MembraneTestingSolutions

RETROSPECTIVE GROUND GAS MITIGATION DESIGN STRATEGY, & 3rd PARTY INSPECTION, TESTING AND VERIFICATION PLAN

FOR MATERIALS TO BE INSTALLED AT:

PLOT'S 1 & 2 LAND NORTH OF STONE GATE, MARSHALL ROAD, COWBIT, LINCOLNSHIRE, PE12 6AH

Document Reference No: MTS.DVP.950-BA

Client: Ark Property Centre Limited

Dated: February 2024

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net

Registered Office: 1, Second Avenue, Halstead, Essex. CO9 2SU • Company Registration Number: 8871015

Client Name: Ark Property Centre Limited

Reference: MTS.DVP.950-BA

Issue: **Preliminary**

Date: 28th February 2024

Approval Status: **For Approval**

Prepared by: **Barrie Ackroyd**

Position: **Managing Director**



……

Revisions:

This Retrospective Ground Gas Mitigation System, Inspection, Testing and Verification Plan Report has been prepared by MembraneTestingSolutions Ltd with all reasonable skill, care and diligence within the terms of the contract with the client, incorporation of our General Terms and Conditions of Business and taking in to account of the resources devoted to us by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This Retrospective Ground Gas Mitigation System, Inspection, Testing and Verification Plan Report is confidential to our client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on this report at its own risk.

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Mr Michael Anthony Smith
Mr Bob Boosey
Mr Carl Orr

Appendix B – Design Drawings

Elemental GI Ltd

- E22208_001 Jan.2023 – Proposed Site Layout Plan

Studio 11 Architects Ltd

- 551.P1.WD.01 Rev A – Plot 1, Floor Plans & Elevations
- 551.P1.WD.03 Rev - – Plot 1, Section A-A & Foundation and First Floor Form Plan
- 551.P2.WD.01 Rev A – Plots 2 & 4 Floor Plans & Elevations
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MTS Ltd Drawings

- 24950-01 Rev - – Typical Existing Perimeter/Internal Wall Retrospective Ground Gas Mitigation Section Details
- 24950-02 Rev - – New Cavity Vents, Retrospective Ground Gas Mitigation Section Detail
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CL:Aire Residential Declaration of Conformance (Example)

EXECUTIVE SUMMARY

1. LIMITATIONS

MembraneTestingSolutions Ltd (MTS Ltd) have prepared this retrospective 3rd party gas mitigation design and verification plan report in accordance with the instructions of Ark Property Centre Ltd (The Client) under the terms of the appointment for the retrospective 3rd party gas mitigation design, integrity testing and validation plan.

This retrospective 3rd party design and verification plan is limited to the ground gas protection measures installed to Plot No's 1 & 2 meeting industry and current best practices. MTS Ltd have provided retrospective ground gas mitigation design proposals for this site, therefore professional Indemnity liability is applied to £2M for our retrospective gas mitigation design measures and validation works.

This retrospective 3rd party design and verification plan has been prepared in accordance with the information currently received, along with industry best practices and in conjunction with the relevant best practice and guidance documents listed below, of which our MD was a contributor and member of the steering committee for the Ciria C735 publication "Good practice on the testing and verification of protection systems for buildings against hazardous ground gases" (2014). MTS Ltd were also a contributor and part funder on the steering committee for the CIRIA 795 project, Retrospective Fitting of Gas Protective Measures to Existing Buildings (2020) and also the Ciria C801 Hazardous ground gas – a site management guide, released Nov 2021.

We are pleased to advise that our Managing Director Mr Barrie Ackroyd has successfully completed the Validation & Integrity Testing Course provided by the British Geomembrane Association for validation, which is also backed by the CITB. Membrane Testing Solutions Ltd are a member of the British Geomembrane Association and are pleased to advise we are now registered with CQMS/SSIP, The Radon Council, The Property Care Association, CL:Aire and we are proud to be a founding member of the British Verification Council (BVC) of which Mr Ackroyd is former Chairperson.

Mr Ackroyd has achieved the Level 3 Assessors Award and the NVQ Level 4 qualification in Validation of Ground Gas Protection Systems, we are also pleased to advise he has successfully achieved CL:Aire accreditation as a Specialist in Gas Protection Validation (SGPV) and our Senior Validation Surveyor Mr Michael Anthony Smith has qualified in the NVQ Level 4 for Verification of Ground Gas Protection Systems (assessed by others) and has acheived CL:Aire TGPV accreditation.

Guidance Reference Documents:

Ground Gas Handbook "NHBC Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present" (2007)
Ciria C665 "Assessing risks posed by hazardous ground gases to buildings" (2007
Ciria C716 "Remediating and mitigating risks from volatile organic compound (VOC) vapours from land affected by contamination" (2012)
Ciria C735 "Good practice on the testing and verification of protection systems for buildings against hazardous ground gases (2014)
Ciria C748 "Guidance on the use of plastic membranes as VOC vapour barriers" (2014)
BS 8485:2015+A1:2019 "Code of practice for the design of protective measures for methane and carbon dioxide ground gasses for new buildings" (2019)
Ciria C795 "Retrofitting hazardous ground gas protection measures in existing or refurbished buildings" (2020)
Ciria C801 – Hazardous ground gas – a site management guide (2021)

2. BACKGROUND INFORMATION

MTS Ltd were initially contacted via email by Mr Neil McNamara of MB Membranes Ltd on the 20th February 2024 advising they had installed ground gas mitigation measures to 3no plots (3, 4 & 5) on the project, however plots 1 & 2 had been constructed previously to the developer receiving the completed site investigation report which subsequently recommended ground gas mitigation measures were required to be installed to all 5no plots. Plot No's 3, 4 & 5 had been 3rd party validated by MEC Environmental Ltd and signed off in line with the CIRIA C735 and industry best practices.

Mr McNamara invited MTS Ltd to contact Mr Nathan Marshall of Ark Property Centre Ltd (the client) to provide recommendations and a quotation for the retrospective ground gas mitigation design for plot no's 1 & 2 of this project, which we subsequently did.

MTS Ltd spoke to Mr Marshall on the telephone initially who advised the plots were constructed with roofs on, however the ground floors had not been insulated and screeded, which would allow the retrospective gas mitigation solution to be installed above the beam and block floor slab and connecting the gas membrane onto existing internal masonry walls using a gas resistant self-adhesive membrane, in line with typical industry standard retrospective measures.

The client provided MTS Ltd with copies of the affected plots ground floor plans and section details, along with a copy of the Phase 1 & Phase 2 site investigation reports. MTS Ltd reverted with recommendations and a quotation for retrospective ground gas mitigation measures, and 3rd party inspection, testing and validation of the installed gas mitigation measures, which we are pleased to advise was accepted by email on the 22.2.2024.

On the basis of the client's instruction we now have pleasure in presenting our retrospective ground gas mitigation design and 3rd party validation strategy for plot No's 1 & 2 on this project.

3. GROUND GAS MONITORING

MTS Ltd received 3no site investigation and remediation strategy reports from the client, produced by Elemental GI Ltd as noted below;

- Phase 1 Geo-Environmental Assessment Report Ref: E22208/1/0 dated January 2023
- Phase 2 Geo-Environmental Assessment Report Ref: E22208/2/1 dated January 2023
- Remedial Method Statement Report Ref: E22208/3/0 dated July 2023

The Phase 2 Site Investigation report highlighted minor elevated levels of Methane (CH_4) ground gas contamination, with zero flow, however as the maximum Methane gas was recorded at 1.9% v/v the site was classified as a CS2 or NHBC Amber 1.

The following is a precis of the PH2 site investigation report;

5.5 Radon and Ground Gas

The site is in an area where less than 1% of homes are estimated to be at or above the Action Level. Therefore, radon protective measures are not required, subject to regulatory approval.

The site's CSM indicated that potential risks were present from ground gas sources comprising [mentioned gas sources here]. An initial ground gas monitoring exercise comprising 3 No. gas monitoring visits was therefore commissioned by the Client to assess potential risks further.

A copy of our gas monitoring records taken to date is presented in Appendix VIII. In summary the following concentrations / flows have been recorded thus far:

- Carbon dioxide (CO2) recorded up to a maximum of 1.0 % v/v;
- Methane (CH4) recorded up to a maximum of 1.9 % v/v;
- Oxygen (O2) recorded to range from 5.5 % v/v and 20.4 % v/v; and
- Flow recorded up to a maximum of 0.0 l/hr.

In accordance with our standard ground gas assessment methodology the site would be indicatively classified as:

- CS2 or Amber 1

At this stage ground gas protection measures may therefore be required for new structures at the site based on the initial gas monitoring results.

The actual ground gas precautions used will depend upon final monitoring results, construction details and regulatory / warranty provider approval. However, for general reference purposes it can be confirmed that CIRIA C665 (one of the main ground gas assessment documents) recommends the following general precautions for this classification:

- Suitable, unobstructed and correctly installed adequate external venting to be present (i.e. in accordance with relevant guidance), such as 'periscope' venting;
- All joints and penetrations sealed and with either;
- Reinforced concrete cast *in situ* floor slab (suspended, non-suspended or raft) with suitable membrane and underfloor venting; or
- Beam and block or pre-cast concrete floor with suitable membrane and underfloor venting.

Other assessment / guidance documents (e.g. BS8485) may be used in the final classification / design reports.

End of Precis.

4. PLOTS 3, 4 & 5 PREVIOUS VALIDATION REGIME

MTS Ltd spoke with Mr Neil McNamara of MB Membranes Ltd who performed the ground gas mitigation measures installation to plot No's 3, 4 & 5 who advised they used JUTA GP1 gas barrier membrane, which was installed on a perimeter and infill basis, where the gas membrane was installed through perimeter and over internal stub masonry walls firstly, with the gas membrane being installed to the complete internal footprint of the buildings, connecting into the previously installed gas membrane through masonry walls at DPC level.

All service pipes, corner detailing and the like were sealed using JUTA GP SAM which is a gas resistant self-adhesive membrane, which was applied using heat and pressure to create a tenacious bond to the GP1 gas membrane.

Upon completion of the gas membrane installations the finished product was 3rd party independently inspected, tested and validated by the following validation company;

MEC Environmental Ltd
Blackburn Technology Management Centre
Unit 2, Challenge Way
Blackburn
Lancashire
BB1 5QB

MTS Ltd contacted Mr Michael Corban owner and director of MEC Ltd to ensure there was no conflict between MEC and MTS Ltd over this project. Mr Corban advised he was more than happy for us to perform the retrospective gas mitigation design and 3rd party validation for the 2no plots left on site to protect.

It was also agreed MEC Ltd's final sign off validation report for plots 3, 4 & 5 could be included within our final sign off validation report for plots 1 & 2 which could be used as a single document to assist the local authority in signing off the planning conditions pertaining to ground gas contamination.

5. PROPOSED RETROSPECTIVE GROUND GAS MITIGATION DESIGN

As the plots have already been constructed with roofs on, it is proposed the gas barrier membrane is retrospectively installed to the internal footprint of the properties, above the concrete beam and block floor slab connecting onto the existing and primed lower blockwork walls, using a gas resistant self-adhesive membrane, 300mm up the wall and 150mm onto the gas membrane on the floor.

It is proposed to use a 300mm wide gas resistant self-adhesive membrane on the primed masonry walls, as the gas resistant membrane will oversale the existing DPC by between 50-75mm which produces a gas resistant seal at the DPC joint.

All service pipes, corner detailing and the like will be sealed using JUTA GP SAM which is a gas resistant self-adhesive membrane, to be applied using heat and pressure to create a tenacious bond to the GP1 gas membrane.

As the properties are already constructed, it is assumed the existing DPC's installed to masonry walls are not gas resistant or effectively sealed as gas resistant materials should be, it is proposed approximately additional cavity vent air bricks of 6000mm2 ventilation capacity are installed on external walls at the rate of 1no 6000mm2 airbrick at 3m centres, which will allow any latent ground gas to percolate/migrate out to atmosphere rather than accumulate and try to migrate through constructed building makeup.

The proposed mitigation measures are to include the following;

- Install 6000mm2 cavity vent airbrick sets at 3m centres around the buildings, below existing DPC level to allow latent ground gas to passively percolate to atmosphere rather than fight its way back into the building through constructed wall finishes. Please see MTS Ltd drawing No. 24950-02 for details.
- Prepare the existing internal building masonry walls to 300mm above the concrete beam and block floor slab, ensuring the masonry is exposed and no plaster or plasterboard is present as the gas mitigation measures need to seal to the masonry fabric of the building. Wall formation is to be level ensuring a smooth surface free of voids, hollows and protrusions. Area to be primed with two coats of bitumen primer and allowed to cure between coats.

- Door thresholds are to be bricked up to DPC level so the gas membrane can pass over the masonry door threshold.
- Install a proprietary JUTA GP1 gas resistant membrane to the footprint of the properties, placed directly above the prepared concrete beam and block floor slab, of fully welded seam construction.
- Apply a 450mm wide strip of Juta GP SAM Detail Strip 150mm to the gas resistant membrane and 300mm onto the prepared and primed masonry walls. Gas membrane is to cross door reveals and seal to the cavity tray/DPC to close off the cavity at door positions. The GP SAM is to be applied using a high-pressure silicon hand roller applying heat where practicable.
- Seal service pipe and steel stanchions using the JUTA GP SAM 150mm up the pipe and 150mm onto the Juta GP1 gas barrier membrane.
- As soon as the gas membrane installation has been validated and signed off, the membrane must be immediately protected using the insulation layer, which the screed layer installed above that.

Please refer to MTS Ltd drawing No's MTS 24950-01 - 24950-04 for details of the proposed gas mitigation measures for this project.

6. BS 8485:2015+A1:2019 COMPLIANCE

As this project includes the retrospective installation of a gas mitigation membrane, the BS 8485:2015+A1:2019 best practice document does not apply which is noted by the below;

1 Scope

This British Standard gives recommendations on ground gas site characterization and the choice of solutions for the design of integral gas protective measures for new buildings to prevent entry of carbon dioxide and methane, and provide a safe internal environment.

This British Standard gives a process that can be used to demonstrate that risks posed by the potential or actual presence of carbon dioxide and methane have been addressed.

This British Standard does not cover protection of new buildings against other hazardous ground gases. Nor does this British Standard cover protection of buildings into which methane and carbon dioxide might be introduced by the activities for which they are used (for example, water pumping stations).

The retrospective design of protection measures for completed buildings and the design of retrospective protection measures after completion of building construction are not covered in this British Standard.

NOTE 1 Guidance on radon and VOCs is given in Annex G and Annex H.

Therefore, the contents of the Ciria C795 "Retrofitting hazardous ground gas protection measures in existing or refurbished buildings" (2020) apply to this project.

As such our design includes for a proprietary gas resistant membrane to be retrospectively installed across the footprint of the property of fully seamed and tested seam construction, with detailing provided using gas resistant self-adhesive tape joints around corner/door reveal detailing, service pipes and the like.

In accordance with the above MTS Ltd have indicated our compliance with industry best practice guidelines to project confidence in our approach to the gas mitigation design for this project.

7. GAS MITIGATION PROTECTIVE MATERIALS

MTS Ltd have specified the following materials for inclusion within plots 1 & 2 which is based on materials meeting the system performance requirements and also offering the best in adhesion where required. MTS Ltd pride ourselves in offering a practical and pragmatic approach to our designs, inclusive of value for money and the very best in system performance.

The materials supplier is as follows;

JUTA UK Ltd
Melton Grove Works
Blackpool Road
Lytham
Lytham Saint Annes
FY8 5PL

Tel: 01772 754 177
Contact: Mr Patrick Flood
Email: info@juta.co.uk
Web: www.juta.co.uk

All materials are to be installed in accordance with the manufacturers' recommendations & MTS Ltd detailed drawings.

- JUTA GP1 Gas Resistant Membrane
- Juta GP Bitumen Primer
- Juta GP SAM (Gas Resistant Self-Adhesive Membrane (20m x 1m)

The material specification sheets are appended in Appendix. C of this report.

8. MTS LTD REMEDIATION DESIGN DRAWINGS

MTS Ltd received drawings from the client which are noted below.

MTS Ltd have also produced a comprehensive set of gas remediation drawings for this project, copies of which may also be found in Appendix. B of this report.

Elemental GI Ltd

- E22208_001 Jan.2023 – Proposed Site Layout Plan

Studio 11 Architects Ltd

- 551.P1.WD.01 Rev A – Plot 1, Floor Plans & Elevations
- 551.P1.WD.03 Rev - – Plot 1, Section A-A & Foundation and First Floor Form Plan
- 551.P2.WD.01 Rev A – Plots 2 & 4 Floor Plans & Elevations
- 551.P2.WD.02 Rev - – Plots 2 & 4, Section A-A & Foundation, First Floor and Roof Form Plan

MTS Ltd Drawings

- 24950-01 Rev - – Typical Existing Perimeter/Internal Wall Retrospective Ground Gas Mitigation Section Details
- 24950-02 Rev - – New Cavity Vents, Retrospective Ground Gas Mitigation Section Detail
- 24950-03 Rev - – Typical External Door Threshold Retrospective Ground Gas Mitigation Section Detail

- 24950-04 Rev - – Typical Service Pipe Sealing Details

9. MATERIALS INSTALLATION CONTRACTOR

The client is to employ an NVQ Level 2 qualified gas membrane installation workforce, in line with the previous 3no plots mitigated on this site.

The installers details are:

MB Membranes Ltd
7 Cecil Court
Harlow
Essex
CM18 7QR

Contact: Mr Neil McNamara
Tel: 01279 444 300
Email: neil@mbmembranes.co.uk
Web: www.mbmembranes.co.uk

MTS Ltd have validated this specialist installation company's workmanship on numerous occasions and over various projects, with excellent working practices always observed.

However, should the client wish to employ any alternative specialist installers, they should be approved by MTS Ltd prior to being appointed to ensure that the installers have the correct experience and expertise to install into this particular project.

10. GAS MEMBRANE INSPECTION METHOD STATEMENT

Membrane Testing Solutions Limited have been appointed by the client to provide retrospective ground gas mitigation design, inspection and validation of the installed gas protection measures to plots 1 & 2 this project.

10.1 PROPOSED VALIDATION, INSPECTION & TESTING REGIME

It is proposed the retrospective gas protective system installation validation is to be performed that meets with the client's installation programme. At the current time it is envisaged the installation works will be performed over 1no site visit inclusive of gas barrier membrane installation and sealing details to existing walls, service pipes and the like.

1. The Validation Surveyor will be suitably experienced and qualified to carry out inspections of the installed gas mitigation system.
2. The perimeter airbrick installations will be validated by photographic validation with evidence provided within our final sign off validation report.
3. The retrospective gas mitigation measures will be validated internally and prior to the insulation and protective screed layer being installed above.
4. The prepared floor and existing wall formation will be fully inspected by the installation contractor prior to accepting the formation and any gas protection measures installation commencing.
5. Validation of site seams will be performed by seam pick probe testing to 100% of site seams inclusive of GP SAM taped and welded joints, ensuring all seams are suitably bonded/adhered.
6. Any faults/rips/tears/punctures or un-bonded seams will be marked and recorded for repair. Repair methods will be agreed with the installation contractor.
7. Any repairs will be re-inspected for suitability, with photographic evidence given in the final report provided at the end of the contract.

8. Upon completion of the inspection and re-test of any repaired defects found, the gas membrane area will be signed off as integral at that time.
9. Photographs will be taken during the testing process and will be contained in the final sign off report.
10. The Validation Surveyor will complete the project survey sheets and record all information contained within, inclusive of any repairs, seam failures, pipe numbers etc. Photographic evidence will be taken. The project survey sheets and photographic logs are to be incorporated in the final report submission.
11. Upon completion of the validation inspection, a validation certificate will be issued to the client stating the outcome of the inspection being a pass in full on all occasions.

The Validation Surveyor Will:

- Perform photographic validation of the installed cavity vent airbricks:
- Perform detailed visual inspections of the installed materials:
- Perform seam pick testing of the installed seams:
- Mark and identify any repairs required and log on a layout plan:
- Verbally Inform the Installation Contractor of any required repairs:
- Witness repairs of the defects and re-inspect to the satisfaction of the validation surveyor:
- Complete the project survey sheets:
- Take photographs throughout the installation process for inclusion within the final validation report:
- Produce a final validation report at the end of the installation process.
- Include MEC Environmental Ltd final sign off validation reports for plots 3, 4 & 5 within the MTS Ltd final sign off validation report.

11. CONCLUSION & RECOMMENDATIONS

As a result of the proposed 3rd party inspections/testing and validation operations to be performed to the two plots on this site, MTS Ltd conclude we have pleasure in presenting the retrospective ground gas mitigation measures in accordance with a remedial design, materials specification and industry installation best practices.

We confirm that the inspections and integrity testing to be performed on the installed JUTA G1 gas membrane will be sufficiently managed, tested and validated to subsequently pass the 3rd party inspection, testing and validation process, all in accordance with the CIRIA C735 and BS 8485:2015+A1:2019 best practice documents.

MTS Ltd therefore recommend that in accordance with the proposed inspection and validation works to be performed by MTS Ltd on this project, the local authority move to sign off this retrospective gas mitigation design as;

“APPROVED FOR CONSTRUCTION”

END OF REPORT

12. APPENDICES

Appendix A – MTS Ltd Validation Surveyors Qualification Certificates
Mr Barrie Ackroyd
Mr Michael Anthony Smith
Mr Bob Boosey
Mr Carl Orr

Appendix B – Design Drawings

Elemental GI Ltd

- E22208_001 Jan.2023 – Proposed Site Layout Plan

Studio 11 Architects Ltd

- 551.P1.WD.01 Rev A – Plot 1, Floor Plans & Elevations
- 551.P1.WD.03 Rev - – Plot 1, Section A-A & Foundation and First Floor Form Plan
- 551.P2.WD.01 Rev A – Plots 2 & 4 Floor Plans & Elevations
- 551.P2.WD.02 Rev - – Plots 2 & 4, Section A-A & Foundation, First Floor and Roof Form Plan

MTS Ltd Drawings

- 24950-01 Rev - – Typical Existing Perimeter/Internal Wall Retrospective Ground Gas Mitigation Section Details
- 24950-02 Rev - – New Cavity Vents, Retrospective Ground Gas Mitigation Section Detail
- 24950-03 Rev - – Typical External Door Threshold Retrospective Ground Gas Mitigation Section Detail
- 24950-04 Rev - – Typical Service Pipe Sealing Details

Appendix C – Material Specifications

- JUTA GP1 Gas Resistant Membrane
- Juta GP Bitumen Primer
- Juta GP SAM (Gas Resistant Self-Adhesive Membrane)

Appendix D – Project Survey Sheets

Gas Protection Inspection & Validation Record (Example)
Inspection, Testing & Validation Certificate of Conformance (Example)
CL:Aire Residential Declaration of Conformance (Example)

APPENDIX A

MTS Ltd Validation Surveyors Qualification Certificates

BGA
British Geomembrane Association

This is to certify that

Barrie Ackroyd

Has successfully attended a
Technical Course
in

Gas Membrane Installations

This in support of the Quality Controls
Of Inspection and Validation
Of Gas Membrane Installations

This certificate is awarded by: BGA British Geomembrane Association Date: 30/10/14

citb

Course content detailed overleaf

Gas Membrane Installation
Technical Course
for
Inspectors & Validators

Training Modules Attended

Practical & Knowledge

- Components of Gas Protection Systems with Venting
- Verification
- Gas Membrane Installation Techniques
- Introduction to Integrity Testing (Practical)
- Introduction to Integrity Testing (Theory)
- Risk Assessment and Validation Plan
- Site Inspections and Pro-formas
- Validation Report
- On Site Assessment

CERTIFICATE of ACCREDITATION

This is to certify that

Barrie Ackroyd

has been awarded the following accreditation

Gas Protection Verification Scheme (GPVS)

Specialist (SGPV)

Certificate No.: 435qQb4axS

Issued:19 November 2020
Valid for 4 years from the above date

Gas Protection Verification

Richard Froggatt
CL:AIRE Chairman

CL:AIRE is a Charitable Company Limited by Guarantee
Registered in England 3740059 / Entrust Enrolment No. 119820 / Registered Charity No. 1075611
Chiltern House, Haddenham Business Centre, Thame Road, Haddenham, Buckinghamshire, HP17 8BY
Telephone: +44 (0)1844 296112 | Email: enquiries@claire.co.uk | Website: www.claire.co.uk

ABBE
Quality Accredited

Certificate of Achievement

(Full Award)

This is to certify that

Barrie Anthony Ackroyd

has been assessed as meeting the required level of competence for all the units necessary to achieve the full award

ABBE Level 4 NVQ Diploma in Verification of Ground Gas Protection Systems

603/3266/9

Units achieved: Mandatory Units K/617/0687, M/617/0688, K/617/0690, M/617/0691, A/617/0693, F/617/0694, J/617/0695

ofqual
REGULATED
register.ofqual.gov.uk

Signed :

Professor Julian Beer, Chair of ABBE Board

Date: 17/01/2023

Candidate Registration No : 0000039497 Certificate Issue No : 154133

Scan code on reverse to authenticate that this is a genuine paper

ABBE
Quality Accredited

Certificate of Unit Achievement

This is to certify that

Barrie Anthony Ackroyd

has been assessed as meeting the following units of competence which form part of an accredited qualification

M/617/0688	Materials for Construction in the Built Environment
J/617/0695	Principles of Regulatory Control Procedures and Legislation
F/617/0694	Verification and Inspection of Ground Gas Protection Systems
K/617/0687	Design Principles and Application for Construction in the Built Environment
A/617/0693	Confirming Work Meets Quality Standards in the Workplace
M/617/0691	Principles of Construction and Maintenance of Buildings
K/617/0690	Health, Safety and Welfare in the Construction Environment

Signed :

Professor Julian Beer, Chair of ABBE Board

Date: 17/01/2023

Candidate Registration No : 0000039497 Certificate Issue No : 154132

Scan code on reverse to authenticate that this is a genuine paper

ABBE
Quality Accredited

Certificate of Achievement

(Full Award)

This is to certify that

Michael Anthony Smith

has been assessed as meeting the required level of competence for all the units necessary to achieve the full award

ABBE Level 4 NVQ Diploma in Verification of Ground Gas Protection Systems

603/3266/9

Units achieved: Mandatory Units K/617/0687, M/617/0688, K/617/0690, M/617/0691, A/617/0693, F/617/0694, J/617/0695

Signed :

Professor Julian Beer, Chair of ABBE Board

Date: 23/01/2020

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REGULATED
register.ofqual.gov.uk

Candidate Registration No : 0000036770 Certificate Issue No : 142188

00026189

ABBE
Quality Accredited

Certificate of Unit Achievement

This is to certify that

Michael Anthony Smith

has been assessed as meeting the following units of competence which form part of an accredited qualification

K/617/0687	Design Principles and Application for Construction in the Built Environment
M/617/0688	Materials for Construction in the Built Environment
K/617/0690	Health, Safety and Welfare in the Construction Environment
M/617/0691	Principles of Construction and Maintenance of Buildings
A/617/0693	Confirming Work Meets Quality Standards in the Workplace
F/617/0694	Verification and Inspection of Ground Gas Protection Systems
J/617/0695	Principles of Regulatory Control Procedures and Legislation

Signed :

Professor Julian Beer, Chair of ABBE Board

Date: 23/01/2020

Candidate Registration No : 0000036770 Certificate Issue No : 142185

00026186

CERTIFICATE of ACCREDITATION

This is to certify that

Michael Smith

has been awarded the following accreditation

Gas Protection Verification Scheme (GPVS)

Technician (TGPV)

Certificate No.: 2UEiQm05Uq

Issued: 8 April 2021
Valid for 4 years from the above date



Richard Froggatt
CL:AIRE Chairman



CL:AIRE is a Charitable Company Limited by Guarantee
Registered in England 3740059 / Entrust Enrolment No. 119820 / Registered Charity No. 1075611
Chiltern House, Haddenham Business Centre, Thame Road, Haddenham, Buckinghamshire, HP17 8BY
Telephone: +44 (0)1844 296112 | Email: enquiries@claire.co.uk | Website: www.claire.co.uk

Certificate of Attendance

Continuing Professional Development

This is to certify that

Robert Boosey

Has attended and passed the course
Verification of Gas Protection Systems

on

26th February 2019

at

Doncaster Membrane Installations Limited, Adwick Park, Manvers, S63 5AB

Contact time: 6.5 hours

Trainers: Michael Corban & Gordon Cave

Richard Froggatt, CL:AIRE Chairman

CL:AIRE
Registered address: 32 Bloomsbury Street, London, WC1B 3QJ
Telephone: +44 (0)2072 994250
Email: enquiries@claire.co.uk Website: www.claire.co.uk
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CL:AIRE TRAINING

Certificate of Attendance

Continuing Professional Development

This is to certify that

Carl Orr

Has attended and passed the course
Verification of Gas Protection Systems

on

8th October 2019

at

Doncaster Membrane Installations Limited, Adwick Park, Manvers, S63 5AB

Contact time: 6.5 hours

Trainers: Michael Corban & Gordon Cave:



Richard Froggatt, CL:AIRE Chairman

CL:AIRE TRAINING

CL:AIRE
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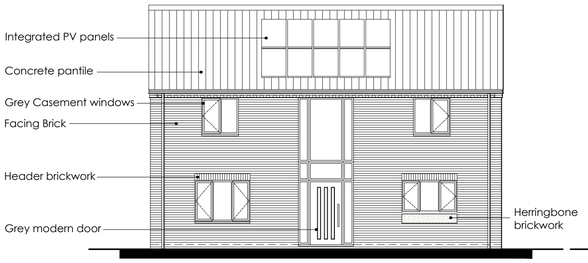
APPENDIX B

MTS Remedial Design Drawings



CLIENT:	TITLE:	DATE:	SCALE@SIZE:	
ARK PROPERTY	Proposed Site Layout Plan	Jan. 2023	NOT TO SCALE	Elemental GI Ltd
		DRAWING No: E22208_001	DESIGN/DRAWN: JR	

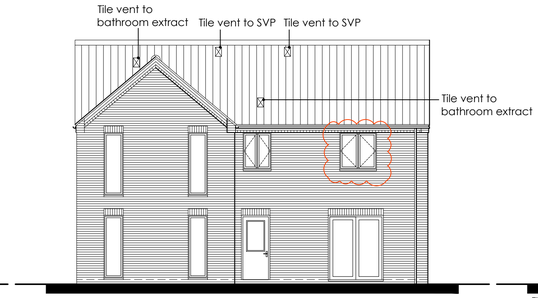
STUDIO 11 ARCHITECTURE



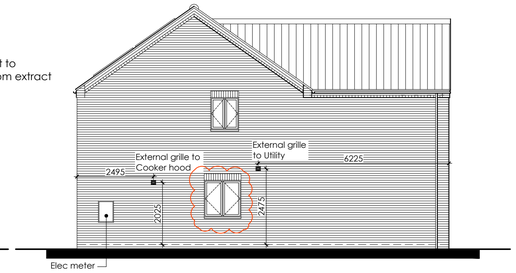
South Elevation



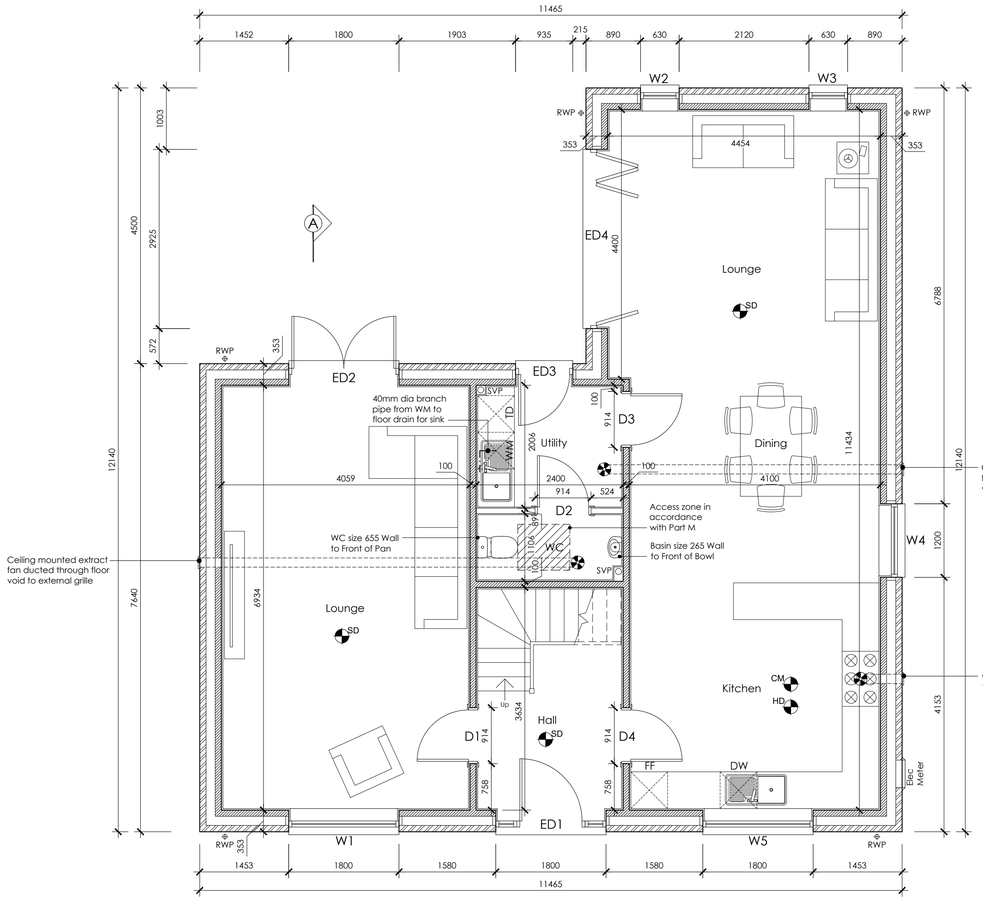
West Elevation



North Elevation

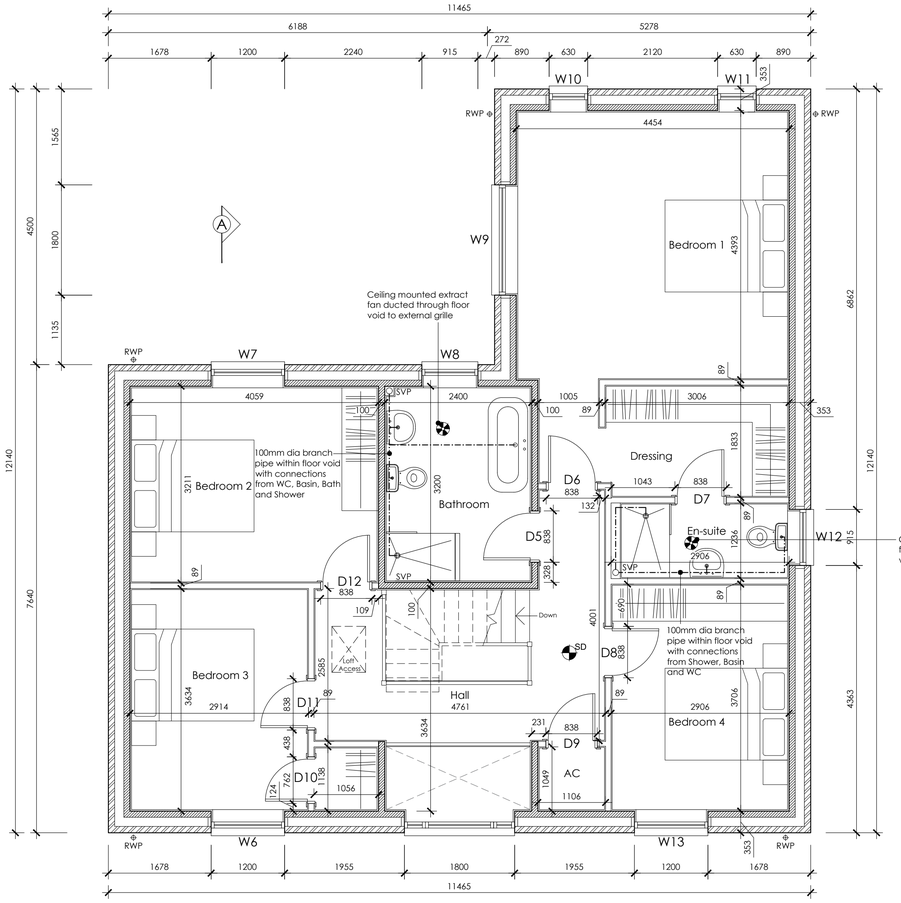


East Elevation



Ground Floor Plan

A



First Floor Plan

A

Do not scale directly from this drawing. All discrepancies are to be brought to the attention of the below office.

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Construction Design and Managment Regulations 2015

The contractors attention is drawn to the significant and/or unusual hazards identified below, annotated on the drawing and explained in the associated design risk registers

CDM Legend

Prohibited Activity

Significant Hazard

Compulsory Action

Significant Information

Staircase

Rise: 205
Going: 232
Pitch: 41°

OPENING SCHEDULE

REF	DESCRIPTION	WIDTH	HEIGHT	NOTES
W1	Window	1800	1350	
W2	Window	630	2100	
W3	Window	630	2100	
W4	Window	1200	1200	
W5	Window	1800	1050	
W6	Window	1200	1200	
W7	Window	1200	1200	
W8	Window	915	1200	Obscure Glazed
W9	Window	1800	1200	
W10	Window	630	2100	
W11	Window	630	2100	
W12	Window	915	1050	Obscure Glazed
W13	Window	1200	1200	
ED1	Door	1800	4800	Screen with 1015 Door
ED2	Door	1800	2100	French Doors
ED3	Door	935	2100	Doorset
ED4	Door	2925	2100	Bi-fold Doors

INTERNAL DOOR SCHEDULE

REF	DESCRIPTION	WIDTH	HEIGHT	NOTES
D1	Door	838	1981	
D2	Door	838	1981	
D3	Door	838	1981	
D4	Door	838	1981	
D5	Door	762	1981	
D6	Door	762	1981	
D7	Door	762	1981	
D8	Door	762	1981	
D9	Door	762	1981	
D10	Door	686	1981	
D11	Door	762	1981	
D12	Door	762	1981	

REVISION	DATE	DRAWN	DESCRIPTION
A	18.01.2023	OS	Window openings to Bedroom 1 & 2, Kitchen/Dining amended for Part O compliance.

ISSUE STATUS

PRELIMINARY

STUDIO11 architecture

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NORFOLK, PE30 5BY

T: 01553 970033
E: design@studio11architecture.co.uk
W: www.studio11architecture.co.uk

CLIENT Ark Property

PROJECT Residential Development at Land North of Stone Gate, Cowbit

DRAWING Plot 1 Floor Plans & Elevations

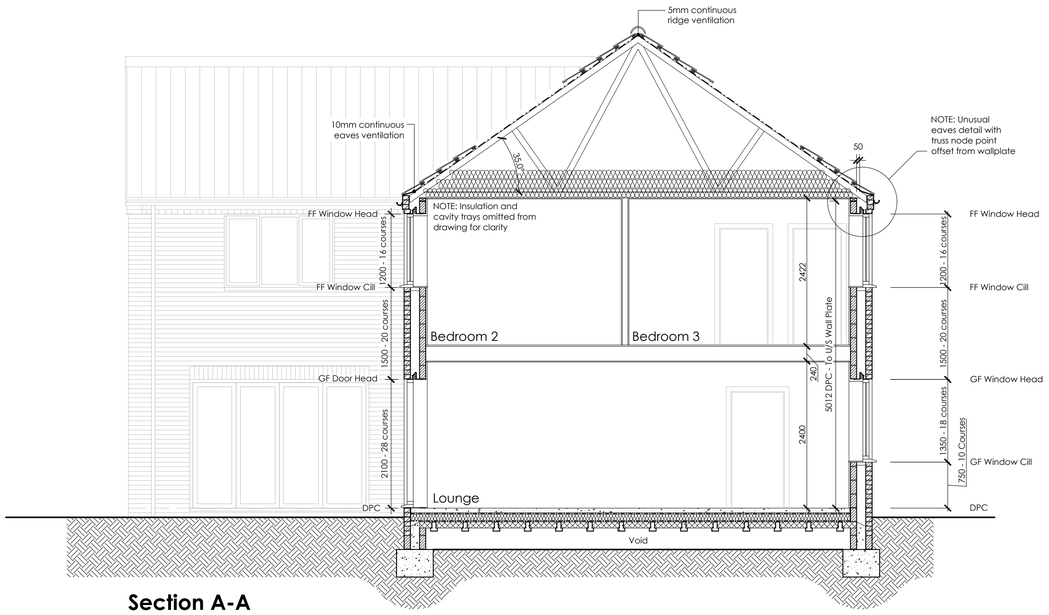
DRAWN	PROJECT DESIGNER	PROJECT DIRECTOR
OS	KB	KB

DATE	SCALE	PAPER SIZE
28.10.2022	1:50 & 1:100	A1

DRAWING NUMBER 551.P1.WD.01

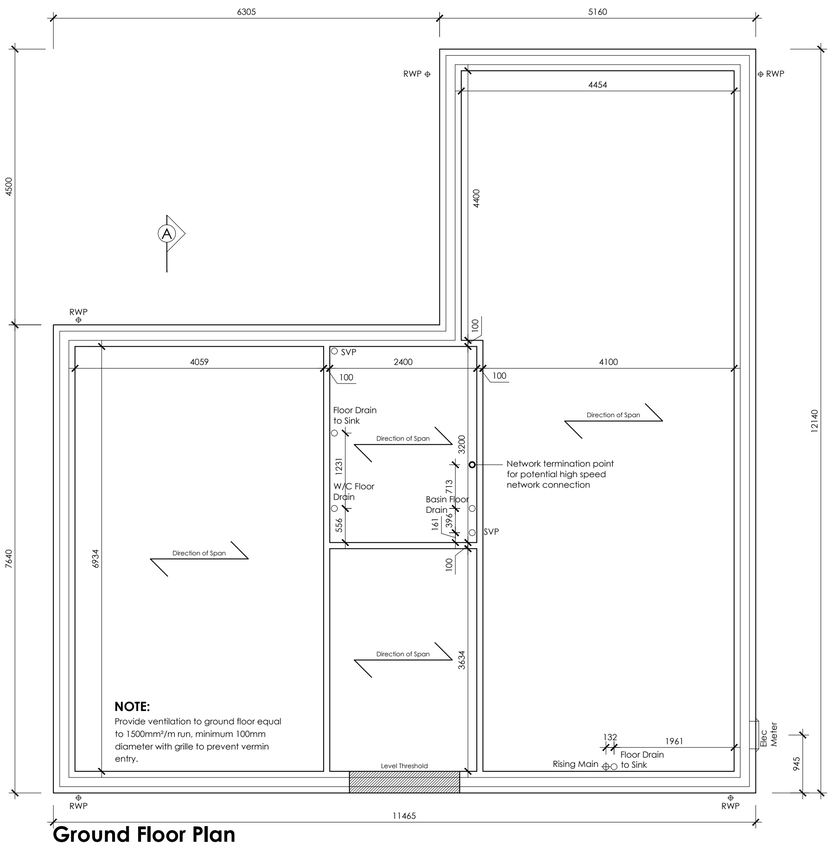
ARCHITECTURE

STUDIO 11 ARCHITECTURE



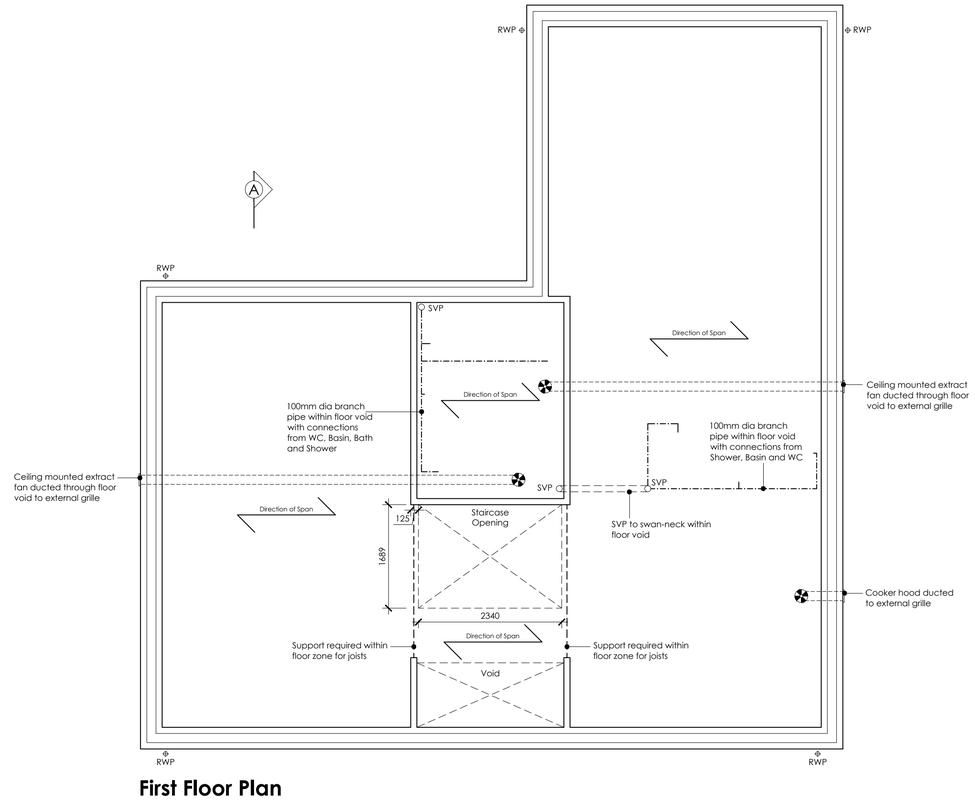
Section A-A

Suspended floor and foundations shown indicatively refer to Engineers information and Construction Specification Notes.



Ground Floor Plan

For Foundation details see Structural Engineers information
For Ground Floor see Beam & Block manufacturers information



First Floor Plan

For Joist details see manufacturers information

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Construction Design and Managment Regulations 2015

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CDM Legend

Prohibited Activity

Significant Hazard

Compulsory Action

Significant Information

REVISION DATE DRAWN DESCRIPTION

ISSUE STATUS

PRELIMINARY

STUDIO11 architecture
KINGS LYNN INNOVATION CENTRE
INNOVATION DRIVE, KINGS LYNN,
NORFOLK, PE30 5BY

T: 01553 970033
E: design@studio11architecture.co.uk
W: www.studio11architecture.co.uk

CLIENT	Ark Property
PROJECT	Residential Development at Land North of Stone Gate, Cowbit
DRAWING	Plot 1 Section A-A & Foundation and First Floor Form Plan

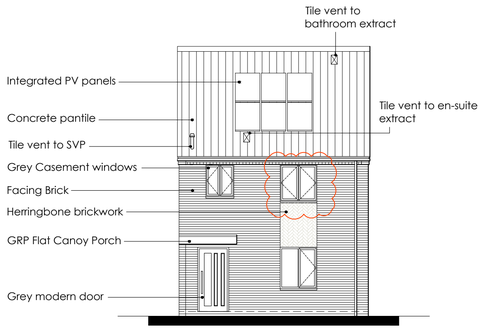
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OS	KB	KB
DATE	**SCALE**	**PAPER SIZE**
28.10.2022	1:50	A1

DRAWING NUMBER

551.P1.WD.03

ARCHITECTURE

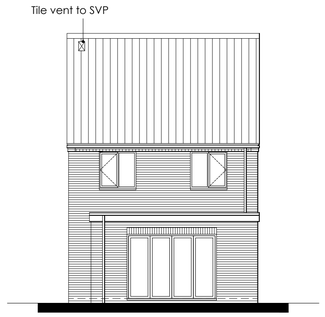
STUDIO 11 ARCHITECTURE



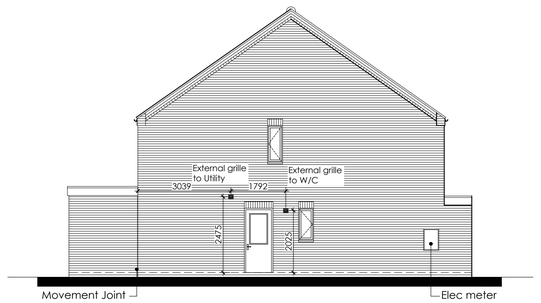
North Elevation



West Elevation



South Elevation



East Elevation

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Construction Design and Managment Regulations 2015

The contractors attention is drawn to the significant and/or unusual hazards identified below, annotated on the drawing and explained in the associated design risk registers

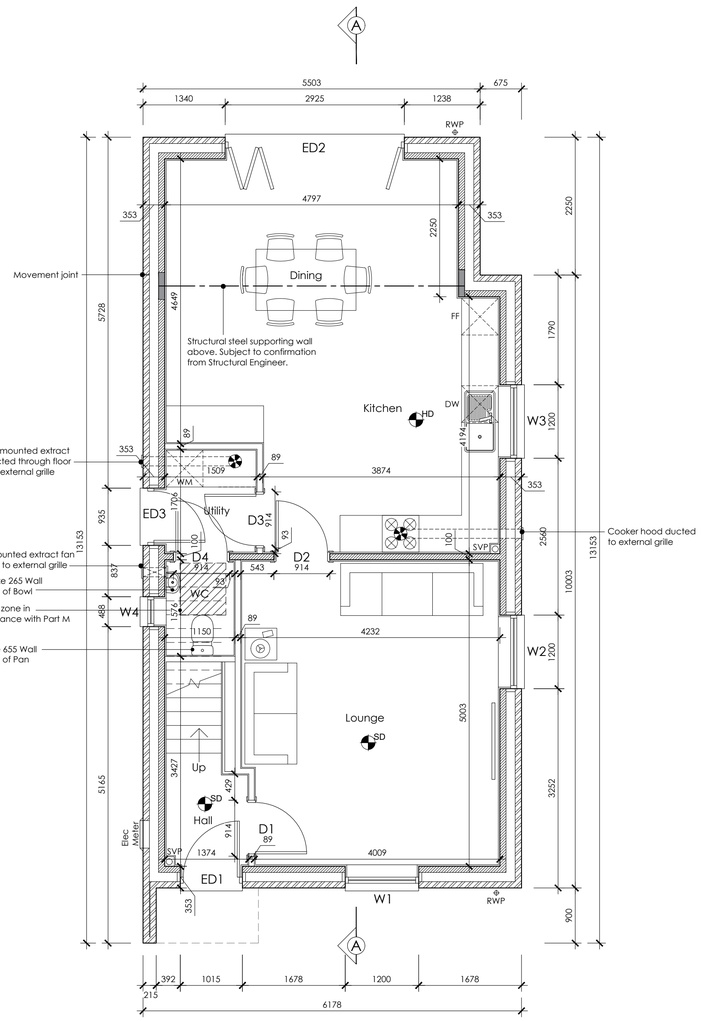
CDM Legend

Prohibited Activity

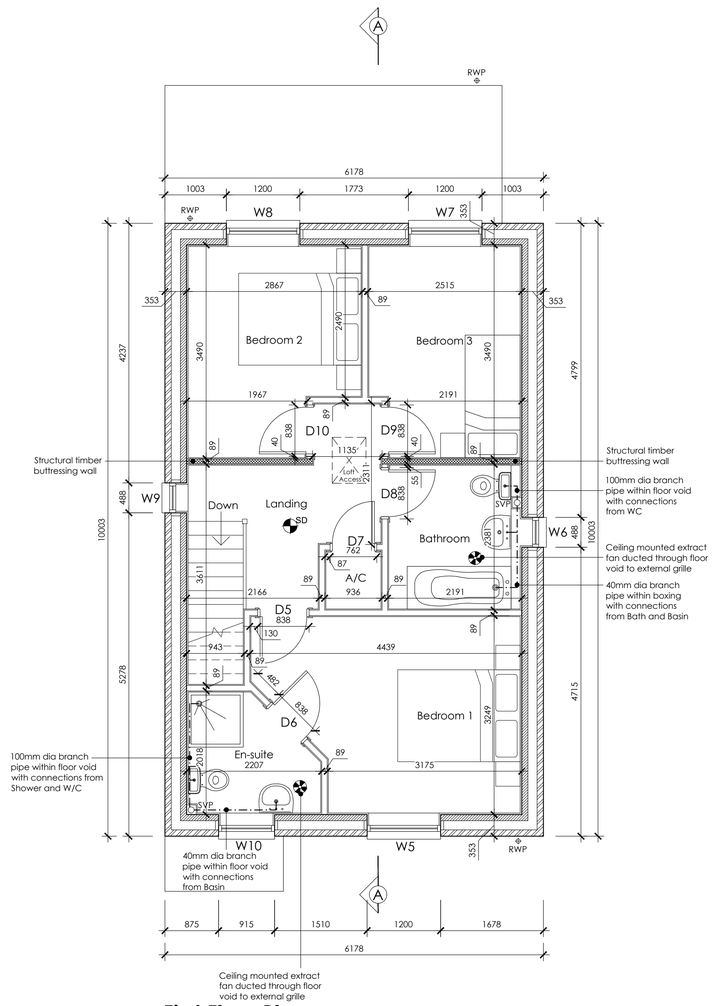
Significant Hazard

Compulsory Action

Significant Information



Ground Floor Plan



First Floor Plan

Staircase

Rise: 204
Going: 226
Pitch: 42°

OPENING SCHEDULE				
REF	DESCRIPTION	WIDTH	HEIGHT	NOTES
W1	Window	1200	1350	
W2	Window	1200	1350	
W3	Window	1200	1050	
W4	Window	488	1050	Obscure Glazed
W5	Window	1200	1200	
W6	Window	488	1050	Obscure Glazed
W7	Window	1200	1200	
W8	Window	1200	1200	
W9	Window	488	1200	
W10	Window	915	1050	Obscure Glazed
ED1	Door	1015	2100	Doorset
ED2	Door	2925	2100	Bi-fold Doors
ED3	Door	935	2100	Doorset

INTERNAL DOOR SCHEDULE				
REF	DESCRIPTION	WIDTH	HEIGHT	NOTES
D1	Door	838	1981	
D2	Door	838	1981	
D3	Door	838	1981	
D4	Door	838	1981	
D5	Door	762	1981	
D6	Door	762	1981	
D7	Door	686	1981	
D8	Door	762	1981	
D9	Door	762	1981	
D10	Door	762	1981	

REVISION	DATE	DRAWN	DESCRIPTION
A	18.01.2023	OS	Window openings to Bedroom 1 amended for Part O compliance.

ISSUE STATUS

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T: 01553 970033
E: design@studio11architecture.co.uk
W: www.studio11architecture.co.uk

CLIENT Ark Property

PROJECT Residential Development at Land North of Stone Gate, Cowbit

DRAWING Plots 2&4 Floor Plans & Elevations

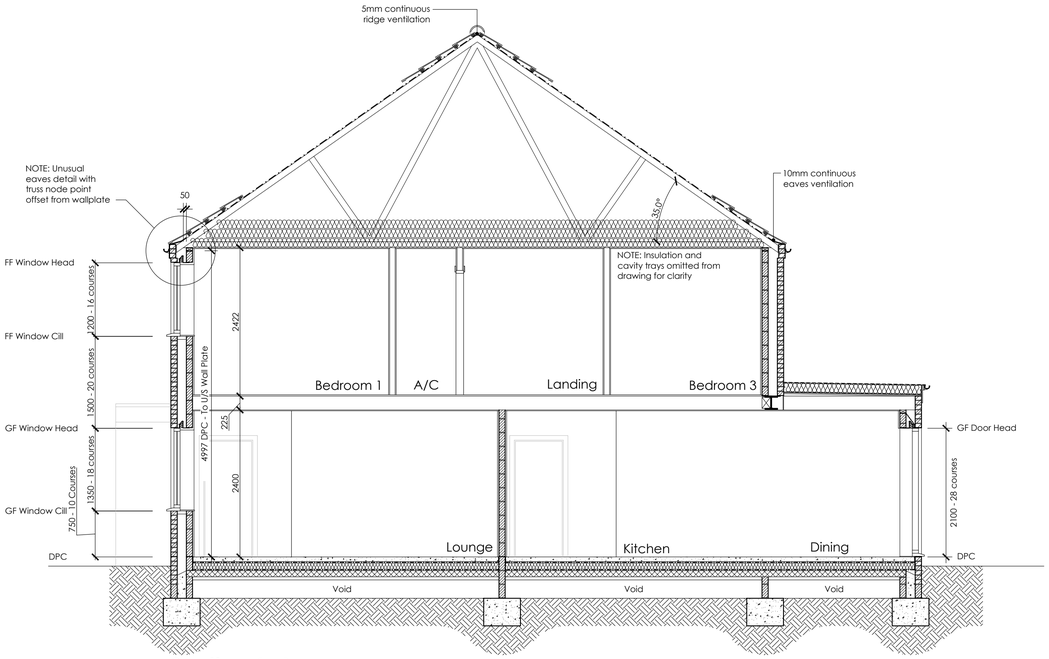
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OS	KB	KB
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02.11.2022	1:50 & 1:100	A1

DRAWING NUMBER

551.P2.WD.01

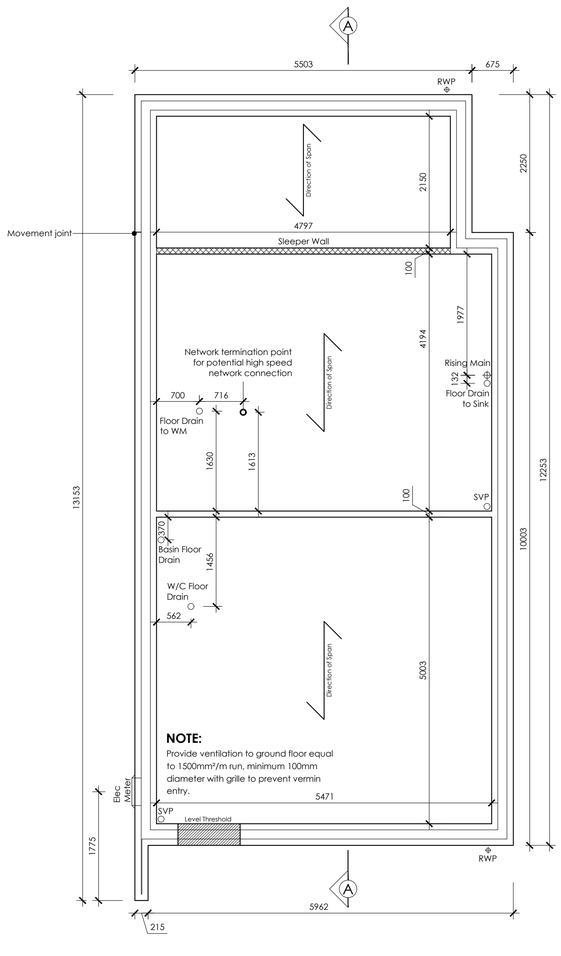
ARCHITECTURE

STUDIO 11 ARCHITECTURE



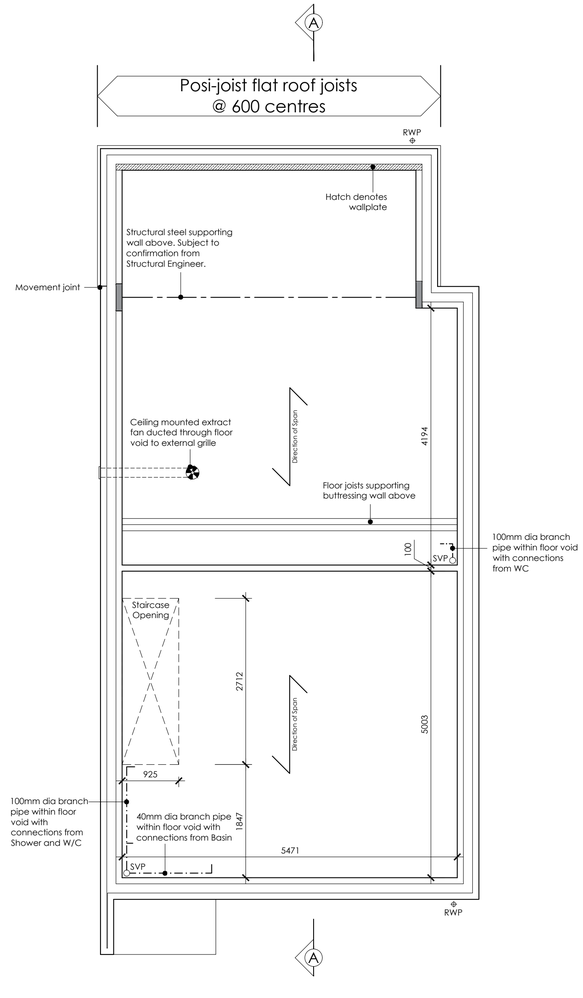
Section A-A

Suspended floor and foundations shown indicatively refer to Engineers information and Construction Specification Notes.



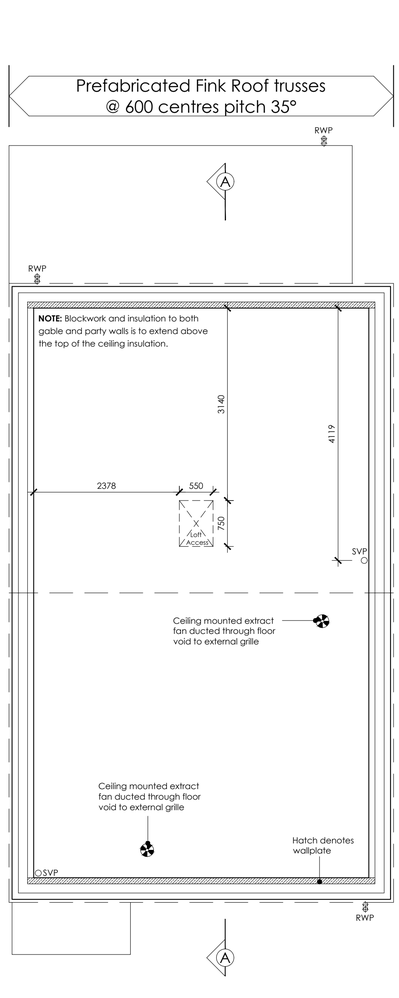
Foundation Form Plan

For Foundation details see Structural Engineers information
For Ground Floor see Beam & Block manufacturers information



First Floor Form Plan

For Joist details see manufacturers information



Roof Form Plan

For Roof Truss details see manufacturers information

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CDM Legend

Prohibited Activity

Significant Hazard

Compulsory Action

Significant Information

REVISION DATE DRAWN DESCRIPTION

ISSUE STATUS

PRELIMINARY

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W: www.studio11architecture.co.uk

CLIENT Ark Property

PROJECT Residential Development at Land North of Stone Gate, Cowbit

DRAWING Plots 2&4
Section A-A & Foundation, First Floor and Roof Form Plan

DRAWN	PROJECT DESIGNER	PROJECT DIRECTOR
OS	KB	KB

DATE	SCALE	PAPER SIZE
02.11.2022	1:50	A1

DRAWING NUMBER

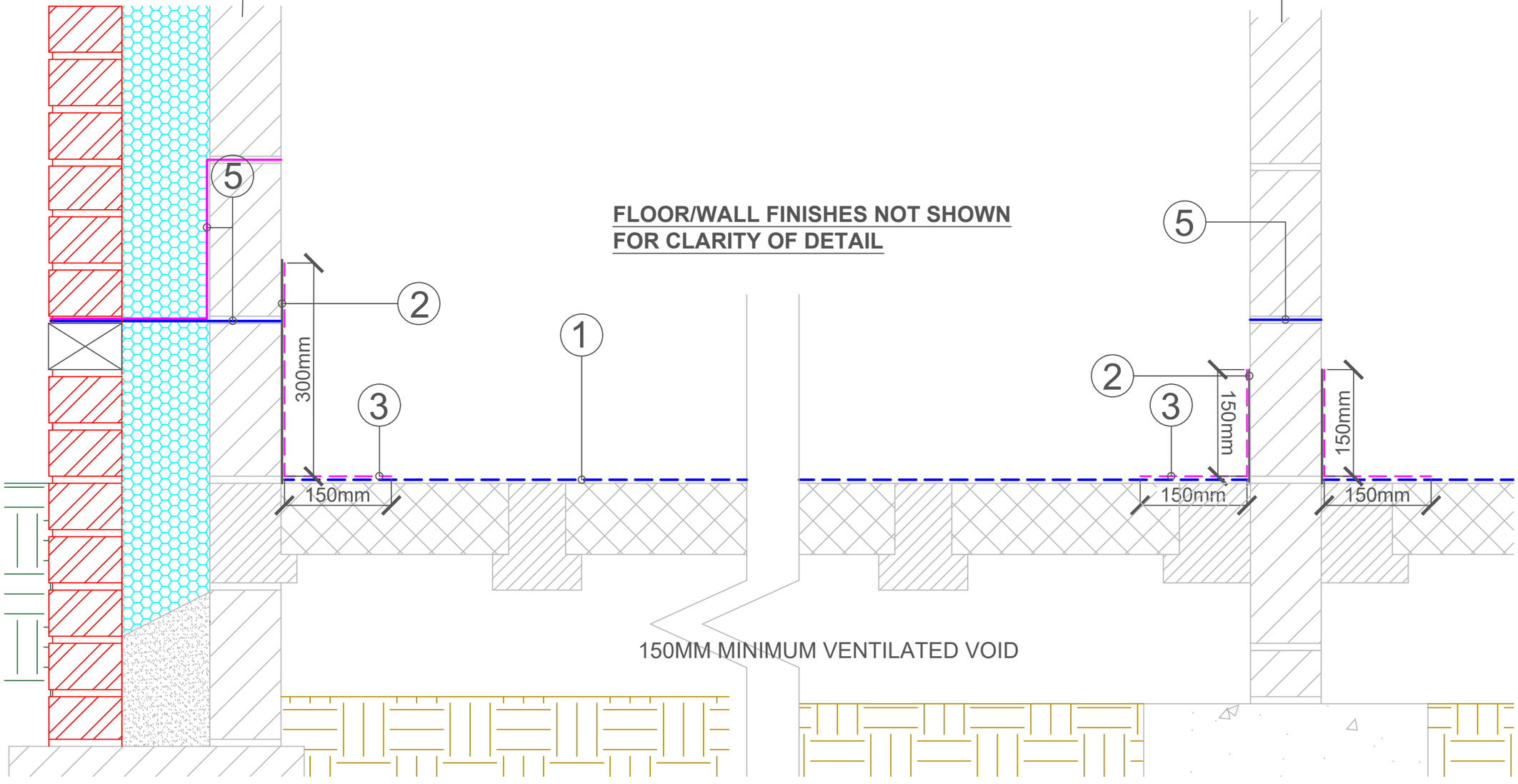
551.P2.WD.02

ARCHITECTURE

EXISTING PROPERTY WALLS WHERE GAS MEMBRANE REQUIRES TO CONNECT ONTO

EXISTING PROPERTY INTERNAL WALLS WHERE GAS MEMBRANE REQUIRES TO CONNECT ONTO

FLOOR/WALL FINISHES NOT SHOWN FOR CLARITY OF DETAIL



TYPICAL GAS MEMBRANE INSTALLATION DETAILS

KEY TO MATERIALS

1. JUTA GP1 GAS BARRIER MEMBRANE, OF FULLY WELDED SEAM CONSTRUCTION BY NVQ LEVEL 2 QUALIFIED OPERATIVES
2. JUTA GP BITUMEN PRIMER ONTO FILLED PERP AND BED JOINTS AND SMOOTH FORMATION
3. 450mm/300mm WIDE JUTA GP SAM SELF-ADHESIVE MEMBRANE 150mm ONTO THE GAS MEMBRANE AND 300mm/150mm ONTO THE PREPARED WALL AND BITUMEN PRIMER, (ALL HEAT BONDED)
5. EXISTING CAVITY TRAY & DPC SPECIFICATION 'BY OTHERS'

Drawing No.

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with the MTS.DVR.950-BA 3rd Party Retrospective Design & Validation Report.



Warning Herality & Safety Information!

This drawing relates to the low ground gas risk issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where low levels of ground gases may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas mitigation details;

24950-01
24950-02
24950-03
24950-04

No.	Revision/Issue	Date

Firm Name and Address

MembraneTestingSolutions

The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 1ET

Office: 0844 557 3766
Out of Hours Contact Telephone: 07887 436699

Mobile: 07887 436699
email: adam@mtsltd.net

www.mtsltd.net

Project Name and Address

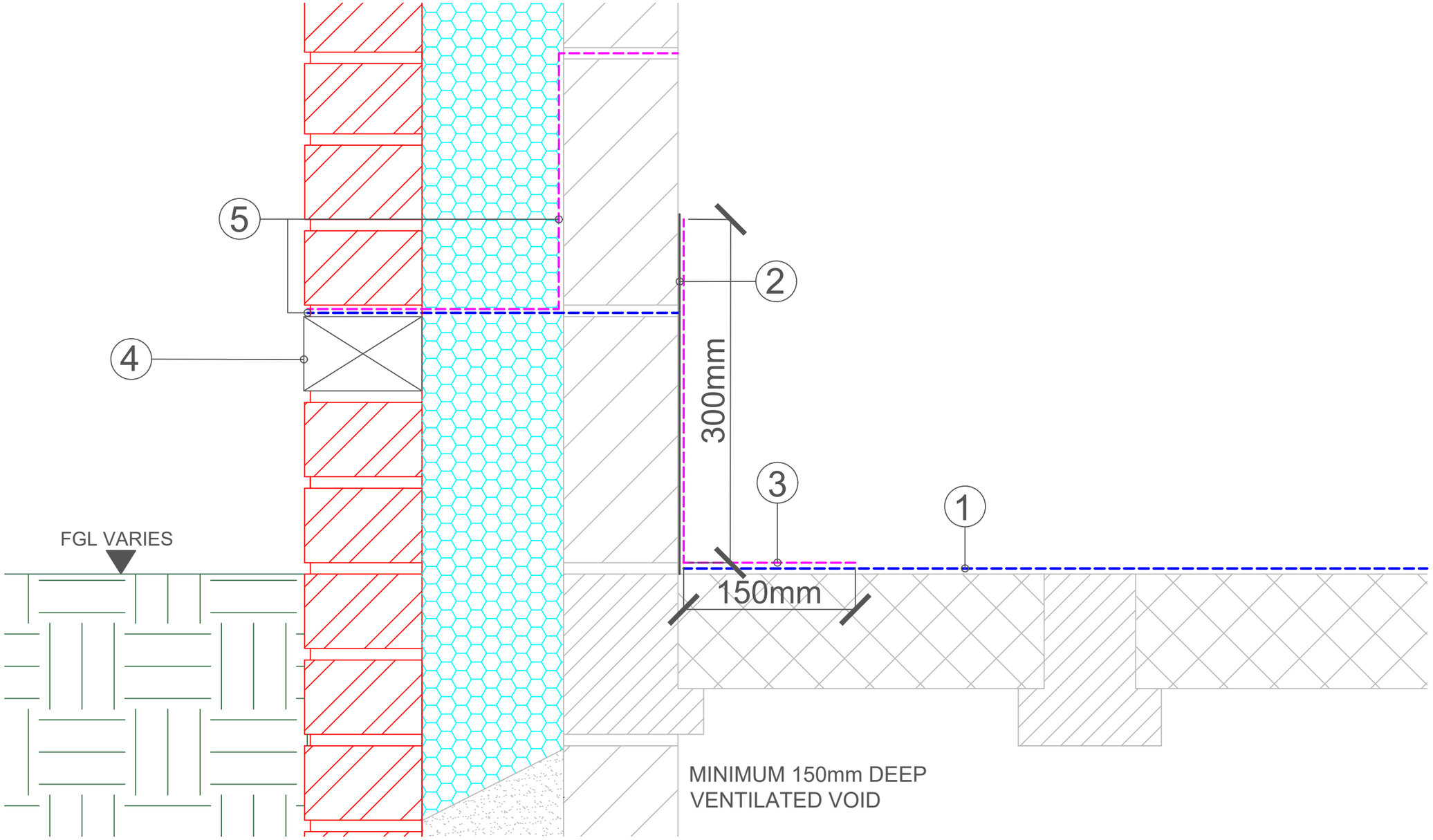
Plots 1 & 2 Marshall Drive, Cowbit, Spalding, Lincolnshire, PE12 6AH

Drawing Title

Typical Existing Perimeter/Internal Wall Retrospective Ground Gas Mitigation Section Details

Project	Sheet
24950-01	Rev -
Date: 28/2/2024	Drawn By: B.Ackroyd
Scale: Not to Scale	Size: A3

FLOOR/WALL FINISHES NOT SHOWN
FOR CLARITY OF DETAIL



NEW PERIMETER CAVITY VENTS

KEY TO MATERIALS

1. JUTA GP1 GAS BARRIER MEMBRANE, OF FULLY WELDED SEAM CONSTRUCTION BY NVQ LEVEL 2 QUALIFIED OPERATIVES
2. JUTA GP BITUMEN PRIMER ONTO FILLED PERP AND BED JOINTS AND SMOOTH FORMATION
3. 450mm/300mm WIDE JUTA GP SAM SELF-ADHESIVE MEMBRANE 150mm ONTO THE GAS MEMBRANE AND 300mm/150mm ONTO THE PREPARED WALL AND BITUMEN PRIMER, (ALL HEAT BONDED)
4. NEW 6000mm2 CAVITY AIRBRICK VENT SETS INSTALLED AT 3M CENTRES AROUND THE BUILDINGS
5. EXISTING CAVITY TRAY & DPC SPECIFICATION 'BY OTHERS'

Drawing No.

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with the MTS.DVR.950-BA 3rd Party Retrospective Design & Validation Report.



Warning Heralth & Safety Information!

This drawing relates to the low ground gas risk issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where low levels of ground gases may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas mitigation details;

24950-01
24950-02
24950-03
24950-04

No.	Revision/Issue	Date

Firm Name and Address

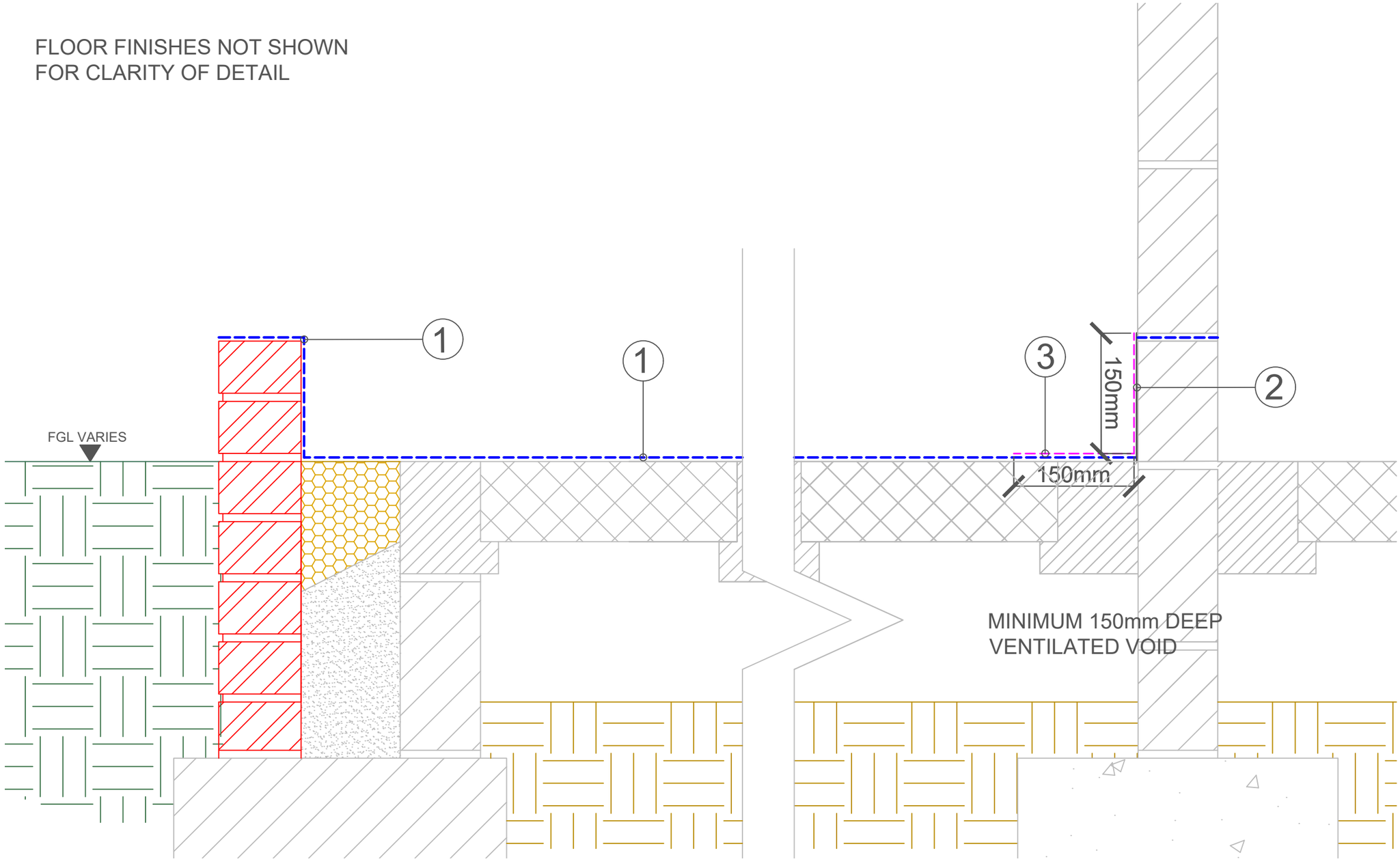
MembraneTestingSolutions
www.mtsltd.net

Project Name and Address
Plots 1 & 2 Marshall Drive, Cowbit, Spalding, Lincolnshire, PE12 6AH

Drawing Title
New Cavity Vents, Retrospective Ground Gas Mitigation Section Detail

Project	Sheet
24950-02	Rev -
Date: 28/2/2024	Drawn By: B.Ackroyd
Scale: Not to Scale	Size: A3

FLOOR FINISHES NOT SHOWN
FOR CLARITY OF DETAIL



TYPICAL EXTERNAL DOOR THRESHOLD DETAIL

KEY TO MATERIALS

1. **JUTA GP1 GAS BARRIER MEMBRANE, OF FULLY WELDED SEAM CONSTRUCTION BY NVQ LEVEL 2 QUALIFIED OPERATIVES**
2. **JUTA GP BITUMEN PRIMER ONTO FILLED PERP AND BED JOINTS AND SMOOTH FORMATION**
3. **450mm/300mm WIDE JUTA GP SAM SELF-ADHESIVE MEMBRANE 150mm ONTO THE GAS MEMBRANE AND 300mm/150mm ONTO THE PREPARED WALL AND BITUMEN PRIMER, (ALL HEAT BONDED)**

Drawing No.

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with the MTS.DVR.950-BA 3rd Party Retrospective Design & Validation Report.



Warning Heralth & Safety Information!

This drawing relates to the low ground gas risk issues on this site.

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The following drawings should be consulted for gas mitigation details;

24950-01
24950-02
24950-03
24950-04

No.	Revision/Issue	Date

Firm Name and Address

MembraneTestingSolutions

The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2LB

Office: 01440 357 3060

Out of Hours Contact: Telephone: 07587 498855

Web Site: mtsltd.net
email: sales@mtsltd.net

www.mtsltd.net

Project Name and Address

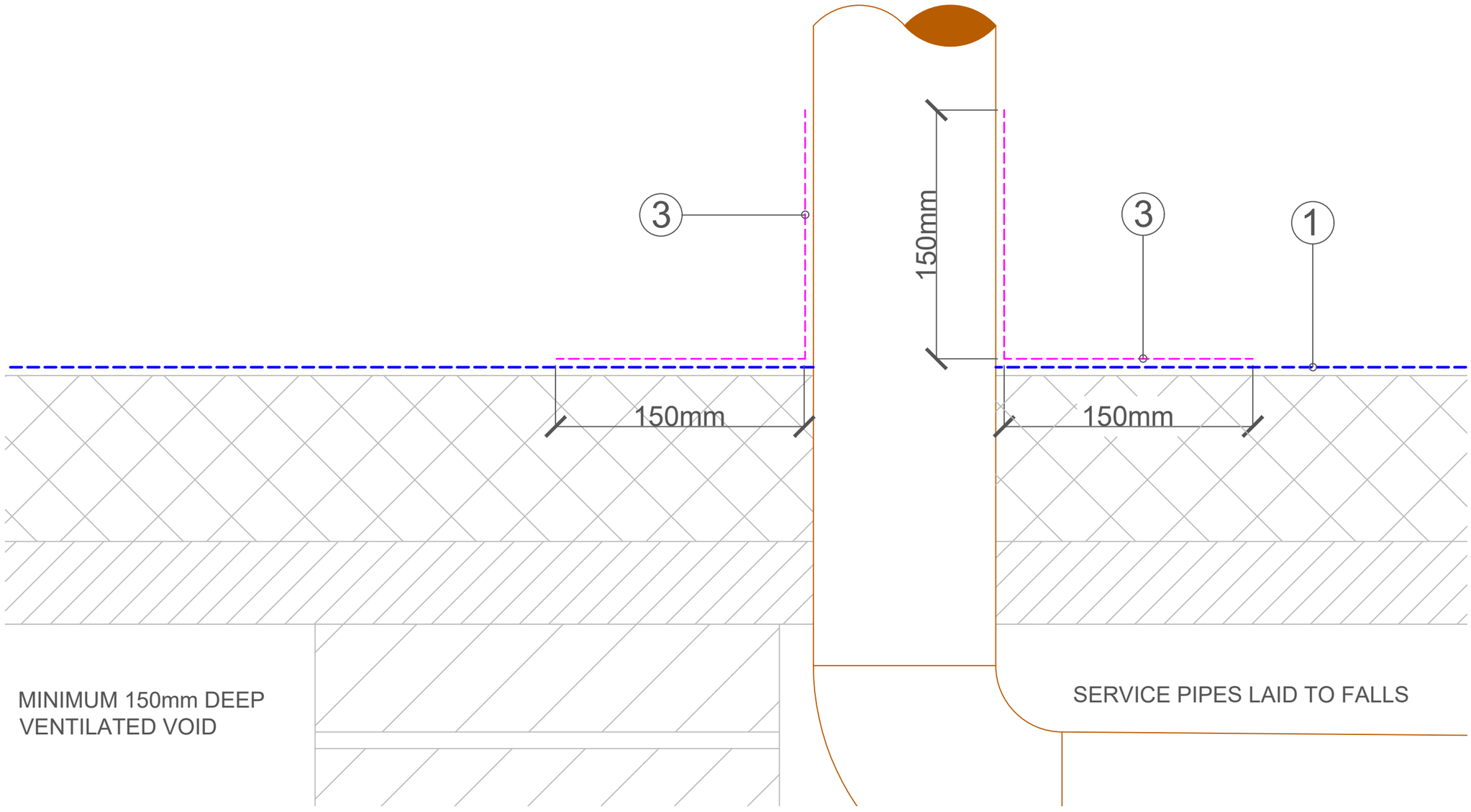
Plots 1 & 2 Marshall Drive, Cowbit, Spalding, Lincolnshire, PE12 6AH

Drawing Title

Typical External Door Threshold Retrospective Ground Gas Mitigation Section Detail

Project	Sheet
24950-03	Rev -
Date: 28/2/2024	Drawn By: B.Ackroyd
Scale: Not to Scale	Size: A3

FLOOR/WALL FINISHES NOT SHOWN
FOR CLARITY OF DETAIL



SERVICE PIPE SEALING DETAIL

KEY TO MATERIALS

1. **JUTA GP1 GAS BARRIER MEMBRANE, OF FULLY WELDED SEAM CONSTRUCTION BY NVQ LEVEL 2 QUALIFIED OPERATIVES**
2. **450mm/300mm WIDE JUTA GP SAM SELF-ADHESIVE MEMBRANE 150mm ONTO THE GAS MEMBRANE AND 300mm/150mm ONTO THE PREPARED WALL AND BITUMEN PRIMER, (ALL HEAT BONDED)**

Drawing No.

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with the MTS.DVR.950-BA 3rd Party Retrospective Design & Validation Report.



Warning Heralth & Safety Information!

This drawing relates to the low ground gas risk issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where low levels of ground gases may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas mitigation details;

24950-01
24950-02
24950-03
24950-04

No.	Revision/Issue	Date

Firm Name and Address

MembraneTestingSolutions
www.mtsltd.net

Project Name and Address

Plots 1 & 2 Marshall Drive, Cowbit, Spalding, Lincolnshire, PE12 6AH

Drawing Title

Typical Service Pipe Sealing Details

Project	Sheet
24950-04	Rev -
Date: 28/2/2024	Drawn By: B.Ackroyd
Scale: Not to Scale	Size: A3

APPENDIX C

Material Specifications

GROUND GAS PROTECTION
GP®1 TECHNICAL DATA SHEET

JUTA | TITANTECH®



GP®1 proprietary gas resistant damp proof membrane (DPM) is a multi-layer, low density polyethylene membrane, reinforced with a polypropylene reinforcing grid with an integral aluminium foil. GP®1 is specifically designed and manufactured to perform as a methane, carbon dioxide, radon, ground gas, air & moisture protection system.

Thickness	0.6 mm
Width	Various m
Length	Various m
Weight	370 g/m²

TITANTECH®
For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling
Roll weights can be in excess of 20 kg and hence appropriate care and equipment is required for unloading and handling.

Storage
Rolls of GP®1 should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.

Installation
GP®1 should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015.

BBA
CE UK CA

GROUND GAS PROTECTION
GP®1 TECHNICAL DATA SHEET

GP®1

Feature	Characteristics	Test Method	GP®1
Physical Properties	Thickness	EN 1849-2	0.6 mm
	Thickness - between Scrim	BS EN ISO 9863-1:2016	0.4 mm
	Width	EN 1849-2	Various m
	Length	EN 1849-2	Various m
	Weight	EN 1849-2	370 g/m^2
Hydraulic Press	Water Column	EN 20811	> 300
	Resistance to Water Penetration	EN 13967, EN 1928	Pass
	Water Tightness	EN 11296, EN 1367, EN 1928	Pass
Mechanical Properties	Resistance to Static Load	EN 12730-B	20 kg
	Tensile Strength (MD)	EN 12311-1	600 N/50mm
	Tensile Strength (CMD)	EN 12311-1	480 N/50mm
	Tensile Elongation (MD)	EN 12310-1	20%
	Tensile Elongation (CMD)	EN 12310-1	20%
	Puncture Resistance	EN 12236	1.25 kN
	Resistance to Tearing (Nail Shank) MD	EN 12310-1	330 N
	Resistance to Tearing (Nail Shank) CMD	EN 12310-1	400 N
Durability and Chemical Resistance	Transmission Rate of Volatile Liquids - Diesel	ISO 6179:2010 (B)	0.246 g/m^2/h
	Transmission Rate of Volatile Liquids - Xylene	ISO 6179:2010 (B)	0.571 g/m^2/h
	Transmission Rate of Volatile Liquids - Toluene	ISO 6179:2010 (B)	0.583 g/m^2/h
	Transmission Rate of Volatile Liquids - Petrol	ISO 6179:2010 (B)	0.135 g/m^2/h
Gas Permeability	Methane Permeability	BS EN ISO 15105-1	< 0.09 ml/m^2/day/atm
	Carbon Dioxide Permeability	BS EN ISO 15105-1	< 0.09 ml/m^2/day/atm
	Radon Permeability	K124/02/95	8.0 x 10^{-15} m^2/s
Compliance and Certification	CE Mark - EN13967:2012 (A1 2017)		
	NHBC Standards Compliant		
	Conforms to BS 8485:2015 + A1 2019		
	BBA Certified - Certificate No. 20/5728		

JUTA UK

Please contact JUTA UK Directly for more information on GP®1

Jointing and Sealing

It is recommended GP®1 be heat welded where possible, with welding carried out by competent personnel with suitable qualifications in accordance with best practice, and guidance contained within BS 8485:2015.

Accessory Products

- GP®1 Starter Band
- GP® Tape
- GP® Self Adhesive Membrane
- GP® Primer
- GP® Top Hats and Preformed Corners
- GP® Protection Fleece
- GP® Void Vent (24/40mm)

GROUND GAS PROTECTION
GP® PRIMER
TECHNICAL DATA SHEET

JUTA | TITANTECH®



GP® PRIMER

GP® PRIMER is a quick drying, cold applied bituminous solution designed to penetrate and seal porous surfaces prior to the application of covering materials. Conforms to BS Code of practice 144, part 3.

Colour	Black
Metal Surfaces	6 - 11 m^2 per litre coverage
Concrete	3 - 4 m^2 per litre coverage
Bituminous	5 - 8 m^2 per litre coverage

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Uses

GP® PRIMER seals porous substrates and courages the adhesion of bituminous waterproofing systems ad sheet coverings. It may be applied successfully to a wide range of surfaces:

- Concrete
- Asbestos Cement
- Slate
- Metals (mild steel, Zinc, Lead)
- Lightweight Concrete screeds

Handling

GP® PRIMER is available in 5 litre and 25 litre containers.

Storage

Storage life indefinite in tightly sealed, undamaged containers.

Health and Safety

Refer to material safety data sheet (MSDS) for a full list of hazards.

BBA

CE UK CA

GROUND GAS PROTECTION
GP® PRIMER
TECHNICAL DATA SHEET

GP® PRIMER

Feature	Characteristics
Colour	Black
Metal Surfaces	6 - 11 m^2 per litre coverage
Concrete	3 - 4 m^2 per litre coverage
Bituminous	5 - 8 m^2 per litre coverage
Drying Time	Allow to dry completely before subsequent installation begins. Drying time is dependent on ambient air temperature, atmospheric conditions and porosity of the substrate. Average drying time at 20°C is between 2 - 6 hours.

JUTA UK
For additional information or assistance, please contact JUTA UK directly.

Application
Apply by brush or spray. Surface should be clean, ie. free from all oil, grease, dirt, dust and loose debris. On metal surfaces all loose rust should be removed using a wire bristled brush and where advanced signs of corrosion are evident these areas should initially be treated with a rust inhibitor. Surfaces should preferably be dry although GP® PRIMER will adhere to damp but not wet surfaces. GP® PRIMER should be applied evenly across the surface in one generous coating.

GROUND GAS PROTECTION
GP®1 SAM
TECHNICAL DATA SHEET

JUTA | TITANTECH®



GP®1 SAM

GP®1 SAM, gas protection self adhesive membrane, is a bituminous gas proof and water proof sheet, composed of self-adhesive SBS polymer modified bitumen incorporating GP®1 with an upper surface finish of black reinforced LDPE, and a lower surface finish of siliconized release film. GP®1 SAM is used for the gas/ waterproofing of underground structures where harmful ground gasses are anticipated, and as a self adhesive accessory to GP®1.

Thickness	1.2 mm
Width	0.9 m or 0.3 m
Length	20 m
Weight	1100 g/m²

TITANTECH®
For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling
Roll weights can be in excess of 20 kg (approx 33 kg/roll) and hence appropriate care and equipment is required for unloading and handling. This product is non-toxic nor flammable.

Storage
Rolls of GP®1 SAM should be stored on in a cool, dry place, and be protected from exposure to rain, sun, heat and cold temperatures prior to installation. Exposure to sunlight for extended period of time could cause difficulty with removal of the release film.

BBA
CE UK CA

GROUND GAS PROTECTION
GP®1 SAM
TECHNICAL DATA SHEET

GP®1 SAM

Feature	Characteristics	Test Method	GP®1 SAM
Physical Properties	Thickness	EN 1849-2	1.2 mm
	Width	EN 1849-2	0.9 or 0.3 m
	Length	EN 1849-2	20 m
	Weight	EN 1849-2	1100 g/m^2
Hydraulic Press	Water Tightness	EN 1928	Pass
	Water Vapour Transmission	EN 1931	0.013 g/m^2/day
Mechanical Properties	Tensile Strength (MD/CMD)	EN 12311-2 (A)	500 N/50mm
	Elongation (MD/CMD)	EN 12311-2 (A)	> 12 %
	Resistance to Static Load	EN 12370	20 kg
	Joint Strength	EN 12317-2	> 30 N
	Durability and Water Tightness (Ageing and Chemicals) 60 kPa	EN 1847	Pass
	Resistance to Nail Tear (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Fire	EN 13501	F Euro Class
Gas Permeability	Methane Permeability	EN ISO 15105-1	< 0.68 ml/m^2/day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	< 2.81 ml/m^2/day/atm
	Radon Permeability	K124/02/95	8.0 x 10^{-15} m^2/S
Compliance and Certification	CE Mark - EN13967:2012 + A1:2017 Type (A/T)		
	BS 8485:2015 Compliant (Methane and Carbon Dioxide Barrier)		

JUTA UK

Please contact JUTA UK Directly for more information on GP®1 SAM

Installation

GP®1 SAM should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015, and/or BS 8102:2009.

It is recommended that GP®1 SAM is not applied in temperatures below 10°C, in colder weather the material can be warmed slightly to aid adhesion.

Accessory Products

- GP® Primer
- GP® Protection Board
- GP® Protection Fleece

APPENDIX D

Project Survey Sheets

MembraneTestingSolutions Ltd

Gas Protection Inspection & Validation Record

One record sheet to be completed for each plot inspected by a SUITABLY QUALIFIED independent consultant/engineer

Project Number:		Design Source Ref:		Specification Source/Ref:			Other Documents Attached	Y/N					
Site Name/Location:		Building Use:	Residential		Commercial		Other (Describe)						
Plot Numbers:		Building Description:	No. of Storeys =		Detached		Semi-Detached		Terrace		Apartment Block		
Compiled By:		Gas Protection Type	Active/Passive		Foundation Type:		Suspended Floor/Raft/Other						

Ventilated sub-floor (if present)	Inspection date/time:		Inspected by:		Photographed:	Y/N	

	Y/N	**Notes/Recommendations (see guide below)**
Void Former Type		1.
Height of Void Space		2.
Venting Media		3.
Pipe Size & Spacing		4.
External Wall Airbricks		5.
Internal Sleeper Walls		6.
External Vent Trenches/Ducts		7.

Gas Barrier	Inspection Date/Time:		Inspected by:		Photographed:	Y/N	

	Y/N	**Notes/Recommendations**
Membrane Type		8.
Extent of Coverage		9.
Underside of Membrane		10.
Slab/Membrane Condition		11.
Laps & Joints		12.

Signed:

Date:

EXAMPLE

INDEPENDENT INSPECTION & VALIDATION CERTIFICATE OF CONFORMANCE

DATE:

PROJECT NAME:

CONTRACT NO:

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) **…….**

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of MembraneTestingSolutions Ltd

Name: ----------

Dated: ----------

Signed for on behalf of The Client: **Name:** ----------

Dated: ----------

EXAMPLE

Gas Protection Verification Declaration

Site

Site Name	test2
Site Address	2 Test Street, Exampleville
GPVS Declaration Reference	0420-C5395

Brief Description of Site

Site description goes here.

Site Type	Residential
Plot Number(s)	456 - 458

Document

Verification Report Title	test2
Verification Report Identifier	N/A
Named Client	N/A

EXAMPLE

GPVS Declaration

SGPV Details

SGPV Name	Helen McLennan
SGPV Accreditation No.	SGPV0000
Telephone	05 55 69 72 43
Email	helen.mclennan@claire.co.uk
Organisation	Testers Ltd
Address	10 Testing Road, Little Testing, TF5 1GR

Declaration

I, Helen McLennan, confirm that I am the person described in the SGPV Accredited Person details section and hold a current valid registration as a SGPV Accreditation No. SGPV0000 under the Gas Protection Verification Accreditation Scheme.

I have reviewed the verification report described in the Document Details section and I am satisfied that:

1. The work has been carried out to an acceptable standard.
2. The work has been verified by suitably experienced and qualified personnel.
3. The level of verification is proportionate to the level of risk identified in the Site Investigation report/Gas risk assessment.
4. The interpretations and conclusions are reasonable.
5. The verification strategy is in line with industry guidance.
6. I am competent to sign this Declaration and that
    a. I am fully aware and comply with the Scheme's Code of Conduct
    b. The work of this review and Declaration are within the limits of my knowledge, competence and professional capacity.

Note: The document that has been reviewed was prepared by the organisation named for the benefit of the named Client who has reliance upon it. Any professional liability arising from any proven negligent act or omission by the Company carrying out the work and publishing the document rests with that Company and not with the GasA Registered Person or the GPVS.

Signed:

Date:

0420-C5395

Name:
[Block capitals]

EXAMPLE