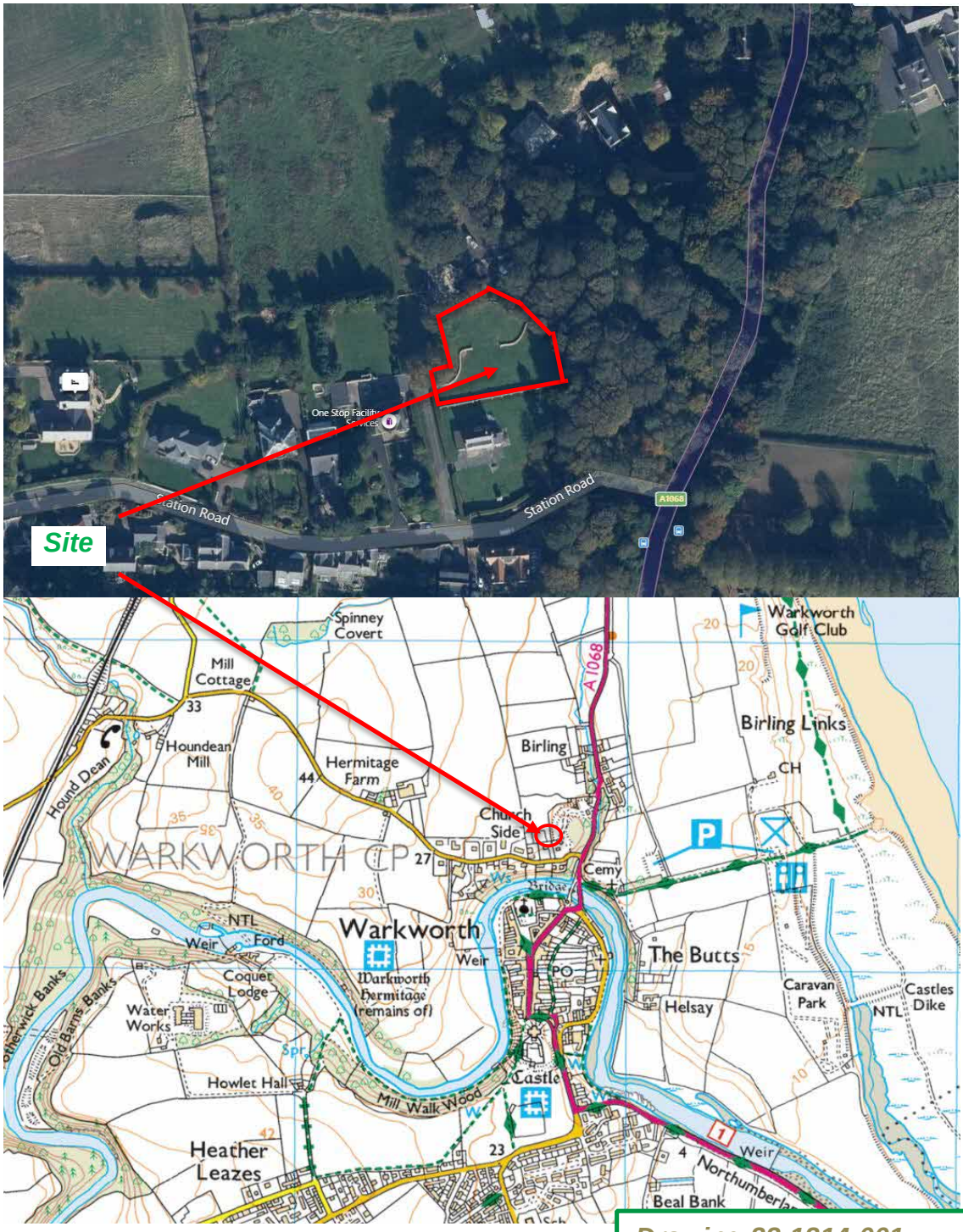
## TERMS

| | |
|---|---|
| AST | Above Ground Storage Tank |
| BGS | British Geological Survey |
| BSI | British Standards Institute |
| BTEX | Benzene, Toluene, Ethylbenzene, Xylenes |
| CIEH | Chartered Institute of Environmental Health |
| CIRIA | Construction Industry Research Association |
| CLEA | Contaminated Land Exposure Assessment |
| CSM | Conceptual Site Model |
| DNAPL | Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB) |
| DWS | Drinking Water Standard |
| EA | Environment Agency |
| EQS | Environmental Quality Standard |
| GAC | General Assessment Criteria |
| GL | Ground Level |
| GSV | Gas Screening Value |
| HCV | Health Criteria Value |
| ICSM | Initial Conceptual Site Model |
| LNAPL | Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene) |
| ND | Not Detected |
| LMRL | Lower Method Reporting Limit |
| NR | Not Recorded |
| PAH | Poly Aromatic Hydrocarbon |
| PCB | Poly-Chlorinated Biphenyl |
| PID | Photo Ionisation Detector |
| QA | Quality Assurance |
| SGV | Soil Guideline Value |
| SPH | Separate Phase Hydrocarbon |
| Sp.TPH (CWG) | Total Petroleum Hydrocarbon (Criteria Working Group) |
| SPT | Standard Penetration Test |
| SVOC | Semi Volatile Organic Compound |
| UST | Underground Storage Tank |
| VCCs | Vibro Concrete Columns |
| VOC | Volatile Organic Compound |
| WTE | Water Table Elevation |

## UNITS

| | |
|---|---|
| m | Metres |
| km | Kilometres |
| % | Percent |
| %v/v | Percent volume in air |
| mb | Milli Bars (atmospheric pressure) |
| l/hr | Litres per hour |
| µg/l | Micrograms per Litre (parts per billion) |
| ppb | Parts Per Billion |
| mg/kg | Milligrams per kilogram (parts per million) |
| ppm | Parts Per Million |
| $mg/m^3$ | Milligram per metre cubed |
| m bgl | Metres Below Ground Level |
| m bcl | Metre Below Cover Level |
| mAOD | Metres Above Ordnance Datum (sea level) |
| $kN/m^2$ | Kilo Newtons per metre squared |
| µm | Micro metre |

# APPENDIX III
# DRAWINGS




*Drawing 22-1214-001*
*Site Location Plan*

ERGO


Key:

Notes:

| P1 | - | 05.06.2022 | DRAFT | RB | JN |
|---|---|---|---|---|---|
| Phase | Revision | Date | Issue | Drawn | Authorised |

| Client: | Job No: | Date: |
|---|---|---|
| Andy Laurie, ALCC Limited | 22-1214 | 05.06.2022 |
| | Drawing No: 002 | Scale: NTS |
| Job Title: Suncroft, Warkworth | Drawing Title: Proposed Development Plan | |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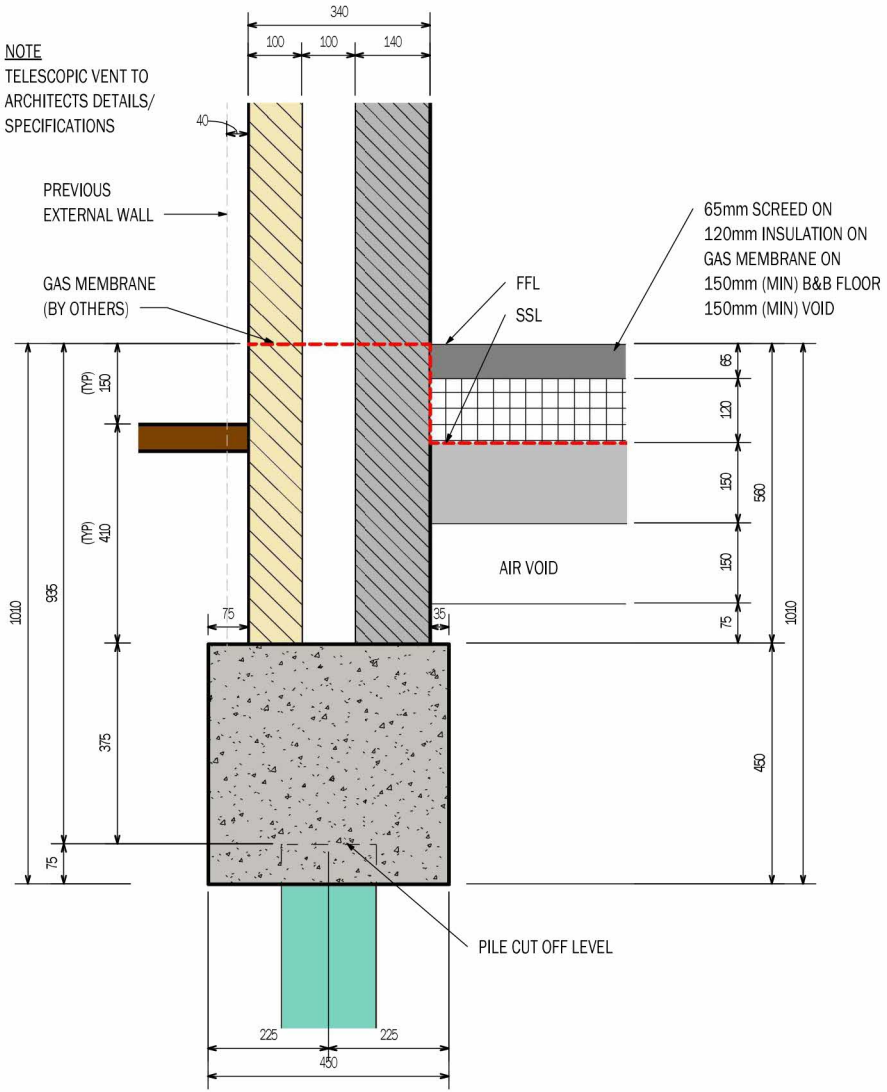
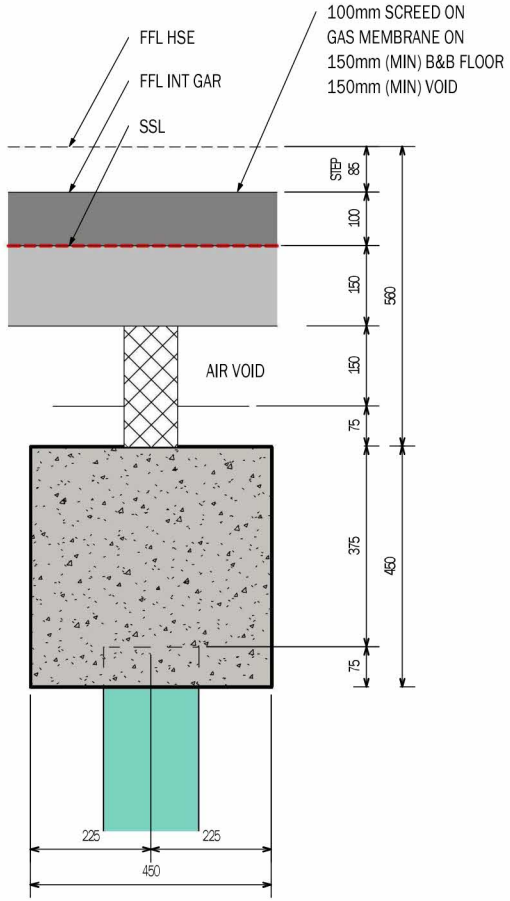
DWG STATUS CONSTRUCTION ISSUE

REV 4 - CONSTRUCTION ISSUE 04-04-22. GROUND BEAM LEVEL RAISED 40mm. GARAGE SCREED DEPTH INCREASED TO 100mm.



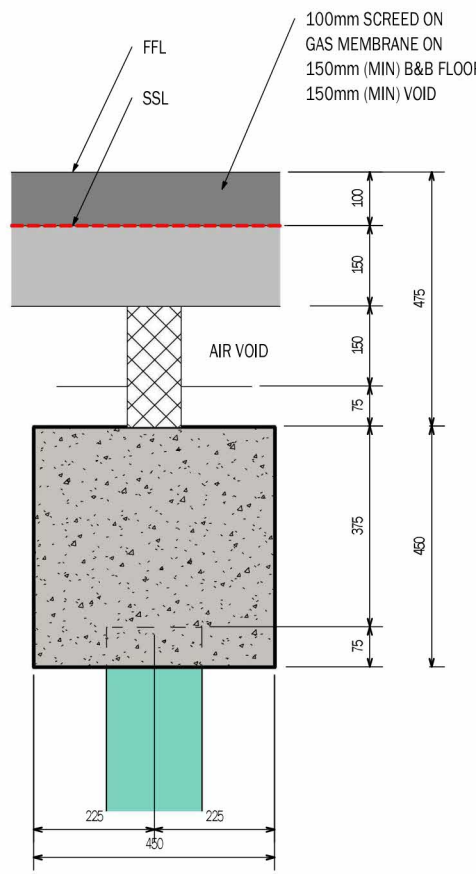

1 PERIMETER DETAIL HSE 1

1 : 10




2 INTERNAL SECTION INTEGRAL GARAGE

1 : 10




3 INTERNAL SECTION DETATCHED GARAGE

1 : 10

Heddon Structures Ltd

CLIENT: ALCC

PROJECT: SUNCROFT WARKWORTH

TITLE: FOUNDATION SECTIONS

| SCALE @ A3: | DRAWN | CHECKED | DATE | JOB NO | DWG NO | REV |
|---|---|---|---|---|---|---|
| 1 : 10 | MH | SC | 25/02/22 | 0458 | 0458-DR-S-004 | 4 |

# APPENDIX IV
# DATA SHEETS

Technical support: +44 (0) 333 202 6800

**Date Published: 11/09/2020**

# Visqueen Gas Barrier

## Features and benefits

- BBA certified - third party accreditation
- Complies with BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Flexible - easy to detail and install on site
- Multi functional - also acts as a radon and damp proof membrane
- Dual jointing methods - lap joints can be taped or heat welded

## Product description

Visqueen Gas Barrier is a multi-layer reinforced polyethylene gas barrier with a 20 micron aluminium foil. The barrier is coloured blue on the upper surface and silver on the reverse. The product is supplied in single wound rolls (not folded), 2m x 50m.

## Approvals and standards

- Third party accreditation (BBA 13/5069)
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2015
- CE Mark EN 13967:2017
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 18001:2007
- Environmental Management System ISO 14001:2015

## Usage

Visqueen Gas Barrier is suitable for use in all types of buildings to prevent the ingress of harmful levels of ground gases e.g.methane, carbon dioxide and radon.

The barrier can be positioned above or below a solid concrete ground floor slab or above a precast suspended segmental ground floor system, e.g. beam and block floor.

The barrier can also be used as a high performance radon membrane and/or damp proof membrane.

The product is not intended for use where there is a risk of hydrostatic pressure.

## System components

- VisqueenPro Double Sided Jointing Tape, 50mm x 10m
- Visqueen Gas Resistant Foil Lap Tape, 75mm x 50m
- Visqueen Ultimate GR Lap Tape, 150mm x 10m
- Visqueen Ultimate Top Hat Units
- Visqueen Preformed Units
- VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m
- Visqueen TreadGUARD 300, 2m x 75m
- Visqueen TreadGUARD 1500, 1m x 2m

## Find your local stockist



Heanor Gate Road, Heanor, Derbyshire, DE75 7RG
+44 (0) 333 202 6800 I enquiries@visqueen.com I www.visqueen.com

Technical support: +44 (0) 333 202 6800

**Date Published: 11/09/2020**

# Visqueen Gas Barrier

## Storage and handling

Visqueen Gas Barrier should be stored horizontally, under cover in its original packaging.

Care should be taken when handling the product in line with current manual handling regulations.

## Preparation

Visqueen Gas Barrier should be installed on a smooth continuous surface e.g. grouted beam and block floor, a compacted blinding layer e.g. 50mm thick sand blinding, or smooth concrete blinding. The substrate should be free from irregularities such as voids or protrusions.

The barrier can be cut with a sharp retractable safety knife or robust scissors.

## Installation

Visqueen Gas Barrier should be loose laid on the substrate with the blue side up so as to avoid sunlight glare.

The barrier should be clean and dry at the time of jointing. It should be overlapped by at least 150mm, bonded with Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Foil Lap Tape. In demanding site conditions seal lap joints with Visqueen Ultimate GR Lap Tape.

Alternatively lap joints can be heat welded to achieve an effective seal. Welded lap joints can be less than 150mm provided the joint integrity is not compromised.

Airtight seals should be formed around all service entry points. Visqueen Preformed Top Hat Units should be used for sealing service entry pipes. The base of the top hat and the upstand should be bonded using Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Foil Lap Tape. The upstand should be secured with the supplied jubilee clip.

Forming an effective barrier to gases may give rise to complex three-dimensional detailing where, it is recommended Visqueen Preformed Units are used e.g. corners. Alternatively Visqueen Pro Detailing Strip can be used to seal awkward junctions.

If the barrier is punctured or perforated a patch of the same material should be lapped at least 150mm beyond the limits of the puncture and bonded with Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Foil Lap Tape. Alternatively a patch can be formed using Visqueen Pro Detailing Strip and lapped at least 150mm beyond the extents of the puncture.

The barrier should be covered by a protective layer as soon as possible after installation to prevent damage e.g. from following trades. Care should be taken to ensure that the membrane is not punctured, stretched or displaced when applying a screed or final floor covering. A minimum thickness of 50mm screed is recommended. When reinforced concrete is to be laid over the barrier the wire reinforcements and spacers must be prevented from puncturing the barrier. Where there is a high risk of potential damage, the barrier should be covered with Visqueen TreadGuard protection, screed, or other approved protection material before positioning the reinforcement.

## Usable temperature range

It is recommended that Visqueen Gas Barrier and all associated system components should not be installed below 5°C.

## Additional information

When used in accordance BS8485:2015 + A1:2019 a subfloor ventilation system or pressure relief maybe required
Where hydrocarbon or VOC contamination is present use Visqueen Ultimate VOC or HC Blok gas protection systems
To assist build sequencing, Visqueen GR DPC is available for gas protection through the wall constructions
For suspended beam and block floor detailing see GB-01
Visqueen Preformed Top Hat Units should be used at service pipe penetrations see GB-51
For internal and external corners Visqueen Ultimate Preformed Units should be used see PFU-553
To seal around steel columns use Visqueen Pro Detailing Strip see GB-52
For additional detailing information, contact Visqueen Technical Services +44 (0) 333 202 6800



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Technical support: +44 (0) 333 202 6800

**Date Published: 11/09/2020**

# Visqueen Gas Barrier

| Property | Test method | Units | Compliance criteria | Result |
|---|---|---|---|---|
| Dimensions | EN 1848-2 | m | | 2 x 50 |
| Overall thickness including scrim mesh | EN 1849-2 | mm | | 0.66 |
| Effective thickness in between scrim mesh | EN 9863-1 | mm | | 0.4 |
| Mass | EN 1849-2 | g/m² | -0%/+5% | 400 |
| Tensile strength - MD | EN 12311 | N | MLV | 350 |
| Tensile strength - CD | EN 12311 | N | MLV | 350 |
| Tensile elongation - MD | EN 12311 | % | MLV | 20 |
| Tensile elongation - CD | EN 12311 | % | MLV | 21 |
| Joint strength | EN 12317-2 | N | MLV | 332 |
| Watertightness 2kPa | EN 1928 | - | Pass/Fail | Pass |
| Resistance to impact | EN 12691 | mm | MLV | 200 |
| Dart impact | BS 2782 | g | MDV | 731 |
| Low temperature flexibility | EN 495-5 | ℃ | MDV | -40 |
| Durability against ageing | EN 1296 and EN 1928 | - | Pass/Fail | Pass |
| Durability chemical resistance | EN 1847 | - | Pass/Fail | Pass |
| Resistance to tearing (nail shank) CD | EN 12310-1 | N | MDV | 358 |
| Resistance to tearing (nail shank) MD | EN 12310-1 | N | MDV | 368 |
| Resistance to static loading | EN 12730 | kg | MLV | 20 |
| Water vapour transmission - resistance | EN 1931 | MNs/g | MDV | 7000 |
| Water vapour transmission - permeability | EN 1931 | g/m²/d | MDV | 0.03 |
| Visible defects | EN 1850 -2 | - | Pass/Fail | Pass |
| Reaction to fire | EN 13501-1 | Class | MDV | F |
| BS 8485:2015 + A1:2019 testing requirements | | | | |
| Mass | EN 1849-2 | g/m² | Average >370 | 400 |
| Methane permeability | ISO 15105-1 | mls/m²/d/atm | Pass/Fail | <0.15 |
| Puncture CBR | BS EN ISO 12236 | N | MDV | 1114 |
| Impact resistance | EN 12691 | mm | MDV | 1000 |
| Tensiles yield strength MD | ASTM D4885-01 | kN/m | MDV | 12.5 |
| Tensiles yield strength CD | ASTM D4885-02 | kN/m | MDV | 7.3 |
| Resistance to static loading | EN 12730 | kg | >MLV | 20 |
| Yield elongation CD | ASTM D4885-04 | % | MDV | 19 |
| Tear resistance - trouser method A - MD | BS ISO 34-1 | kN/m | MDV | 48.2 |
| Tear resistance - trouser method A - CD | BS ISO 34-1 | kN/m | MDV | 44.8 |
| Tear resistance - angle method B - MD | BS ISO 34-1 | N | MDV | 53.5 |
| Tear resistance - angle method B - CD | BS ISO 34-1 | N | MDV | 60.6 |

## Health and safety information

Refer to the Visqueen Gas Barrier material safety datasheet (MSDS).



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Technical support: +44 (0) 333 202 6800

**Date Published: 11/09/2020**

# Visqueen Gas Barrier

## About Visqueen

The Visqueen name has long been recognised as one of the leading manufacturers of high quality advanced membrane technologies and design based solutions by specifiers, distributors, builders merchants and contractors throughout the UK and Europe.

For further guidance on the Visqueen services shown below, please refer to the relevant section of the Visqueen website (www.visqueen.com) or contact Visqueen Technical Services on +44 (0) 333 202 6800 or enquiries@visqueen.com

## Complete Range, Complete Solution


## Visqueen Technical Support

Visqueen combine an extensive product portfolio with industry leading levels of service and support which includes guidance over the phone, bespoke CAD drawings to help with complex detailing, electronic NBS specifications and access to a dedicated team of highly knowledgeable and experienced field based Technical Support Managers.

Visqueen Technical Support is available to all our customers including architects, specifiers, distributors, builders merchants, contractors and end users. All of our technical team have been awarded the industry recognised qualification Certificated Surveyor in Structural Waterproofing (CSSW).

## Visqueen CPD Seminars

The Visqueen Continuing Professional Development (CPD) Seminars provide up-to-date information on changes within Building Regulations/Building Standards and nationally recognised industry guidance affecting damp proofing, water vapour control, hazardous ground gas protection and below ground structural waterproofing.

The one hour seminars have been produced for design specialists within the construction sector and are delivered by our team of Technical Support Managers.

## Visqueen PI designs and special projects

From initial design to the completed project, Visqueen are with you every step of the way. Whether it be hazardous ground gas protection and/or below ground waterproofing protection employing barrier, structurally integral or drained systems, Visqueen can offer professional indemnity (PI) insurance for bespoke Visqueen design solutions.

Visqueen Technical Support Managers work with all stakeholders to provide cost effective Visqueen solutions offering complete peace of mind throughout the construction phase and beyond.

## Visqueen Training Academy

Based at our manufacturing facility in Derbyshire, the Visqueen Training Academy is available to support Visqueen customers throughout the UK by providing a wide range of both theory and practical skills related training.

Courses include one day product awareness training for our distributors and builders merchants to help them in their day-to-day jobs, through to intensive three day courses giving detailed hands-on training in the practical skills required for safe and robust product installation.



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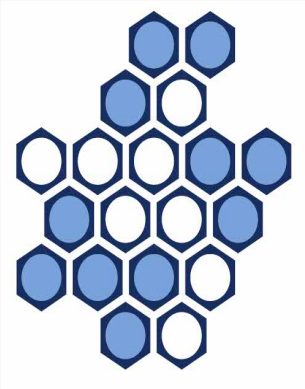
# FiloSeal+HD Duct Seal

Duct sealing system FiloSeal+HD is an eginnered universal solution for sealing larger heavy cables and pipes in ducts, boreholes or transit frames.

Up to 2 bar Pressure Resistance
100Kg pulling Force on the cables when sealed
10xd at 45º, with 1 bar pressure bending test



## Features

- Flexible, one component, adhesive and sealing compound in a cartridge - (310ml)
- Kits are complete with backing and mastic to fill an empty duct of the quoted kit size
- High levels of Gas and Water tightness
- Excellent adhesion, applicable to all common building materials
- Shows Fire resistance properties
- Resistant against Water, Alkaline, Chemical agents
- Resistant to termites (Mastotermes Darwiniensis) Northern Australian termites
- Resistant to Rats
- Resistant to Hydrogen Sulphide / Methane and many other Gases (NedLab)
- Non-corrosive
- Solvent-free
- Shock absorbing
- Non-toxic, neutral and almost odourless
- Also suitable for limiting the EX-zones during transitions (observe chemical resistance)
- Complies with 2011 NEC Articles 225.27, 230.8, 300.5(G), 300.7 (A) on Raceway Seals, and 501.15 (B)(2)
- Suitable for any shaped duct/borehole/opening
- WIMES Compliant (3.02 2013 6.4.3.2 b)
- Quick and easy installation
- A complete kit
- Seals all know materials, PVC & PE sheathed cables, PILC, (HD) PE pipes
- Engineering duct sealing solution
- Suitable for renovations, can be installed retrospectively
- Over 25 years of operational experience

## More info

Download: FiloSeal+ disclaimer

View this product at: https://www.filoform.co.uk/filoseal-hd-re-enterable-duct-sealing

# FiloSeal+HD Duct Seal

## Products

| Art.nr. | Product Name | Duct diameter min.-max. (mm) | Order unit |
|---|---|---|---|
| 280010 | FiloSeal+HD - 75mm > 110mm | Ø 110 max. | per piece |
| 280020 | FiloSeal+HD - 125mm > 160mm | Ø 160 max. | per piece |
| 280030 | FiloSeal+HD - 180mm | Ø 180 max. | per piece |
| 280040 | FiloSeal+HD - 200mm | Ø 200 max. | per piece |
| 280050 | FiloSeal+HD - 225mm | Ø 225 max. | per piece |
| 280060 | FiloSeal+HD - 250mm | Ø 250 max. | per piece |

# APPENDIX V
# GAS VERIFICATION SHEET

# ERGO 22-1214 SUNCROFT, WARKWORTH Gas Protection Validation Site Record

**One record sheet to be completed per plot. To be completed by the ERGO Professional Inspecting**

| | | | | | |
|---|---|---|---|---|---|
| **Site:** | SUNCROFT | **Plot no:** | PLOT 2 GARAGE | **Inspection date/time:** | 24/02/23 |
| **Inspection by:** | K. FLANNIGAN | **Installers:** | DP BUILDERS LTD | **Photographed:** | ✓/× |

| | **Membrane Type** | **Laps and joins** | **Membrane Condition (inc. underside)** | **Extent of coverage** |
|---|---|---|---|---|
| **Complete** ✓/× | VISQUEEN MEMBRANE | ADEQUATE | ADEQUATE | GOOD |
| **Remarks inc. any repairs** | MINOR REPAIRS, RECTIFIED. | **Please select:** [Taped] Hand welded Auto welded Other (please state) | | |

| | **Service Entries** | **Damp Proof Course** | **Test Type** |
|---|---|---|---|
| **Complete** ✓/× | ADEQUATE | N/A | |
| **Remarks inc. any repairs** | **Pre-formed**: y /(n) | | [Pick Test] / Air Lance |

This Plot has [PASSED] / FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS / [IS NOT]* required for this Plot.

Inspection by: K. FLANNIGAN ..... Signe [redacted] ....

# Gas Protection Validation Site Record

**Plot No:** 2

| | | | | | |
|---|---|---|---|---|---|
| **Inspection date/time:** | 10/10/22 | Inspected by: | JM | Photographed: | ✓/x Yes |

| | ✓/x | Notes/recommendations |
|---|---|---|
| **Membrane Type Correct** | ✓ | Visqueen as required |
| **Extent of Coverage Correct** | ✓ | Full coverage and bridging of cavity |
| **Underside of Membrane** | ✓ | Swept clear no penetrating items |
| **Slab / membrane condition** | ✓ | Adequate no evidence of penetrations |
| **Laps and joints** | ✓ | Adequate. Photographed |
| **Damp-proof course** | ✓ | Adequate and tied in |
| **Service entries** | ✓ | Adequately sealed |
| **Folded Membrane Joint Taped & inspected** | ✓ | Joint correctly sealed and bnp tape present adequate l-p |

This Plot has **PASSED/FAILED*** inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot

Inspection by: S Malby Signed: [redacted]

**One record sheet to be completed for each plot – To be completed by ERGO Professional Inspecting.**

# Gas Protection Validation Site Record

**One record sheet to be completed per plot. To be completed by the ERGO Professional Inspecting**

| | | | | | |
|---|---|---|---|---|---|
| **Site:** | Suncroft | **Plot no:** | Plot 1 | **Inspection date/time:** | 9/11/22 |
| **Inspection by:** | JM | **Installers:** | DP | **Photographed:** | ✓/x |

| | Membrane Type | Laps and joins | Membrane Condition (inc. underside) | Extent of coverage |
|---|---|---|---|---|
| **Complete** ✓/x | Correct | Adequate and sealed | Swept prior to laying | Full, Adequate |
| **Remarks inc. any repairs** | Minor pinprick identified and completed under supervision | **Please select:** Taped ~~Hand welded~~ Auto welded Other (please state) | | |

| | Service Entries | Damp Proof Course | Test Type |
|---|---|---|---|
| **Complete** ✓/x | Adequately sealed | Correct | |
| **Remarks inc. any repairs** | **Pre-formed**: y / n | | Pick Test /Air Lance |

This Plot has **PASSED/FAILED*** inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot

Inspection by: J Malley ..... Signed: [redacted] .....



Ergo Environmental Limited
Registered in England No: **11162116** Registered Office: 172-174 Albert Road, Jarrow, Tyne and Wear, Jarrow NE32 5JA

# Gas Protection Validation Site Record

**One record sheet to be completed per plot. To be completed by the ERGO Professional Inspecting**

| | | | | | |
|---|---|---|---|---|---|
| **Site:** | SUNCROFT WARKWORTH | **Plot no:** | 1 & 2 | **Inspection date/time:** | 10/6/22 2:30 |
| **Inspection by:** | JC | **Installers:** | DP Builders | **Photographed:** | ✓/× |

| | **Membrane Type** | **Laps and joins** | **Membrane Condition (inc. underside)** | **Extent of coverage** |
|---|---|---|---|---|
| **Complete ✓/×** | VISQUEEN GAS | As required | ✓ | ✓ |
| **Remarks inc. any repairs** | externals only<br>- preformed corner units | **Please select:**<br>(Taped)<br>Hand welded<br>Auto welded<br>Other (please state) | good | As required at this stage. |

| | **Service Entries** | **Damp Proof Course** | **Test Type** |
|---|---|---|---|
| **Complete ✓/×** | ✓ | X | ✓ |
| **Remarks inc. any repairs** | **Pre-formed:** (y) / n<br>those complete at this stage are good | not yet complete externals only | (Pick Test) /Air Lance |

This Plot has (PASSED)/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit (IS)/IS NOT* required for this Plot

Inspection by: J. CAMPBELL ..... Signed: [redacted]

No further visit required following installation of internal areas.