



**REMEDIATION STRATEGY &
VERIFICATION PLAN**

**HOLBEACH FOOD ENTERPRISE
ZONE, LAND OFF A151,
SPALDING, PE12 7BF**

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Date: 11th May 2022



EnviroSolution Ltd Document Verification

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Report Title	Remediation Strategy & Verification Plan		
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Appendix A – Floor Slab Design Plan

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1 Introduction

1.1 Background

This report presents the Remediation Strategy and Verification Plan associated with the redevelopment of land located off the A151 in Holbeach, Spalding. The proposed development is a new electrical contractors facility featuring a central warehouse, a car park to the east and a concrete yard to the west.

1.2 Supporting Information

The following report has been completed for the site:

- EnviroSolution, Phase 1 Environmental Site Assessment Report, 26th January 2022, CL101.

This report provides the basis for the conceptual understanding of the site.

1.3 Requirement for Remediation

The desk-based information indicates that peat deposits could be present beneath the site. Peat is classed a natural source of ground gases (i.e. methane and carbon dioxide) and these gases could be present in the ground beneath the site.

No gas monitoring has been carried out and so the site has been classified as CS2 utilising the guidance contained in the CL: AIRE research bulleting RB17 'A Pragmatic Approach to Ground Gas Risk Assessment'.

2 Remediation Options

2.1 Remediation Options

The remedial objectives are to ensure that a safe and suitable development platform is provided for the proposed land use, by removing all potential exposure pathways.

At present the gas protection measures for the development are unknown and no design plans are available.

In accordance with BS8485, the proposed development the proposed building falls into 'Type D' (Table 3 of BS8485) and therefore, the gas protection measures should achieve a score of 1.5. The gas protection measures should comprise an element or a combination of elements from Tables 5 – 7 of BS8485 and no more than one element per table should be combined to achieve the gas protection score. The gas protection score could be achieved through the structural barrier, ventilation and / or the incorporation of a suitable gas resistant membrane.

The floor slab design proposals (as shown in Appendix A) will more than achieve the required a gas protection score (GPS as they comprise a cast in situ monolithic reinforced ground bearing floor slab (GPS = 1.5) and a gas resistant membrane (GPS = 2).

2.2 Unexpected Ground Conditions

If any materials containing unexpected visual or olfactory evidence of contamination is encountered then groundwork should cease and the Local Planning Authority be informed, so that a suitable way forward can be agreed.

2.3 Health and Safety Considerations

During the redevelopment of the site it will be necessary to implement measures to protect construction workers, and adjacent.

Construction workers and site visitors will wear appropriate personal protective equipment (PPE). Health and safety procedures should ensure that ingestion of soils and groundwater is avoided (e.g. by washing hands prior to eating, drinking and smoking).

As a minimum, the works should be undertaken in accordance with best practice guidance and the following measures undertaken to assist with control of dust generation:

- Regularly damping down with water of access roads and stockpiles.
- A wheel washing facility for vehicles entering and leaving the site during the construction period to pass through.
- Use of enclosed or tarpaulined vehicles to transport materials and aggregates.
- Regular cleaning of local roads.
- Vehicle movements kept to a minimum and vehicle speeds within the site limited.

- Location of dust generating equipment (e.g. mobile crushing and screening equipment) to be positioned such that potential nuisance impacts to receptors are minimised, as far as practicable.

3 Validation & Verification Plan

3.1 Validation Testing

3.1.1 Site Won Materials

Validation for site won materials is not required, except where unexpected contamination is encountered. This should be undertaken to ensure that the materials are suitable for re-use on site. It is recommended that sampling is undertaken at a frequency of one sample per 50m³. Results should be compared to the respective soil quality criteria (see Section 3.2).

3.1.2 Imported Materials

If any soil is to be imported to site, then validation of imported materials will be required. This should be undertaken at a frequency of one sample per 50m³ for brownfield sourced or one sample per 100m³ for greenfield sourced material. A minimum of 3 no. samples should be taken for any one source of imported materials.

The material should be compliant with BS3882:2015 *"Specification for Topsoil"* and the soil quality criteria presented in Section 3.2 in order to protect the rooting zone and human health.

Comparison of the results should be made with the soil quality criteria (see Section 3.2). If any exceedances are found, then the material should not be used on the site.

It is recommended that validation of imported soils is undertaken at the source of the material to ensure that the material is suitable for use prior to importation to site. If the sampling of the imported materials is to be undertaken prior to importation to site, the respective quantity of materials should be stockpiled/isolated at source whilst the laboratory testing is being undertaken. This should ensure that the laboratory test results remain representative of the materials to be imported. Delivery certificates should be retained.

Validation certificates and documentation will be retained and included within the verification / completion report for all imported materials. Where validation is undertaken at source subsequent delivery notes should be retained for all imported material and copies included in the completion report to ensure corroboration of site delivered materials with those sampled.

3.1.3 Testing Requirements

Sufficient time should be allowed for sampling, analysis and the decision-making process required to meet the remediation objectives. Sampling must be undertaken by a suitably qualified environmental professional (i.e. Environmental Scientist/Engineer) or experienced chemist.

3.1.4 Validation of Gas Protection Measures

3.1.4.1 Validators Qualifications

Following the installation of the gas protection measures this work should be validated and verified by a suitably qualified and independent contractor in accordance with CIRIA C735, which is defined as follows:

1. NVQ Level 4 "Gas Protection Verification"
2. CL:AIRE TGPV Accredited Surveyor

Gas protection measures design plans and specifications of the selected gas membrane should be provided to the verifier prior inspection.

3.1.4.2 Risk Based Approach to Verification

A risk-based system takes account of various factors that will influence the consideration of the scope of verification activities, including integrity testing. The verification specialist will consider the following:

1. Site – specific gas regime
2. Number of buildings/plots to be inspected and over the period this will take place
3. Complexity of the design and installation
4. Qualifications and experience of the workforce
5. Additional gas resistance protection: Pressure release system installed as standard.

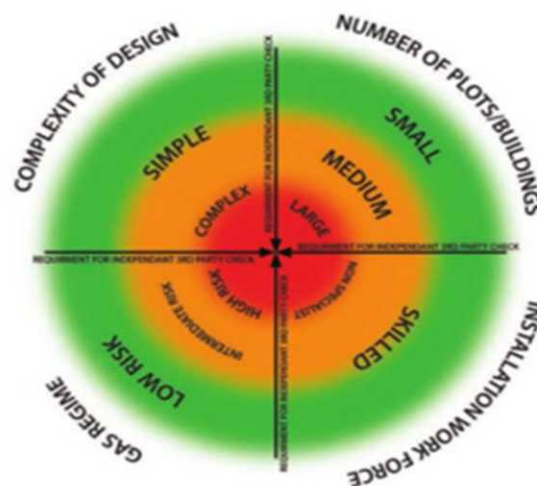


Diagram of risk from CIRIA 735

The elements that have been considered in the generation of this verification plan are:

Gas Regime:

Low Risk	CS2
Intermediate Risk	CS3/4
High Risk	CS4 and above

Design complexity:

Simple	Few service entries/penetrations, gas membrane and sub floor void
Complex	Variety of gas protection measures, numerous columns/penetrations/service entries, corners and small spaces

Number of plots/buildings:

Small	<5
Medium	3-15
Large	>10

Installation workforce: To Be Confirmed

Non-Specialist	General builder/ground worker
Skilled	Qualified and experienced installer (NVQ 2 qualification in gas protection installation)

Conclusion: The Gas Regime for this development is a Characteristic Situation 2 = Low Risk*3.1.4.3 Verification Process*

Inspections will be required during the installation of a gas protection membrane and prior to the pour of any concrete. During the site inspection any non-conformities will be pointed out the contractor and a remediation log of the non-conformity made. These will then be rectified by the installers and will be inspected again.

The following tests will be conducted during the Verification process.

1. Pick & Probe testing on minimum of 100% of all seams
2. Non-Destructive Air Lance testing on a minimum of 100% of all seams to ASTM D4473-08 (2013)
3. Visual Inspections on minimum of 100% of all seams
4. Destructive Testing on selected seam test welds or field tests where appropriate

3.2 Soil Quality Criteria

Materials to be utilised on site should meet the Soil Quality Criteria in **Appendix B**. As the controlled waters risk assessment has concluded that the risks to groundwater and surface water bodies are low, the quality criteria for the site are based on mitigating risks to human health rather than leachability criteria.

The soil quality criteria comprise a combination of:

- CLEA SGVs
- LQM 'Suitable for Use Levels'
- LQM 'Category 4 Screening Levels'

All materials to be used in areas of soft landscaping must meet the soil quality criteria for residential land use without plant uptake.

Any material imported to site must not contain contaminant levels that exceed the existing site conditions, regardless of whether they meet the assessment criteria. This is to ensure minimal risk levels are achieved.

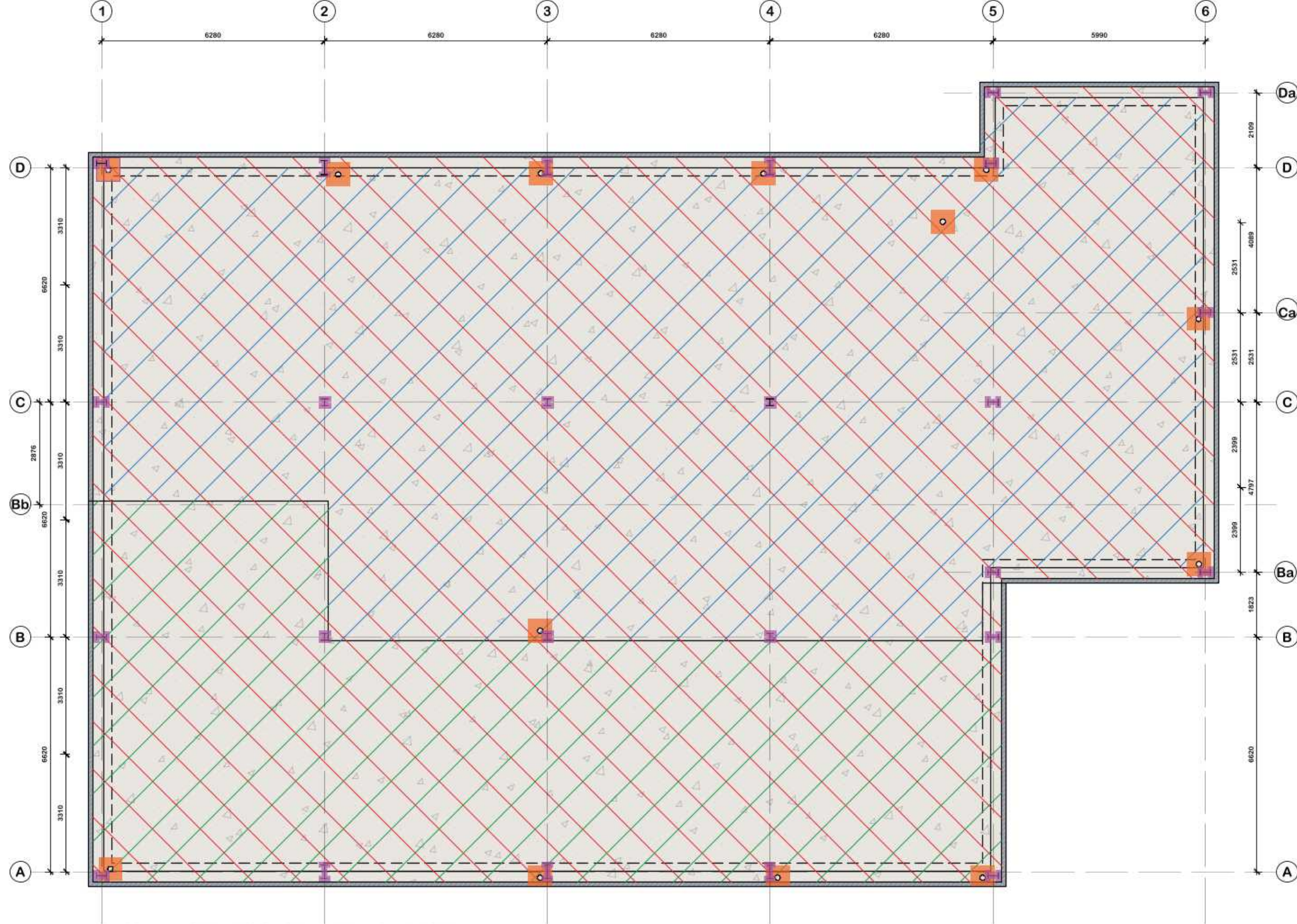
If asbestos is identified, then the contaminated material must not be re-used in private garden areas, unless it is buried at depth beneath a clean cover system. If widespread asbestos containing materials (ACM) are identified during the groundworks the procedure outlined in Section 2.2 for unexpected contamination should be followed.

3.3 Verification Report

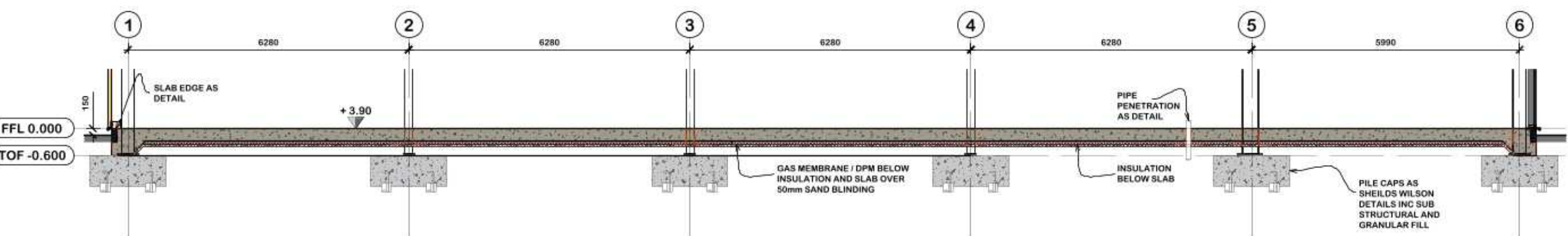
Following completion of the remedial works, verification of the works must be included in the Verification Report.

All the information shall be collected by the contractor, and issued to the Client or the Client's representative, who on completion should complete an independent assessment of the results and produce a final verification report. The verification report should form part of the operations and maintenance manual and health and safety file for the site to be held by future site operators and to be used for any future development.

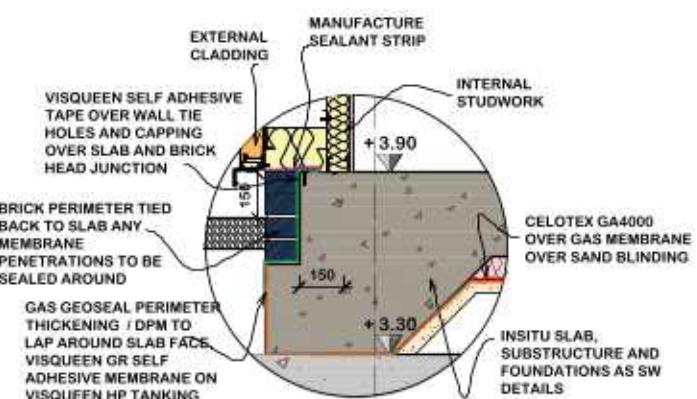
APPENDIX A



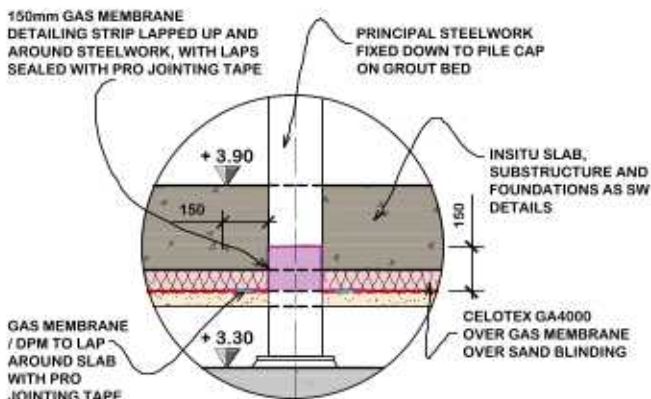
PROPOSED GROUND FLOOR SLAB (GAS PROTECTION)
SCALE: 1:100



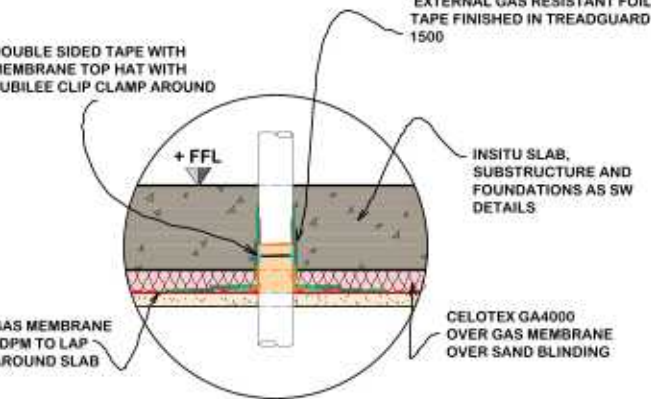
BUILDING SECTION B-B
SCALE: 1:100



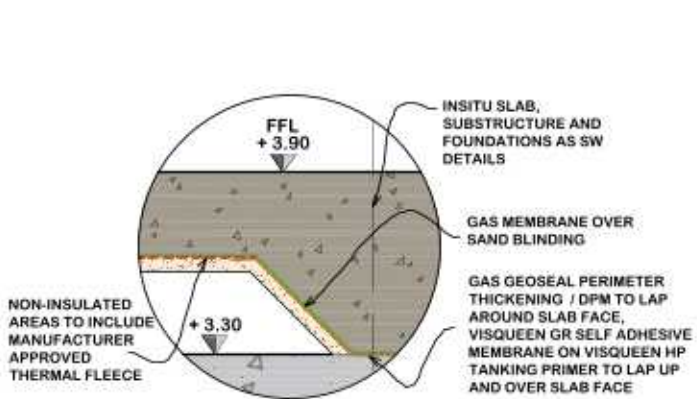
TYPICAL EDGE DETAIL
SCALE: 1:25



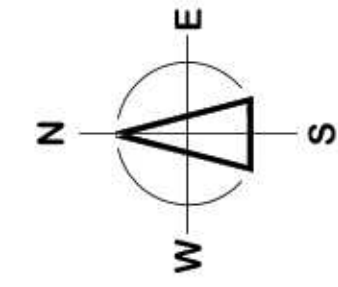
TYPICAL STEEL PENETRATION DETAIL
SCALE: 1:25



TYPICAL PIPE PENETRATION DETAIL
SCALE: 1:25



TYPICAL EDGE DETAIL - NON INSULATED
SCALE: 1:25



Notes:

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All dimensions are in millimetres unless stated otherwise.

It is recommended that information is not scaled off this drawing.

This drawing should be read in conjunction with all other relevant information, specifications & schedules.

If this drawing is received electronically it is the recipients responsibility to print the document at the correct scale.

All dimensions to be checked on site prior to commencing work and any discrepancies to be advised immediately.

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David Trundle Design Services Ltd are responsible for the 'Architectural' design of the elements included on this drawing only.

Architectural design has been carried out with due consideration for the safety during construction, occupation and maintenance of the finished structure.

The works contain no extraordinary hazards or risks that are not present during routine construction operations that would not readily be apparent to a competent contractor.

This information should be included as part or commencement of the Health and safety file for the project.

PROPOSED LEGEND

- EXTENT OF GF SLAB WITH PERIMETER BRICK DETAIL
FFL GF +3.90
TOTAL AREA APPROX 629m²
- EXTENT OF INSULATION BELOW SLAB
CELOTEX GA4000
TOTAL AREA APPROX 388m²
- EXTENT OF MANUFACTURE PROTECTION
FLEECE BELOW GAS MEMBRANE / DPM
TOTAL AREA APPROX 241m²
- EXTENT OF VISQUEEN GAS MEMBRANE / DPM
TOTAL AREA APPROX 629m²
- PERIMETER STEELWORK COLUMN
PENETRATION - SEAL 150mm IN ALL DIRECTIONS AS DETAIL
- SERVICE PENETRATION WITH TOP HAT
- SEAL AS DETAIL

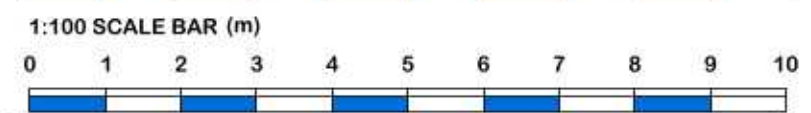
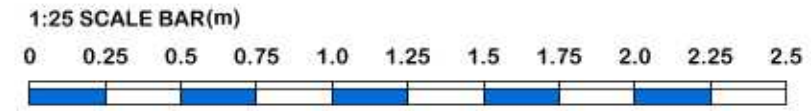
NOTES
TO BE READ IN CONJUNCTION WITH NBS SPECIFICATION
ANY DISCREPANCIES TO BE RAISED WITH TRUNDLE DESIGN SERVICES FOR CLARIFICATION/CONFIRMATION.

STEELWORK SIZES AND CONNECTION DETAILS BY STRUCTURAL ENGINEERS INCLUDING FIRE WALL SUPPORTING STEELWORK

FOUNDATION DESIGN AS ENGINEERS DETAILS

ALL PENETRATIONS AND LAPS INSTALLED IN ACCORDANCE WITH MANUFACTURES DETAILS

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 GAS RESISTANT FOIL 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 GAS RESISTANT FOIL LAP TAPE. THE UPSTAND SHOULD BE SECURED WITH THE SUPPLIED JUBILEE CLIP.



B	11.05.2022	SLAB EDGE DETAIL UPDATED TO MANUFACTURER COMMENTS.
A	11.05.2022	SLAB EDGE DETAIL UPDATED TO MANUFACTURER COMMENTS.
no	date	amendment description

Revisions

Drawing Status: **CONSTRUCTION**

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Project Title:

AJS

PLOT 9, HOLBEACH
SOUTH LINCOLNSHIRE FOOD ENTERPRISE ZONE

Drawing Title:

PROPOSED OFFICE AND WORKSHOP
PROPOSED GROUND FLOOR SLAB
GAS PREVENTION PLAN & PENETRATION DETAILS

Scale: 1:100 @ A2 Date: MAY 2022 Drawn: HC

Drawing Number: **21-L74-C008B** Revision:

Checked by: Date:

If this drawing is unsigned in the check box then the drawing is an unauthorised issue and should not be used for any purposes

APPENDIX B

Soil Quality Criteria

Substance	Commercial (mg/kg)
Asbestos	Present
Arsenic	640
Cadmium	190
Chromium	8,600
Copper	68,000
Lead	2,300
Mercury	1,100
Nickel	980
Selenium	12,000
Zinc	730,000
Aliphatics >C5-C6	3,200
Aliphatics >C6-C8	7,800
Aliphatics >C8-C10	2,000
Aliphatics >C10-C12	9,700
Aliphatics >C12-C16	59,000
Aliphatics >C16-C21	1,600,000
Aliphatics >C21-C35	1,600,000
Aliphatics >C35-C44	1,600,000
Aromatics >EC5-EC7	260,000
Aromatics >EC7-EC8	56,000
Aromatics >EC8-EC10	3,500
Aromatics >EC10-EC12	16,000
Aromatics >EC12-EC16	36,000
Aromatics >EC16-EC21	28,000
Aromatics >EC21-EC35	28,000
Aromatics >EC35-EC44	28,000
Aromatics >EC40-EC44	28,000
Acenaphthene	84,000
Anthracene	520,000
Benz(a)anthracene	170
Benzo(b)fluoranthene	44
Benzo(k)fluoranthene	1,200
Benzo(a)pyrene	35
Benzo(g,h,i)perylene	3,900
Chrysene	350
Fluoranthene	23,000
Fluorene	63,000
Indeno(1,2,3-cd)pyrene	500
Phenanthrene	22,000
Pyrene	54,000
Naphthalene	190
Dibenzo(a,h)anthracene	3.5

Notes

Soil Quality Criteria = LQM 'Suitable for Use Levels' & LQM 'Category 4 Screening Levels'.