



REMEDIATION METHOD STATEMENT

Home Farm, Bedfield, Suffolk, IP13 7EE

Chapter Build Group Limited

December 2022

Project no: 61647

Document Review Sheet: -

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Date: - 21 / 12 / 2022

Document Status

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Revision Status

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Title: REMEDIATION METHOD STATEMENT
 Project: Home Farm, Bedfield, Suffolk, IP13 7EE
 Client: Chapter Build Group Limited
 Project No.: 61647

Contents:-

1. Introduction	2
1.1. RMS Objectives	2
2. Limitations of Use	3
3. Site Location and Description	3
4. Review of Previous Investigation	3
4.1. Goldfinch Environmental Ltd, Geo-Environmental Desk Study Report, ref. 0772/1, May 2021	3
4.2. Richard Jackson Ltd, Infiltration Assessment, ref. SB/61647/SLR, May 2022 4	4
4.3. Richard Jackson Ltd, Revision A Ground Investigation Report, ref. 61647, July 2022	4
4.4. Richard Jackson Ltd, Gas Monitoring Letter Report, ref. JG/61647/GML, November 2022.....	5
5. Potential Contaminant Linkages	6
5.1. Summary of Identified Significant Potential Contaminant Linkages.....	6
5.2. Breaking the Contaminant Linkages	7
6. Remedial Strategy	7
6.1. Preparatory Works	7
6.2. Health Safety and Environment	7
6.2.1. Contractor & CDM Regulations.....	7
6.2.2. Control of Dust	8
6.3. Preliminary Tasks	8
6.4. Watching Brief - Generic.....	9
6.5. Areas of Proposed Soft Landscaping.....	10
6.6. Waste Soils	11
6.7. Gas Mitigation Measures	11
7. Verification Plan	12
8. Validation Report.....	13

Appendix

Appendix A: Drawings & Figures

Appendix B: Tier One Screening Values

Appendix C: Discovery Strategy

Appendix D: Gas Membrane Specifications

1. Introduction

Richard Jackson Ltd received an instruction to prepare a remediation method statement (RMS) in connection with the proposed redevelopment at Home Farm, Bedfield, Suffolk, IP13 7EE.

The works were instructed by the Client, Chapter Build Group Limited and were carried out in accordance with our fee proposal detailed within an email of 19th July 2022.

This RMS relates to the proposed redevelopment of the site for residential purposes. The proposed development scheme is to comprise the demolition of existing structures and the erection of 7no. new residential dwellings with associated gardens, drives/parking, access roads and infrastructure. A proposed development plan is presented in Appendix A.

Phase one and two investigations have previously been undertaken at the site by both, Richard Jackson Ltd. and third-party consultants, as detailed in the following reports:

- Goldfinch Environmental Ltd – Geo-Environmental Desk Study Report, ref. 0772/1 (May 2021);
- Richard Jackson Ltd – Infiltration Assessment, ref. SB/61647/SLR (May 2022);
- Richard Jackson Ltd – Revision A Ground Investigation Report, ref. 61647 (July 2022);
- Richard Jackson Ltd – Gas Monitoring Letter Report, ref. JG/61647/GML (03 November 2022).

The above reports are reviewed briefly as part of this RMS.

1.1. RMS Objectives

This RMS provides a detailed strategy for the implementation of the required remedial measures for the proposed development. The specific objectives of the RMS are as follows:

- To summarise the site investigations and risk assessment work undertaken to date;
- To present the requirements of the remediation scheme to break the significant contaminant linkages which have been identified;
- To identify and designate the roles and responsibilities of various involved parties;
- To state how remediation should be recorded and verified.

2. Limitations of Use

This RMS sets out the measures which will be carried out to mitigate potentially significant risks as identified by the site investigation in relation to the proposed end-use of the site. It also provides a strategy for addressing risk arising from unexpected conditions which may be encountered during the redevelopment of the site.

This report does not provide a completion statement for the works, such verification will be provided at the appropriate time as a Validation Report.

3. Site Location and Description

The site was located to at Home Farm, to the south of Bedfield Road, Bedfield, Suffolk, IP13 7EE. The approximate Ordnance Survey grid reference for the centre of the site was TM 229 655. A site location plan is presented as Figure 1 in Appendix A.

The site was roughly level at an approximate elevation of 61.5m aOD. It was irregularly shaped with maximum approximate dimensions of 75m southwest to northeast and 70m northwest to southeast.

At the time of the ground investigation, the site comprised, in the north, a collection of abandoned two-storey height barns with corrugated iron roofs, constructed over concrete floor slabs. According to the Goldfinch Environmental Ltd desk study report, these buildings has been relatively unchanged since 1999. The concrete hardstanding, created a yard in the western part of the site and formed the driveway to the public Bedfield Road. The concrete hardstanding showed evidence of deterioration, with overgrown vegetation which was encroaching on to the buildings and multiple possible prior locations of above-ground oil tanks noted. The south of the site was set to soft landscaping with dense bramble growth, lined by hedges, trees, and wooden fencing. Rubble and scrap metal were found in the north-western corner of the site.

A detailed site description is presented as Section 4 of Goldfinch Environmental Ltd Geo-Environmental Desk Study report, reference 0772/1, dated May 2021.

4. Review of Previous Investigation

As mentioned in Section 1, previous investigations have been undertaken at the site. These are summarised in the following section.

4.1. Goldfinch Environmental Ltd, Geo-Environmental Desk Study Report, ref. 0772/1, May 2021

At the time of site walkover, the site was occupied by a series of closely situated buildings over concrete floor slabs in the northern half of site, concrete hard cover in the west and soft cover and dense tree growth in the southern third. Buildings were recorded to be of variable construction types with little to no evidence of deterioration. Furthermore no staining from

contamination or leaching of containerised fluids or industrial activities were observed.

Off-site a disused wind pump was recorded to the southeast with residential properties beyond, Home Farm buildings and associated farmland was present to the northwest on the opposite side of the Bedfield Road, with agricultural land to the southwest, and a series of residential properties to the northeast.

The report recorded the site to have comprised a sparsely developed rural plot from the first historic Ordnance Survey map examined (1888), with development noted in the early 1900s and some possible further minor expansion/reconfiguration recorded in the early 2000s.

The superficial deposits were identified as Lowestoft Formation, listed as a Secondary Aquifer, with the underlying Crag Group (Sand), listed as a Principal Aquifer.

No readily identifiable sources of contamination were reported.

The report concluded that on the basis of the low risk presented by contamination, an intrusive investigation may be considered unwarranted.

4.2. Richard Jackson Ltd, Infiltration Assessment, ref. SB/61647/SLR, May 2022

After the mechanical excavation of 2no. trial pits (TP01, TP02) to 2.05m bgl (below ground level) and 2.0m bgl respectively, soakage tests were completed in accordance with BRE Digest 365 (2016).

The investigation disclosed surface materials (Topsoil / Concrete) overlying in turn Made Ground, Superficial Deposits (Unspecified), and the Lowestoft Formation. The Lowestoft Formation was encountered as a firm light brown-light grey sandy gravelly clay, with gravel of chalk and occasional flint.

The soakage tests were recorded to be unsuccessful due to insufficient infiltration during the period of testing, and therefore no infiltration rate was established.

The site was not considered appropriate for the adoption of infiltration drainage, and therefore alternative methods of surface water disposal should be investigated.

4.3. Richard Jackson Ltd, Revision A Ground Investigation Report, ref. 61647, July 2022

The fieldwork on which this investigation was based comprised the formation of 10no. windowless sampler (WLS) boreholes to a maximum depth of 5.00m bgl together with the installation of monitoring standpipes in 6no. locations. The factual findings of the trial pits, excavated as part of the above summarised infiltration assessment, were also considered as part of this report.

The disclosed ground conditions were as follows:

- Surface Materials / Made Ground – max depth 1.70m below ground level (bgl);
- Superficial Deposit (unspecified) – max depth 1.80m bgl;
- Lowestoft Formation – base unproven in this investigation.

Groundwater was encountered at depths of between 0.9m bgl (WS01) & 3.0m bgl (WS03), with standing water levels at depths of between 0.6m bgl (WS04) & 3.85m bgl (WS03).

Geotechnical testing of recovered soil samples was undertaken and included water content determinations, Atterberg Limit tests and pH value and sulphate content determinations.

Chemical analyses for a broad suite of potential contaminants was undertaken on recovered soil samples and disclosed elevated concentrations of Arsenic and Lead within the Made Ground in a limited number of locations at the site. Remediation of corresponding areas of soft landscaping was recommended.

Further geo-environmental works were recommended including completion of the on-going gas monitoring programme (as summarised in Section 4.4), together with the preparation of an RMS and associated validation works and verification reporting.

4.4. Richard Jackson Ltd, Gas Monitoring Letter Report, ref. JG/61647/GML, November 2022

As noted above, 6no. semi-permanent monitoring standpipes were installed in WLS boreholes as part of the intrusive investigation works. These wells were monitored on 6no. occasions over a period of five months at a range of atmospheric and weather conditions in line with current guidelines as given in CIRIA document 665, 'Assessing risk posed by hazardous ground gases to buildings', (2007).

The standpipes were monitored for the presence of carbon-dioxide, methane, oxygen and volatile organic compounds (VOC). Flow rates, water levels and the depth of the installed monitoring pipes was also recorded. The monitoring programme recorded the following:

- Max CO₂ concentrations: 6.1% by volume (v/v) in WS03 in the north of the site;
- Max CH₄ concentrations: of up to 1.4% v/v in WS04 in the centre of the site;
- Peak Flow rates of up to 43.2 l/hr have also been recorded at location WS03 in the centre of the site, although these reduced to 11.0l/hr rapidly and then reduced to 0.0l/hr;
- Depleted oxygen concentrations as low as 6.2% v/v were detected at location WS01 in the north-east of the site;

- Peak Volatile Organic Compound (VOC) concentrations of 55.0ppm were detected at location WS09 in the south of the site, reducing to 3ppm during the monitoring visit.

In accordance with CIRIA document 665, 'Assessing risk posed by hazardous ground gases to buildings', (2007), the site was characterised as a characteristic situation 2 (CS-2).

The site was also assessed in accordance with the traffic-light classification system defined by the NHBC in 'Guidance on Evaluation of Development Proposals in Sites where Methane and Carbon-dioxide are Present' (2007) & was classified as an Amber-2 site.

Both a CS-2 classification & Amber-2 classification require the adoption of protective measures to mitigate the risks posed by ground gases.

5. Potential Contaminant Linkages

5.1. Summary of Identified Significant Potential Contaminant Linkages

On the basis of the above summarised previous investigations and risk assessments together with the site's proposed end use a number of unacceptable potential contaminant linkages have been identified, which will require remediation. These are summarised in Table 1.

Table 1: Summary of identified unacceptable potential pollutant linkages

Potential Source	Potential Pathway(s)	Potential Receptor(s)	Comments
Arsenic & Lead in Made Ground	Direct contact with soils in areas of soft landscaping.	Residential End Users.	The sum of exposure via these pathways is considered to have potential to cause significant harm to the identified receptor, should the site be occupied prior to remediation.
	Ingestion of soils and dust. Either directly or via the consumption of home-grown produce.		
	Inhalation of vapours and dust.		
Carbon-dioxide from Made Ground	Inhalation, Accumulation & Explosion	Residential End Users.	Incorporation of protection measures to prevent gas ingress into new buildings.
		Site Workers	Consideration should be given to the monitoring of excavations during site development.

5.2. Breaking the Contaminant Linkages

In order to break the contaminant linkages identified in Table 1, one or more elements of the potentially significant contaminant linkages should be removed by the remediation so that there is no longer a potential linkage. The contaminant linkages may be broken via one of the following remediation types:

- Removal of the potential receptors of contamination;
- Removal of the contaminant source;
- Removal/management of the contaminant pathways.

6. Remedial Strategy

Remedial measures are considered to be required to address the unacceptable potential pollutant linkage identified in Table 1. The following sections provide details on the required remediation and how it is to be implemented.

For the purposes of these works 'clean' means validated materials that are physically and chemically suitable for their intended end use.

6.1. Preparatory Works

The following works are to be undertaken prior to remediation commencing at the site:

- Final site levels will be agreed;
- The positions of all services (above-ground and below-ground) shall be determined and clearly identified on site. This is to include the depth to below ground services;
- Enabling works will be completed, including creation of an access road, vegetation clearance and demolition of structures.

6.2. Health Safety and Environment

Reference should be made to CIRIA Report No.132 'A Guide for Safe Working on Contaminated Sites' (1996), and Health and Safety Guidance Document, 'Protection of Workers and the General Public during the Development of Contaminated Land' (1991).

6.2.1. Contractor & CDM Regulations

It is understood that the remediation works are to be undertaken by a the Principal Contactor.

It is also envisaged that the works would be undertaken within the requirements of the Construction (Design and Management) Regulations 2015, which details specific duties for clients, designers and contractors to ensure that appropriate arrangements are put in place so that the work can be carried out without risk to the health and safety of any person. To that end any site operatives should be made aware of the possibility of encountering elevated concentrations of contaminants in the ground. Therefore, the precautions detailed within the Richard Jackson Ltd, Revision A Ground Investigation Report, ref. 61647 dated July 2022 with respect to risks to construction workers should be incorporated into the Principal Contractors method statements and risk assessments and adhered to during the works.

All site staff and visitors should maintain high levels of personal hygiene, utilize appropriate personal protective equipment (including respiratory protective equipment if deemed necessary) and pay attention to staff inductions and briefings.

The contractor is to ensure that all necessary welfare facilities are available for the staff and site visitors.

6.2.2. Control of Dust

It is recommended that measures to control the production of dust should be employed from a health and safety and nuisance perspective. All material excavated should ideally be loaded directly into waiting lorries, but should stockpiling be necessary, they should be placed on suitable impermeable plastic sheeting and covered to prevent the run-off or leaching of contamination and the generation of dust. Ideally stockpiles should be sited on areas of hardstanding. Measures should be taken to ensure that contaminated materials are not accidentally transferred off site, for example on vehicle tyres.

6.3. Preliminary Tasks

All site staff and site contractors will be briefed on the potential for soil contamination to be encountered prior to commencing works on site. In addition to the standard health and safety procedures, outlined above, this briefing will include the following information:

- A summary of the nature of contamination which may be encountered at the site.
 - Soil contaminants previously recorded in the soils at the site include Arsenic & Lead.
 - Ground gas contamination including elevated concentrations of carbon-dioxide have been encountered at the site.
- Specific areas of the site in which contamination is considered likely to be encountered. Staff and contractors should be specifically aware of the potential for contamination to be encountered in the vicinity of

the WS02-WS04 corresponding to Plots 2 & 3 and the front gardens of Plots 4 & 7.

- Responsibilities of individuals under the discovery strategy, which is discussed further below.

It will be the responsibility of the on-site manager to ensure written confirmation of staff briefing in accordance with the above, is retained and provided to the relevant person and authorities, if requested.

It is possible during the redevelopment of the site, that unexpected contamination may be encountered. A discovery strategy has been devised, on the basis of current best practice, which will be adhered to in instances where unexpected contamination is encountered. The discovery strategy is presented in Appendix C.

6.4. Watching Brief - Generic

In order to monitor the ground conditions for soil impacts on a regular basis during the redevelopment of the site, we would recommend that the following works are undertaken as a watching brief:

- A photographic record of the key stages of the development, e.g. formation level excavations, reduced levels and the formation of areas of soft landscaping.
- Any observations of contamination, including visual (to be supported by photographic evidence), olfactory and wellbeing evidence, which are made during the course of the development by any member of site staff, contractor or site visitor.
- Where observations of contamination were 'unexpected' the methodologies detailed in the discovery strategy presented in Appendix C will be adhered to.

Written and signed statements will be obtained by the following parties on completion of the respective phases of work:

- Groundworks contractor(s) – on completion of groundworks.
- Environmental consultant - completion of groundworks and landscaping works.
- On-site manager – on completion of groundworks and landscaping works.

The written statements to be provided by the above specified persons are to include the following information:

- Site name and address.
- Name, company and role of the person signing the statement.

- Dates on which the works to which the statement refers were undertaken. Start and end dates must be specified.
- Confirmation of whether contamination was observed or not.

Where contamination was observed, the following additional information will be included in the signed, written statement:

- A description of the contamination observed, including reference to photographic evidence where appropriate.
- A plan indicating the locations where the contamination was observed.
- The details, including name and role of the person(s) notified of the observations.
- Details of the actions undertaken to mitigate the observed contamination.

In addition to the above information, the on-site manager will include confirmation that all site staff and contractors received appropriate briefing of the potential for contamination to be encountered at the site.

It will be the responsibility of the on-site manager to ensure that the watching brief is maintained.

6.5. Areas of Proposed Soft Landscaping

Remediation of the proposed soft landscaped areas in the vicinity of the proposed contamination impacts; Plots 1 & 2 and the front gardens of plots 4 & 7, will be required for the protection of human health. Soft landscaping areas which require remediation are indicated on Figure 4 presented in Appendix A.

Remediation will be achieved via the placement of a cover system with a minimum thickness of 600mm. This may be achieved by raising levels, excavation of materials to provide sufficient space or a combination of both.

The soft landscaped areas will be backfilled with certified 'clean' materials which are both physically and chemically suitable for their intended end use. The backfill material will comprise a minimum thickness of 150mm topsoil to be placed at the surface. An alternative subsoil certified as 'clean' may be used to make up the required thickness of cover.

Based upon the above requirements, a suggested composition for the cover system within landscaped areas may be given as:

- 150mm Topsoil
- 450mm Subsoil

The placed topsoil will comply with the specifications detailed in BS3882 – 2007, 'Specification for Topsoil and Requirements for Use'. Both the Topsoil and subsoil backfill will also comply with the screening values presented in Appendix B and should be sampled and tested prior to being used on site to confirm that they are suitable for their intended use.

6.6. Waste Soils

The contractor undertaking the remediation works will at all times comply with all relevant legislation and best practice in relation to waste management.

Reference should be made to the EU Waste Framework Directive, Revised Directive 2008/98/EC and 'The definition of Waste: Development Industry Code of Practice (CoP) Version 2' published by CL:AIRE (2011) to establish whether soils generated from on-site works are classified as waste.

A significant amount of waste will likely be generated from excavation works. There may be limited opportunities for re-use of materials on site, subject to compliance with the CoP.

There is, however, likely to be some waste to be disposed of off-site. The groundworks contractor should classify the waste in accordance with the document entitled 'Guidance on the classification and assessment of waste (1st Edition 2015), Technical Guidance WM3', and the results of the analysis undertaken by Richard Jackson Limited to determine whether the soils are hazardous or not.

Waste removed from the site must be classified according to the analytical methods criteria recommended by the Landfill (England and Wales) (Amendment) Regulations 2004 and 2005. The regulations set new acceptance criteria for wastes to be disposed of at landfill sites with effect from 16 July 2005. It is recommended that the soil analyses undertaken by Richard Jackson Limited, along with any subsequent Waste Acceptance Criteria testing are forwarded to the receiving landfill to confirm the classification of the waste soils.

Full and detailed records should be kept of all waste soils removed from the site for future reference purposes.

6.7. Gas Mitigation Measures

On the basis of the ground gas monitoring regime undertaken at the site, the site has been classified as a Characteristic Situation 2 (CS-2) in accordance with the methodologies specified in CIRIA Report C665, 'Assessing risk posed by hazardous ground gases to buildings' (2007).

The risk from ground gases at the site has also been classified in accordance with the traffic light system presented in NHBC document, 'Guidance on evaluation of development proposals on sites where methane and carbon-dioxide are present' (2007). The site has been classified as an Amber-2 site and ground gas protection measures are considered to be required.

The following gas mitigation measures are required to address the risks identified:

- All joints and penetrations are to be sealed;
- A compliant, 2000g gas resistant membrane will be installed by a specialist installed;
- Underfloor venting will be required, to be achieved through the construction of suspended floor slabs in the residential properties. If this is to be NHBC compliant this will need to facilitate one full air-change every 24-hours.

BS 8485:2015 should be consulted for guidance regarding design, installation and verification.

The manufacturer's specification for the gas resistant membrane to be installed at the site is presented in Appendix D alongside drawings indicating how the membrane is to be installed in respect of the proposed construction at the site. It is acknowledged that the contractor may prefer to use an alternative manufacturer for the gas resistant membrane & this is considered acceptable, as long as the appended specification for the membrane is met.

The membrane will be installed by a manufacturer approved installer in order to achieve warranty.

7. Verification Plan

Verification of the remedial strategy will be required in order to demonstrate that the site specific objectives outlined in Section 1.1 have been met. This will comprise the following:

- Records of the watching brief undertaken at the site, in accordance with Section 6.4.
- Details of required additions to the remedial strategy if the watching brief identifies contamination to be present. This should include details of the encountered contamination together with the proposed remedial action and methodology for verifying the necessary remediation.
- All materials imported to the site will be certified as 'clean' (clean as defined in Section 4). They will need to be sampled and tested by a UKAS accredited analytical laboratory. Delivery tickets and weighbridge tickets are to be retained.
- The placement of 'clean' cover to soft landscaped areas as indicated on Figure 4 in Appendix A, will be verified by an experienced and appropriately qualified third party consultant. Verification will comprise visual inspection of the backfill materials including plans showing sample locations, photographs and depth measurements, to confirm that sufficient material was been placed. Soil samples of each cover material will then be recovered in appropriate containers,

stored in cool boxes and transported to the analytical laboratory under chain of custody.

- Details of the supplier and confirmation of the source(s) of materials used as the cover system will be provided.
- Sampling of the topsoil and subsoil materials to be placed as a cover system will be undertaken at a rate to be agreed with the Local Authority.
- Recovered samples will be analysed by an independent and appropriately qualified consultant and tested at a UKAS and MCerts accredited laboratory for the range of contaminants detailed in Appendix B.
- Cover system materials will be chemically compliant with the screening values for soils presented in Appendix B. For the purposes of remediation, the concentration of individual TPH fractions will not exceed 500mg/kg. Where the applicable screening value for human health is less than 500mg/kg, backfill materials will comply with the lower value.
- Confirmation that the required gas mitigation measures have been installed as specified in Appendix D and in accordance with the methods detailed in CIRIA Report C735, 'Good practice on the testing and verification of protection systems for buildings against hazardous ground gases' (2014). Confirmation that the installed gas mitigation measures have achieved warranty shall also be provided.
- The information and evidence gathered as part of the above tasks will be provided to the Local Authority as soon as it is available.

8. Validation Report

A full validation report will be issued upon completion of the remediation works to demonstrate that the requirements of the remediation method statement have been met. This will be submitted to the Local Authority.

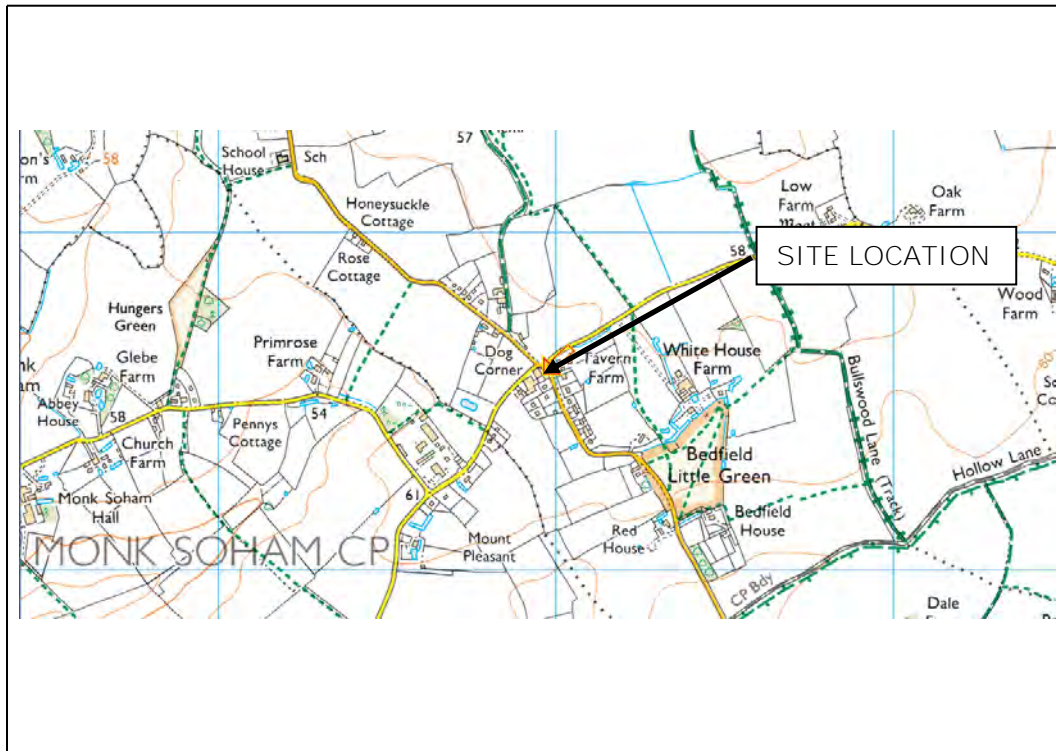
The following items should be included in the validation report:

- Written confirmation from the on-site manager that staff briefing and training as specified in Section 6.3.1 was undertaken.
- Written accounts of the watching brief undertaken at the site, which as a minimum will include all key stages of the development. The watching brief will include details of any unexpected contamination encountered together with details of the proposed mitigation strategy.
- Photographic evidence of the thickness and detail of the 'clean' cover placed to soft landscaped areas.

- Details on the source and analytical laboratory data of the materials (topsoil and subsoil) making up the 'clean' cover system to soft landscaped areas.
 - Presentation of consignment notes for soils disposed off-site indicating which treatment centre or landfill they were sent to.
 - Written confirmation of the appropriate installation of required gas mitigation measures, to include confirmation that warranties were achieved following verification of the installation.
-

Appendix A

Figure & Drawings



REPRODUCED FROM ORDNANCE SURVEY MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE, © CROWN COPYRIGHT RICHARD JACKSON LTD – ACC No. 100002572



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847 The Crescent, Colchester, CO4 9YQ
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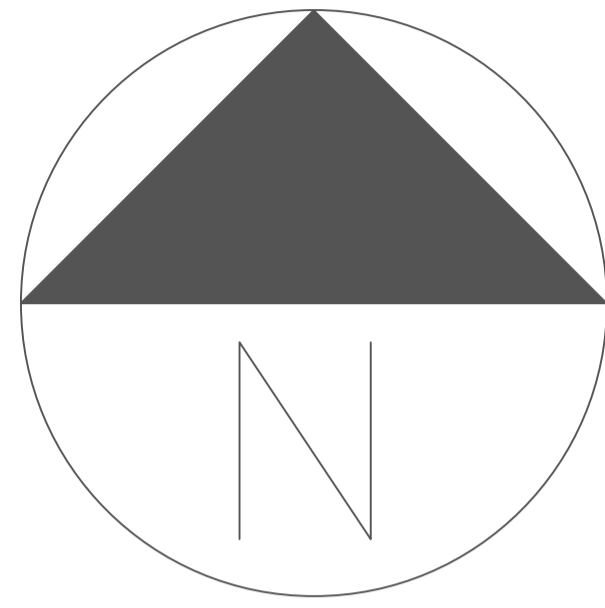
Home Farm, Bedfield, IP13 7EE

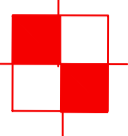

FIGURE 1

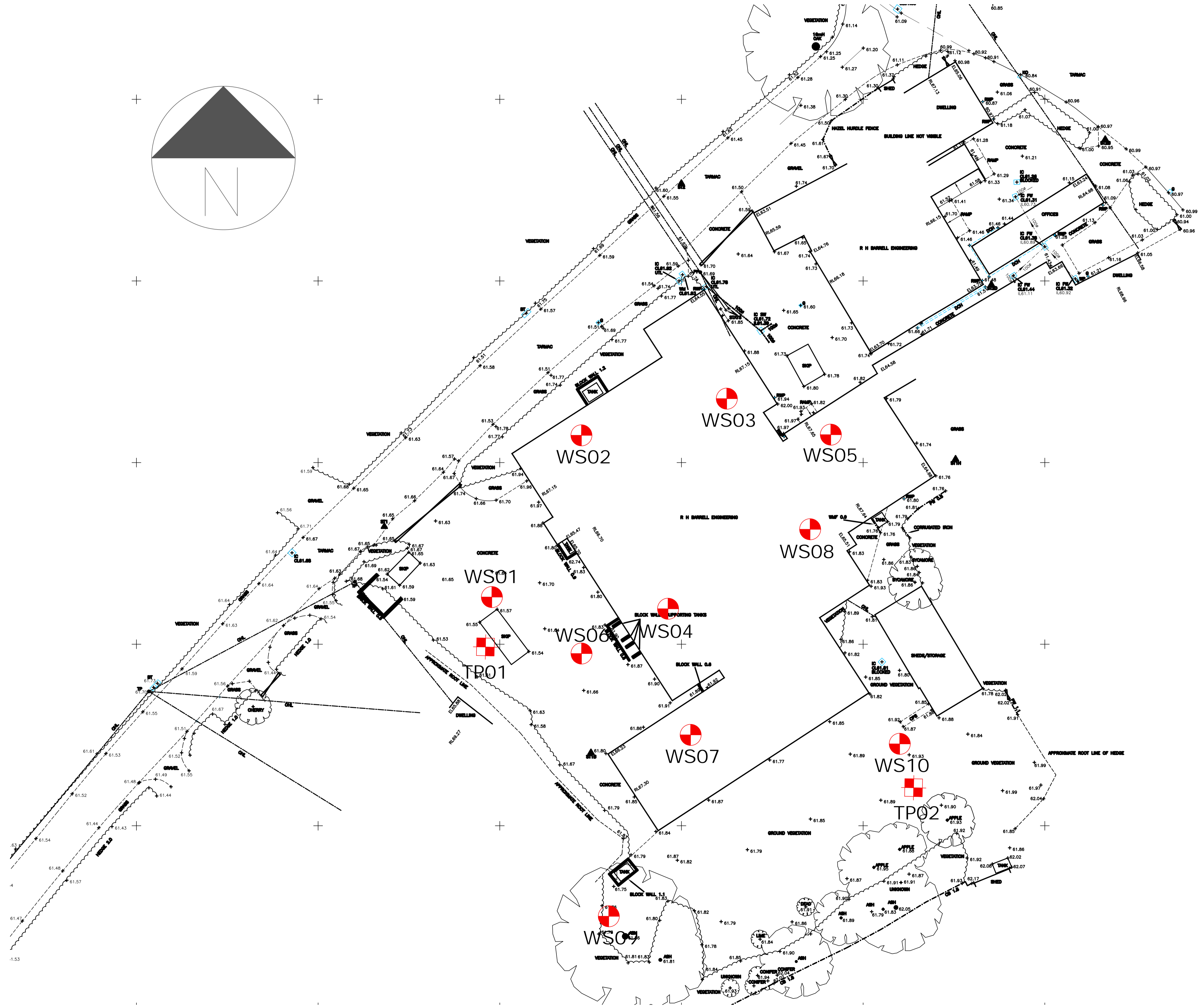
SITE LOCATION PLAN

SCALE: N.T.S.

JOB NO: 61647



- KEY**
-  INFILTRATION TEST LOCATIONS (TP01-TP02)
 -  WINDOWLESS SAMPLER LOCATIONS (WS01-WS10)



REV	DATE	DESCRIPTION	DRAWN	CHKD

REVISIONS

This drawing is to be read in conjunction with all other Engineer's drawings and all other project information. Any discrepancy between the Engineer's drawings and other project information is to be reported to the Engineer immediately.



Project
HOME FARM, BEDFIELD,
SUFFOLK, IP13 7EE

Title
EXPLORATORY HOLE LOCATION PLAN

Client
CHAPTER BUILD GROUP LIMITED

Scale 1:200 @ A1	Drawn MB	Date 04/04/22
Job Manager KO	Checked KO	Approved KO

Richard Jackson
Engineering Consultants

847 The Crescent, Colchester, Essex CO4 9YD Tel: 01206 228800
 5 Quern House, Mill Court, Great Shelford, Cambs CB22 5LD Tel: 020 7448 9910
 4 The Old Church, St. Matthews Road, Norwich, Norfolk NR1 1SP Tel: 01223 314794
 The Wheelhouse, Bonds Mill, Stonehouse, Gloucestershire GL10 3HF Tel: 01172 520070
 Email Address: mail@rj.co.uk Website: http://www.rj.co.uk


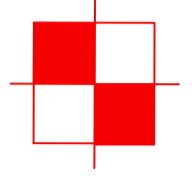
Drawing No. **61647-G-FIG02** Revision

Drawing Status
 INFORMATION APPROVAL COSTING
 TENDER CONSTRUCTION AS CONSTRUCTED

DO NOT SCALE



KEY

-  WINDOWLESS SAMPLER LOCATION (WS01 - WS10)
-  TRIAL PIT LOCATION (TP01 - TP02)

REV	DATE	DESCRIPTION	DRAWN	CHKD

REVISIONS

This drawing is to be read in conjunction with all other Engineer's drawings and all other project information. Any discrepancy between the Engineer's drawings and other project information is to be reported to the Engineer immediately.



Project
HOME FARM, BEDFIELD
SUFFOLK, IP13 7EE

Title
EXPLORATORY HOLE
LOCATION PLAN

Client
CHAPTER BUILD GROUP LTD

Scale 1:200 @ A1	Drawn MB	Date 13/05/22
Job Manager KO	Checked CW	Approved CW

Richard Jackson
Engineering Consultants


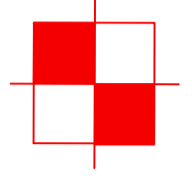
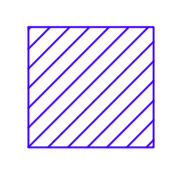
847 The Crescent, Colchester, Essex CO4 9YD Tel: 01206 228800
 Unit 06C130, 6th Floor, 1 St. Katherine's Way, London, E1W 1UN Tel: 020 7448 9910
 5 Quern House, Mill Court, Great Shelford, Cambs CB22 5LD Tel: 01223 314794
 4 The Old Church, St. Matthews Road, Norwich, Norfolk NR1 1SP Tel: 01603 202040
 The Wheelhouse, Bonds Mill, Stonehouse, Gloucestershire GL10 3BF Tel: 01172 520070
 Email Address: mail@rj.co.uk Website: http://www.rj.co.uk

Drawing No. **61643-G-FIG03** Revision

<input checked="" type="checkbox"/> INFORMATION	<input type="checkbox"/> APPROVAL	<input type="checkbox"/> COSTING
<input type="checkbox"/> TENDER	<input type="checkbox"/> CONSTRUCTION	<input type="checkbox"/> AS CONSTRUCTED



KEY

-  WINDOWLESS SAMPLER LOCATION (WS01 - WS10)
-  TRIAL PIT LOCATION (TP01 - TP02)
-  AREAS REQUIRING SOFT LANDSCAPING REMEDIATION

REV	DATE	DESCRIPTION	DRAWN	CHKD

REVISIONS
 This drawing is to be read in conjunction with all other Engineer's drawings and all other project information. Any discrepancy between the Engineer's drawings and other project information is to be reported to the Engineer immediately.



Project
**HOME FARM, BEDFIELD
 SUFFOLK, IP13 7EE**

Title
**SOFT LANDSCAPING
 REMEDIATION PLAN**

Client
CHAPTER BUILD GROUP LTD

Scale 1:200 @ A1	Drawn MB	Date 19/12/22
Job Manager KO	Checked KO	Approved KO

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Drawing No. **61647-G-FIG04** Revision

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<input type="checkbox"/> TENDER	<input type="checkbox"/> CONSTRUCTION	<input type="checkbox"/> AS CONSTRUCTED

Appendix B

Tier One Screening Values

Reference Criteria for Soils

In 2014 Land Quality Management Ltd (LQM) and the Chartered Institute of Environmental Health (CIEH) published 'Suitable 4 Use Levels' (S4ULs) for human health risk assessment. The S4ULs have been derived in accordance with UK legislation, national and Environment Agency policy using a modified version of the Contaminated Land Exposure Assessment (CLEA) software. The S4ULs are based on minimal or tolerable risk as described in SR2 (Environment Agency, 2009a).

The S4ULs are intended to replace the 2nd edition of the LQM/CIEH Generic Assessment Criteria (GAC).

The S4ULs have also been used to replace the Environment Agency Soil Guideline Values (SGVs), which were defined in 2009 alongside updates to the CLEA methodology and software.

The parameters detailed in the LQM/CIEH S4ULs publication have been adapted using the CLEA software to reflect site specific conditions, including the Soil Organic Matter (SOM).

A global SOM of 1% has been adopted for organic chemicals for the purposes of the initial assessment. A SOM of 6% has been adopted for inorganic chemical as detailed in 'The LQM / CIEH S4ULS for human health assessment', (2015).

In the absence of a comprehensive toxicology and physical parameter data no S4UL has been derived for lead. In March 2014 DEFRA published Category 4 Screening Levels (C4SLs) for six contaminants including lead. The C4SLs are based on a unique toxicological benchmark, 'Low Level of Toxicological Concern' rather than the 'minimal or tolerable level of risk' which forms the basis for the S4ULs.

It is understood the site is to be developed for residential purposes and as a result S4ULs for a residential land use with homegrown produce have been adopted as these generally represent the most conservative screening values and should be used to assess the suitability of 'clean' backfill. Furthermore the screening value concentrations of each of the TPH fractions has been limited to 500mg/kg unless the screening value for the protection of human health is less than 500mg/kg.

The screening values which are to be applied for backfill materials at the site are detailed in the below table.

Tier One Screening Values for Human Health

Contaminant	Source of Screening Value	Screening Value (mg/kg)
Arsenic	S4UL ¹	37
Cadmium	S4UL ¹	11
Chromium	S4UL ¹	910
Copper	S4UL ¹	2,400
Nickel	S4UL ¹	180
Lead	C4SL ³	200
Selenium	S4UL ¹	250
Mercury	S4UL ¹	40
Zinc	S4UL ¹	3,700
Benzo(a)pyrene	S4UL ²	2.2
Dibenz(a,h)anthracene	S4UL ²	0.24
Naphthalene	S4UL ²	2.3
TPH Aromatic C ₅ -C ₇	S4UL ²	70
TPH Aromatic C ₇ -C ₈	S4UL ²	130
TPH Aromatic C ₈ -C ₁₀	S4UL ²	34
TPH Aromatic C ₁₀ -C ₁₂	S4UL ²	74
TPH Aromatic C ₁₂ -C ₁₆	S4UL ²	140
TPH Aromatic C ₁₆ -C ₂₁	S4UL ²	260
TPH Aromatic C ₂₁ -C ₃₅	S4UL ²	500*
TPH Aromatic C ₃₅ -C ₄₄	S4UL ²	500*
TPH Aliphatic C ₅ -C ₆	S4UL ²	42
TPH Aliphatic C ₆ -C ₈	S4UL ²	100
TPH Aliphatic C ₈ -C ₁₀	S4UL ²	27
TPH Aliphatic C ₁₀ -C ₁₂	S4UL ²	130
TPH Aliphatic C ₁₂ -C ₁₆	S4UL ²	500*
TPH Aliphatic C ₁₆ -C ₃₅	S4UL ²	500*
TPH Aliphatic C ₃₅ -C ₄₄	S4UL ²	500*
Sulphide	Assumed	250

¹Limit value adopted based upon Suitable 4 Use Level for non-organic contaminants, residential land use with homegrown produce and a soil organic matter (SOM) of 6%

² Limit value adopted based upon Suitable 4 Use Level for organic contaminants, residential land use with homegrown produce and a global SOM of 1%

³ Limit value adopted based upon DEFRA Category 4 Screening Level for residential land use with homegrown produce.

*These values have been limited to 500mg/kg as discussed above.

Appendix C

Discovery Strategy

Discovery Strategy

Should an area of unexpected contamination be identified or suspected by visual, olfactory or wellbeing means during the redevelopment of the site, the discovery strategy presented below should be implemented.

The following table outlines the responsibilities of persons in different roles when unexpected contamination is encountered:

Person Observing Contamination	To be reported to:	Action to be taken:
Site Visitor	<ul style="list-style-type: none"> • Site Manager 	No further actions
Contractor	<ul style="list-style-type: none"> • Site Manager 	Where possible works are to cease. The area should be made safe and secure prior to reporting to the site manager.
Site Manager	<ul style="list-style-type: none"> • Direct Manger (if applicable) • Appointed Environmental Consultant • Babergh / Mid Suffolk Planning Authority 	Where possible works are to cease. The area should be made safe and secure prior to reporting to the required persons.
Environmental Consultant	<ul style="list-style-type: none"> • Site Manager • Babergh / Mid Suffolk Planning Authority 	Advise persons working on the site that works are to cease and that the area is made safe and secure before reporting to required persons.

In accordance with the above responsibilities, the appointed Environmental Consultant will be informed, by the site-manager, of the instances of suspected contamination encountered during the redevelopment of the site. The Environmental Consultant should attend site to inspect the area of suspected contamination and develop a remedial strategy for the encountered contamination.

Unexpected contamination encountered during the redevelopment of the site should be isolated from other materials on site whilst a remedial strategy is prepared. The remedial strategy should include details on how to deal with the encountered contamination including how contaminated material should be disposed of.

The remedial strategy for the encountered contamination should be presented as an operational amendment to this RMS and submitted to Babergh / Mid Suffolk Local Authority Environmental Health Office (EHO) for consideration and approval. The required mitigation measures should be implemented.

It is possible that during the redevelopment of the site, contamination may be encountered which is considered to pose a risk or nuisance to site neighbours or the general public. In this instance the Babergh / Mid Suffolk

planning authority, pollution control team and the Health and Safety Executive should be informed. Where the encountered contamination is considered to pose a potential risk to life, the emergency services should be contacted immediately. If conditions encountered on-site during the development are considered to pose a potential risk of pollution to adjoining land, the owner of the adjoining land will be informed as will the Babergh / Mid Suffolk planning authority and the EHO.

Appendix D

Gas membrane specifications

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 45001:2018
- 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.

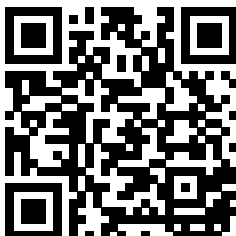
The barrier can also be used as a high performance radon membrane and/or damp proof membrane.

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 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



Professional Indemnity Design
Full Design Liability for Structural Waterproofing and Gas Protection



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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.

When installing the membrane in demanding site conditions, use Visqueen GR Lap Tape in place of Visqueen Gas Resistant Foil Lap Tape.

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 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.

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 Gas Resistant 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.

Long periods of exposure to ultraviolet light will reduce the effectiveness of the membrane. The membrane should be covered by a protective layer immediately after installation to prevent damage from following trades, ultraviolet light, etc. 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

The information in this datasheet was correct at the time of publication. It is the user's responsibility to obtain the latest version of the datasheet as it is updated on a regular basis. The information contained in the latest datasheet supersedes all previously published editions.

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	+/-10%	0.52
Mass	EN 1849-2	g/m ²	-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	MDV	150
Dart impact	BS 2782	g	MDV	731
Low temperature flexibility	EN 495-5	°C	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/m ² /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/m ²	Average >370	400
Methane permeability	ISO 15105-1	mls/m ² /d/atm	Pass/Fail	<0.15
Puncture CBR	BS EN ISO 12236	N	MDV	1114
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).

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



Structural
Waterproofing



Gas
Protection



Damp Proof
Membrane



Tapes



Damp Proof
Course



Stormwater



Vapour
Control

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.

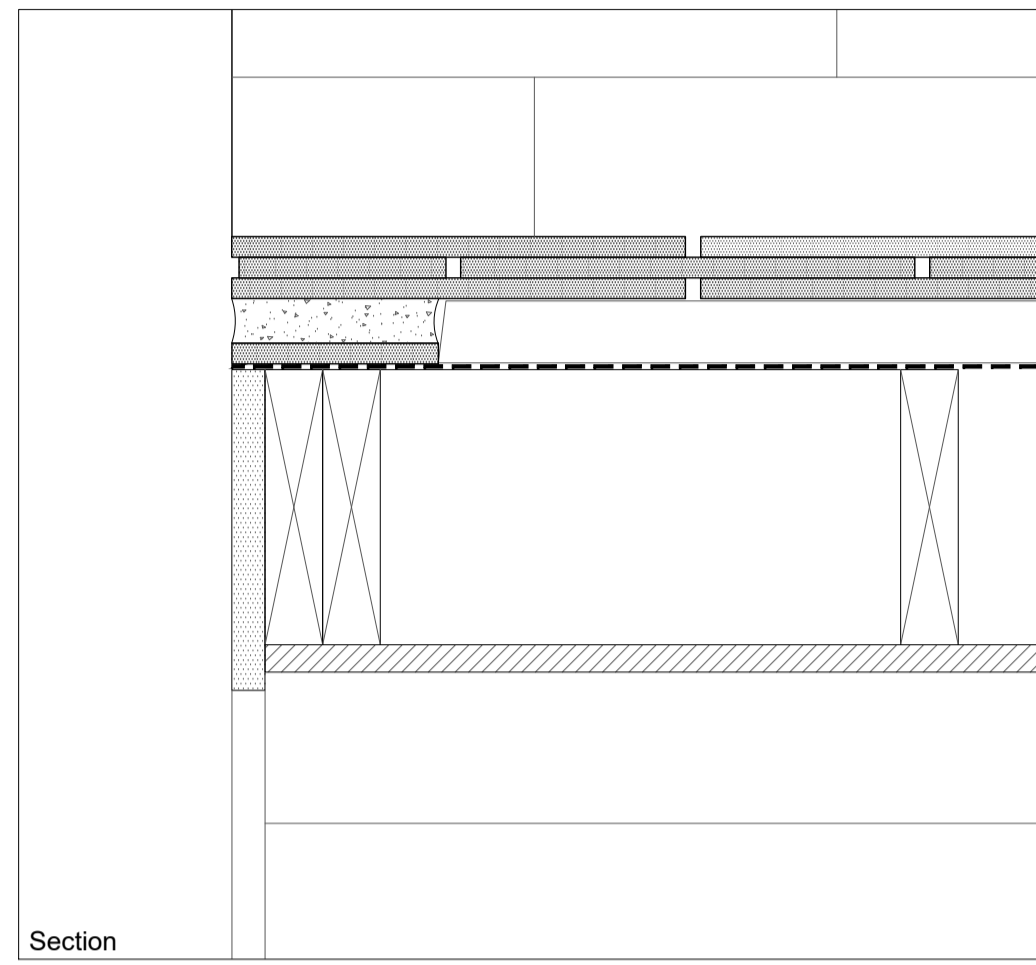
Visqueen Technical Support Managers work with all stakeholders to provide cost effective Visqueen solutions offering complete peace of mind throughout the construction phase and beyond.

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.

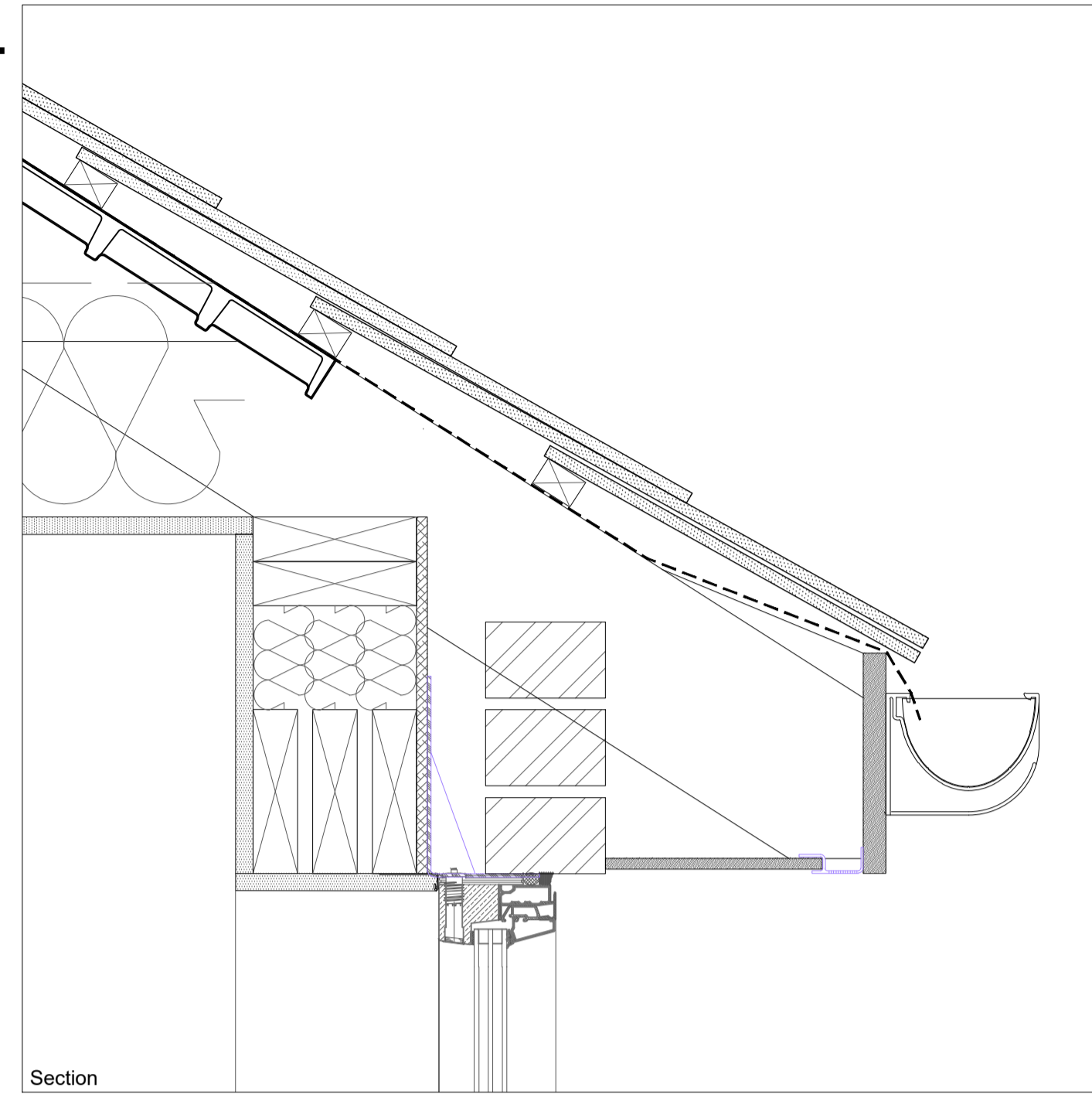
Courses include one day product awareness training for our distributors and builders merchants to help them in their day-to-day jobs, through to intensive three day courses giving detailed hands-on training in the practical skills required for safe and robust product installation.

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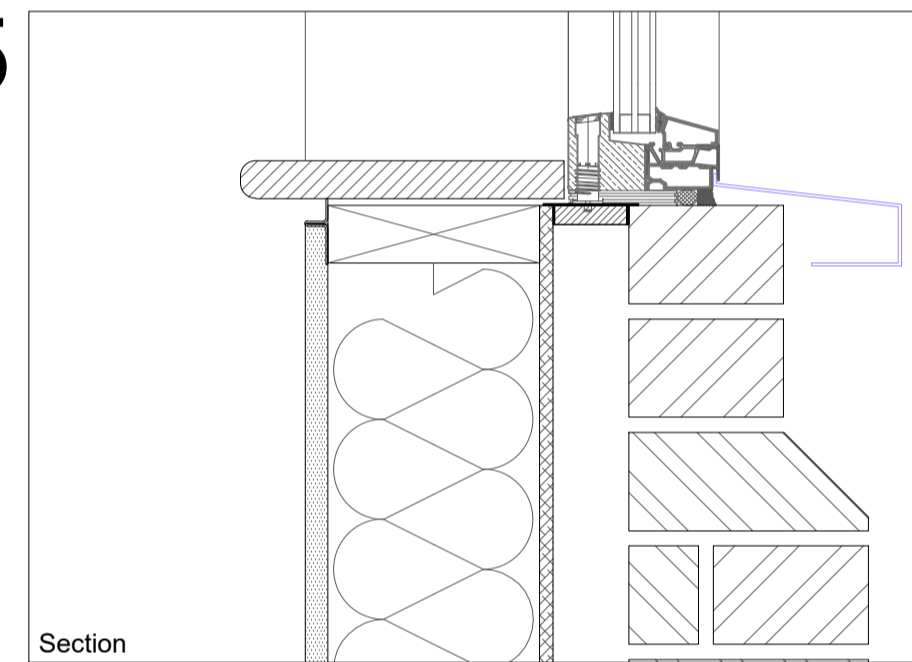
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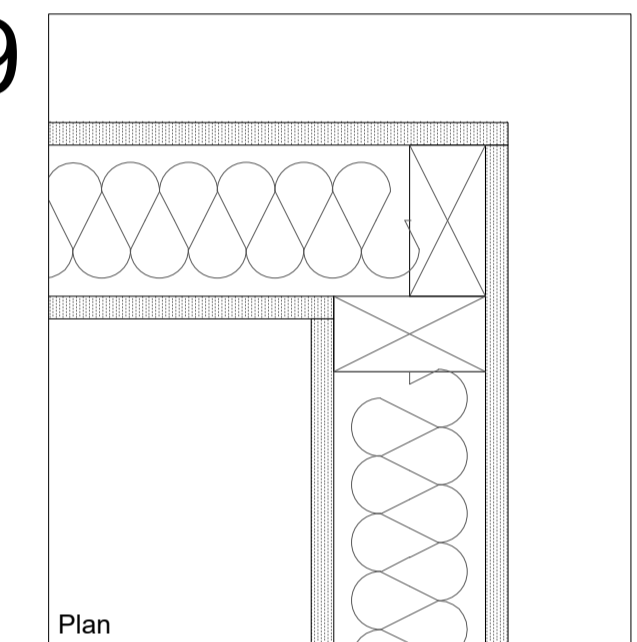
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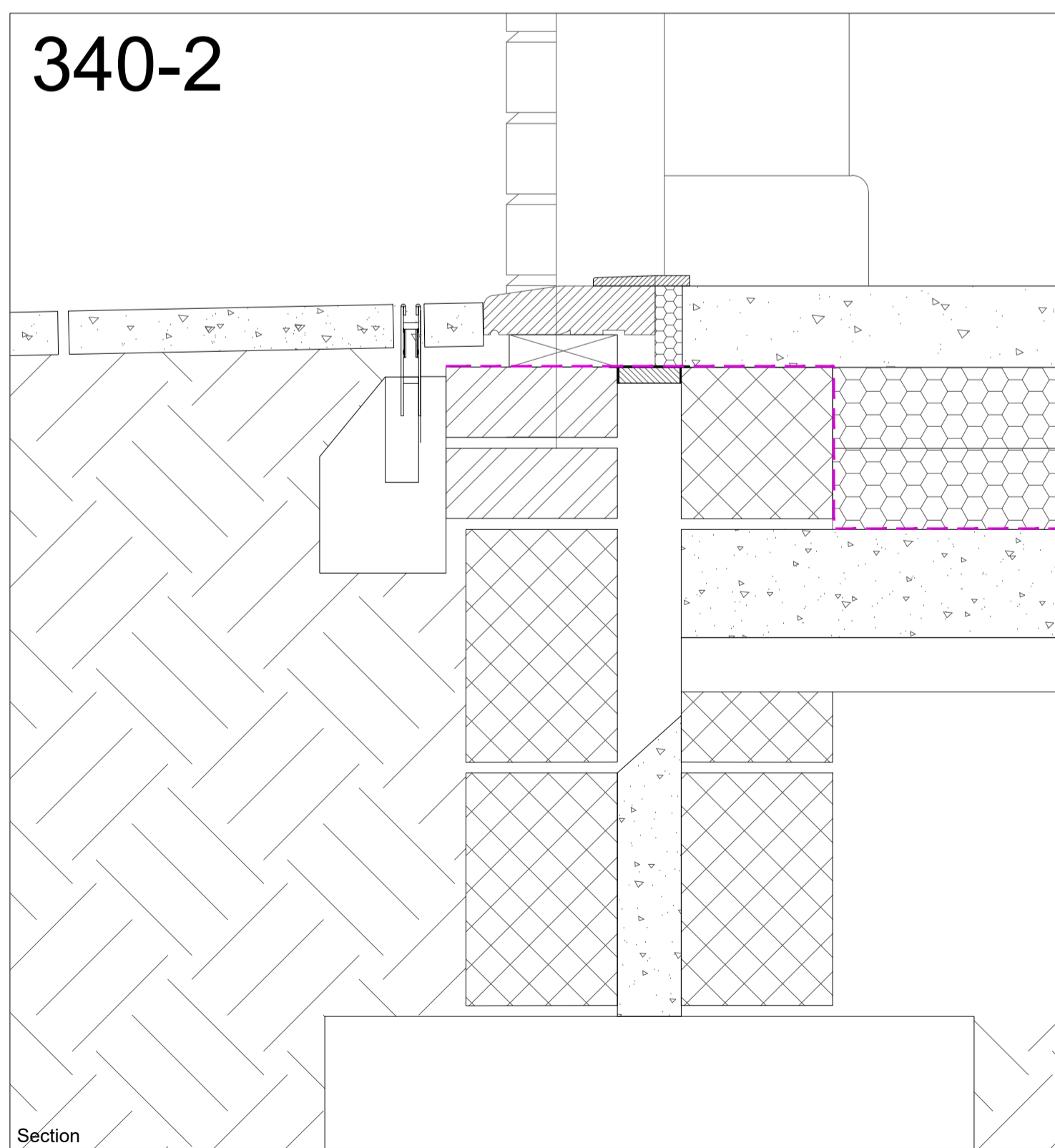
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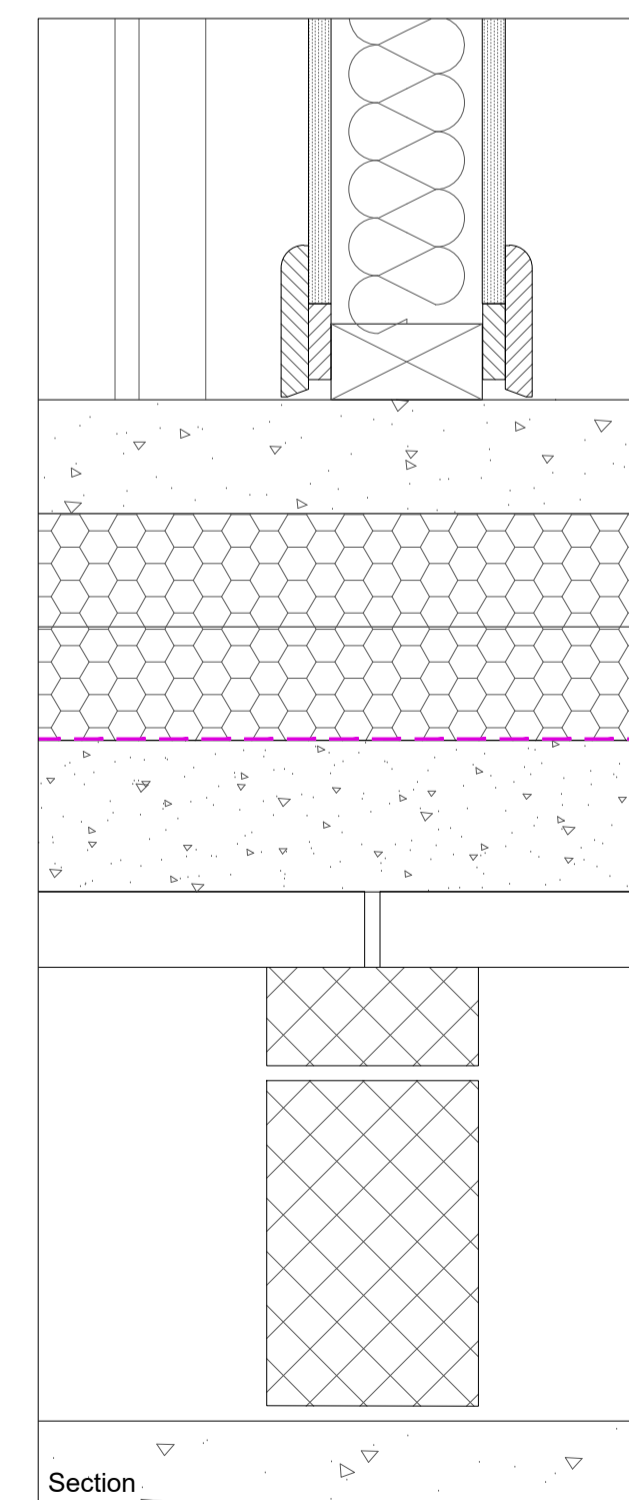


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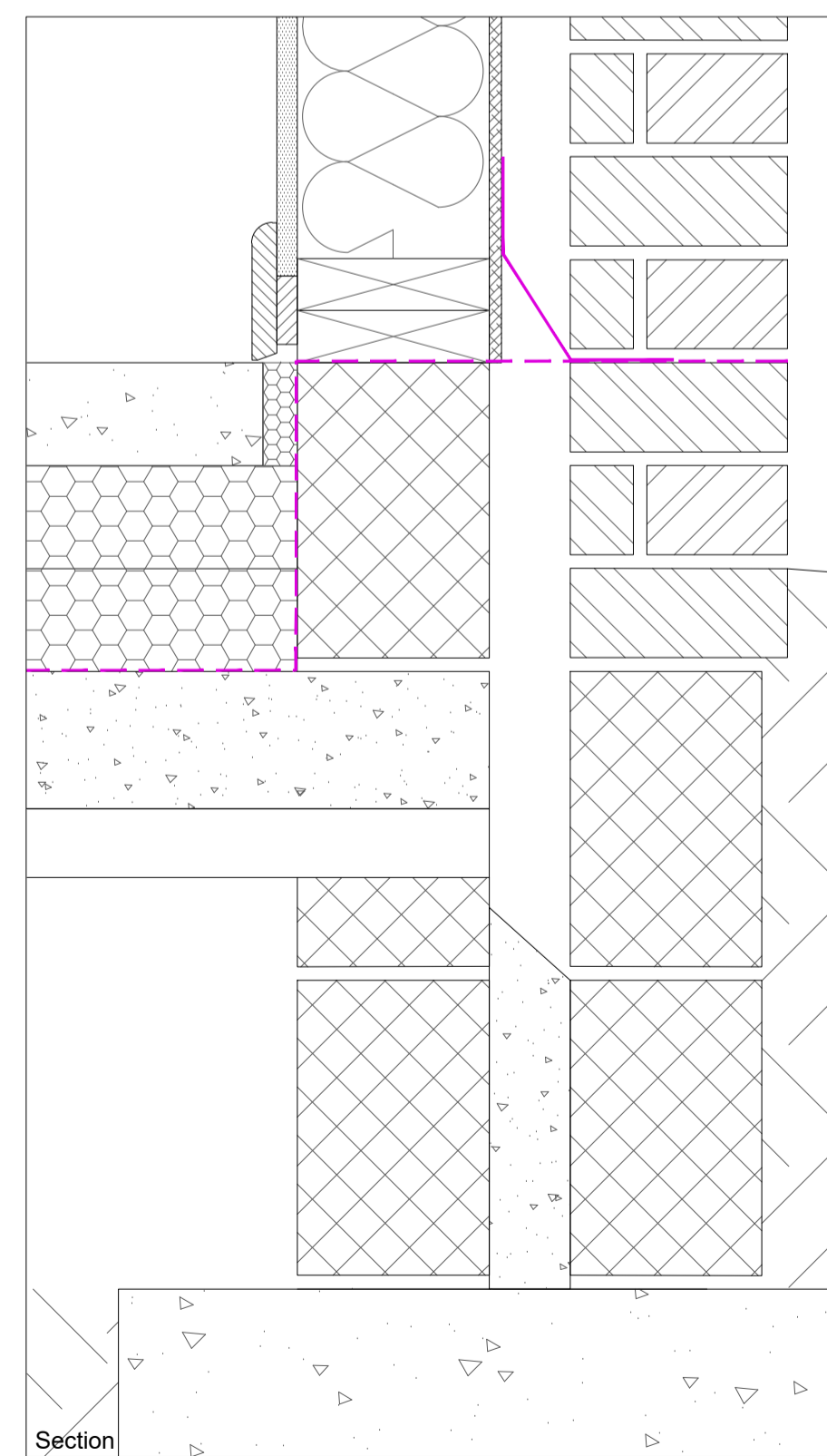


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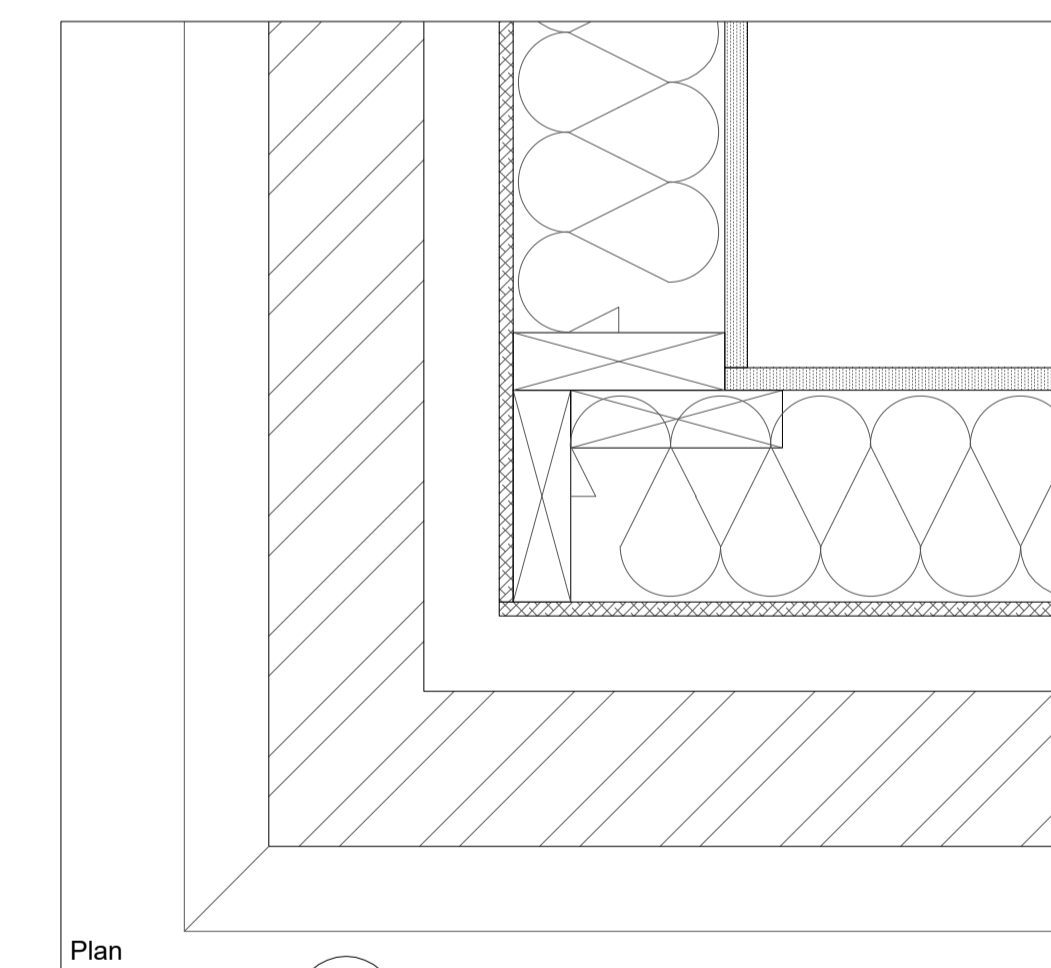
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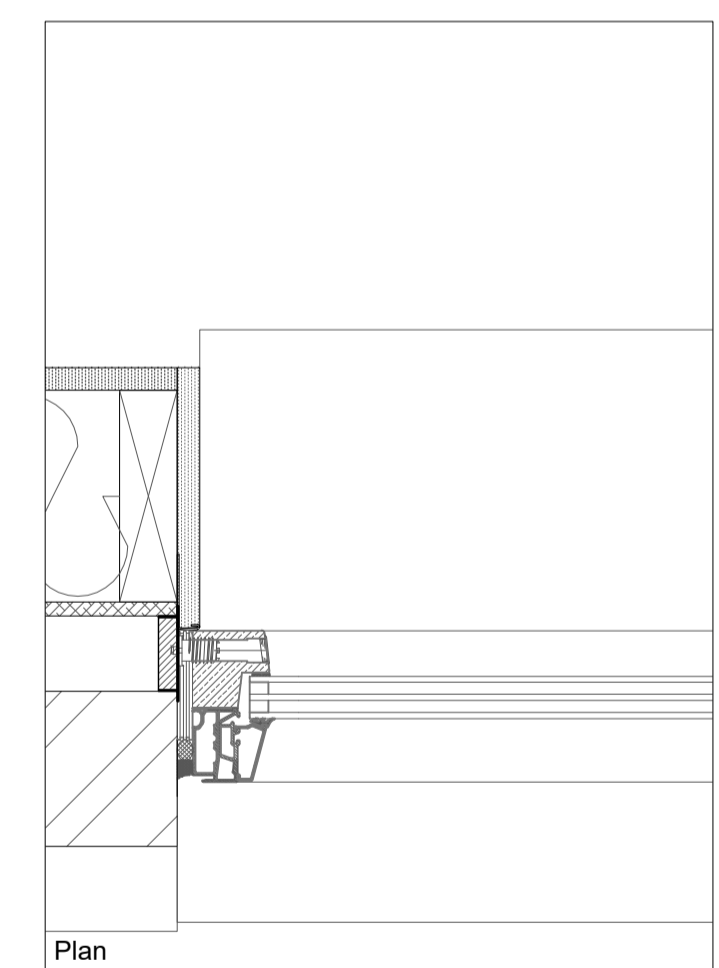
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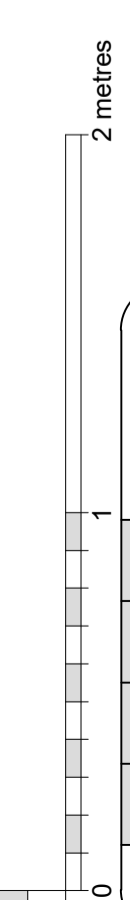
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13.12.22	A	Membrane added	JW	PW
Date	Revision	Description	Drawn	Checked
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Project :	Buildings at Home Farm, Bedfield IP13 7EE			
Client :	Nortan properties			
Dwg. Title :	Plot 3 - Details	Dwg. Status :	Building regulations	
Date :	March 2022	Scale :	1:5 @ A1	Dwg. No. : PW1241_BR340 Revision : A
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