

Date: 2nd July 2025  
Reference: 16465-V13

## GAS MEMBRANE VALIDATION – EDENFIELD ROAD, NORDEN

|                                                           |                                                                                   |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Project Name:</b>                                      | Edenfield Road, Norden                                                            |
| <b>Project Number:</b>                                    | 16-465                                                                            |
| <b>Client:</b>                                            | Stonebond Group Ltd                                                               |
| <b>Date:</b>                                              | 20-06-2025                                                                        |
| <b>Gas Membrane Installers Name &amp; Qualifications:</b> | Arch and Wood Construction & Commercial Ltd<br>NVQ Level 2 Qualified Installer    |
| <b>Ground Gas Risk Assessment</b>                         | Vapour resistant membranes (Plots 1-10)<br>Characteristic Situation (CS2) (11-49) |
| <b>Plots:</b>                                             | 13-14                                                                             |

The gas mitigation measures validation site inspection record and associated photographs are enclosed within this letter as a Controlled Quality Assurance (CQA) site data capture record.

### FINAL QUALITY ASSURANCE

| E3P SITE VALIDATION CQA | QUALIFICATIONS                                           | POSITION   |
|-------------------------|----------------------------------------------------------|------------|
| Richard Webster         | CL:AIRE Course – Verification of Gas Protection Measures | Technician |

| PREPARED BY | QUALIFICATIONS                    | POSITION          |
|-------------|-----------------------------------|-------------------|
| Mark Wilson | BSc (Hons) Ind, FGS, MEnvSc, CSci | Senior Consultant |

| AUTHORISED BY | QUALIFICATIONS                    | POSITION          |
|---------------|-----------------------------------|-------------------|
| Mark Wilson   | BSc (Hons) Ind, FGS, MEnvSc, CSci | Senior Consultant |

**Table 1 Validation Letter References**

| PLOT NUMBER     | DATE       | REPORT REFERENCE |
|-----------------|------------|------------------|
| 1-6             | 22-11-204  | V1               |
| 7-10            | 25-11-2024 | V2               |
| 7-10 New Detail | 10-04-2025 | V3               |
| 1-6 New Detail  | 23-04-2025 | V4               |
| 17-19           | 07-05-2025 | V5               |
| 43-45           | 12-05-2025 | V6               |
| 40-42           | 14-05-2025 | V7               |





| PLOT NUMBER | DATE       | REPORT REFERENCE |
|-------------|------------|------------------|
| 20-23       | 20-05-2025 | V8               |
| 24-25       | 27-05-2025 | V9               |
| 36-39 & 49  | 03-06-2025 | V10              |
| 46-48       | 05-06-2025 | V11              |
| 11-12       | 10-06-2025 | V12              |
| 13-14       | 20-06-2025 | V13              |

## GROUND GAS MITIGATION DESIGN

The Ground Gas Risk Assessment for the site determined that the site should be classified as Characteristic Situation 2 in accordance with BS8485 2015 (+A1 2019).

In addition, vapour resistant membranes are required to be installed for plots located within the east and southeast part of the site (Plots 1-10) due to elevated concentrations of volatile contaminants.

A Gas Protection Design Report (GPDR) was prepared by E3P as detailed within their document (Ref: 16-465-R7-2) dated April 2025.

The GPDR has been prepared, reviewed, and authorised by a suitably qualified person who holds the relevant technical and professional qualifications as prescribed within the NHBC Document NF94 2023.

## OVERVIEW OF GROUND GAS MITIGATION DESIGN & CONSTRUCTION REQUIREMENTS

### Characteristic Situation 2 – Design Mitigation Requirements.

- ✳ Passive sub-floor dispersal layer of very good performance which meets all criteria in Paragraph B.6 of BS8485:2015 (minimum 150 mm clear void space and with correct frequency of side ventilation).
- ✳ Lapped and taped / sealed gas resistant membrane in the floor slab construction which meets all the criteria as set out in Table 7 of BS8485:2015 (+A1 2019) and Verification in Section 3.2.2 of CIRIA 735:2014.

For Plots 1-10, the following mitigation measures will be required:

### Volatile Organic Compounds – Design Mitigation Requirements

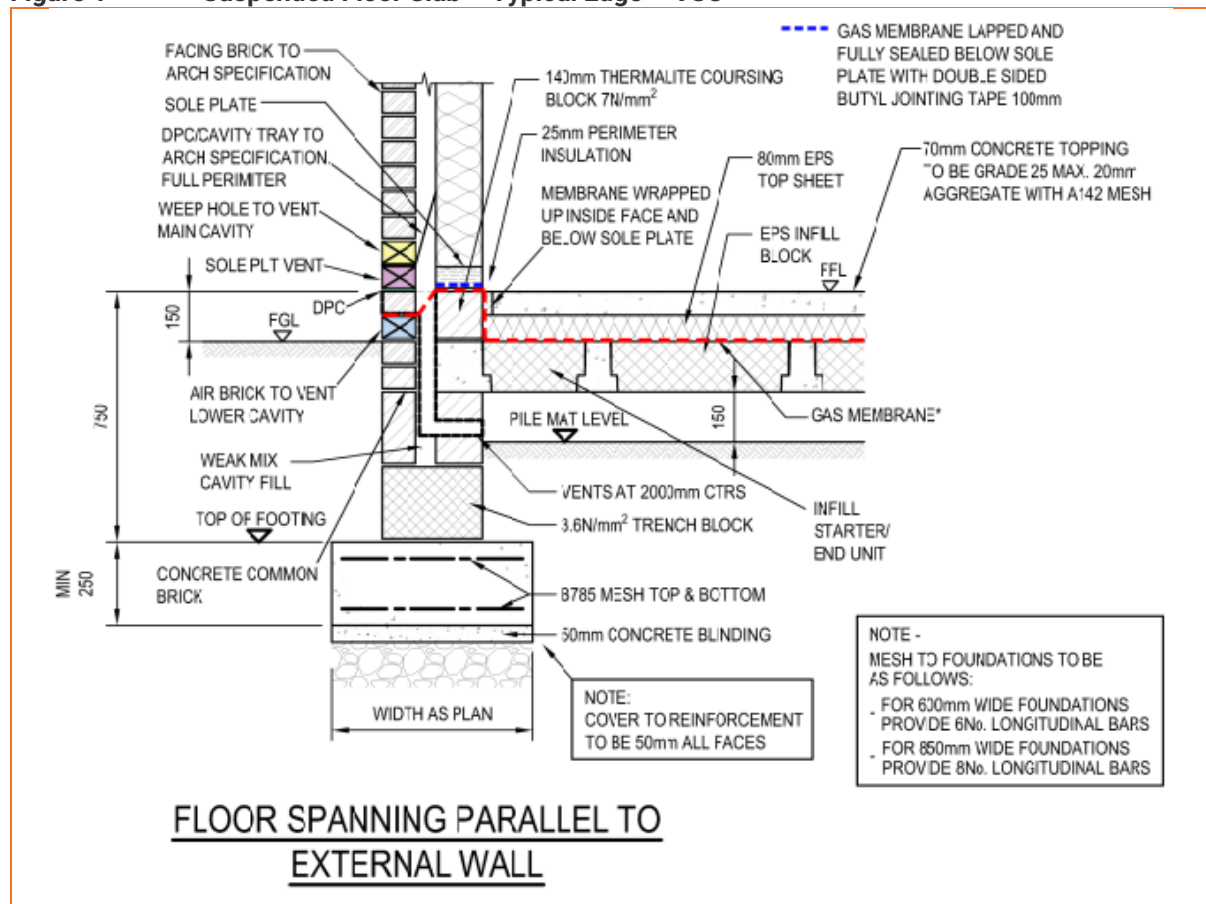
- ✳ Sealed/welded vapour resistant membrane in the floor slab construction which meets all the criteria as set out in Table 7 of BS8485:2015 (+A1 2019), Verification in Section 3.2.2 of CIRIA 735:2014, and is compliant with CIRIA 748:2014.
- ✳ Every second plot constructed will be subject to air lancing integrity testing in accordance with an internationally recognised standard – to be undertaken by specialist third party contractor and reported separately.

A detailed sub-structure design has been prepared by AJP Consulting Engineers as detailed within their Drawing EDE-AJP-XX-00-DR-S-2013, Rev P05, dated 7th April 2025.

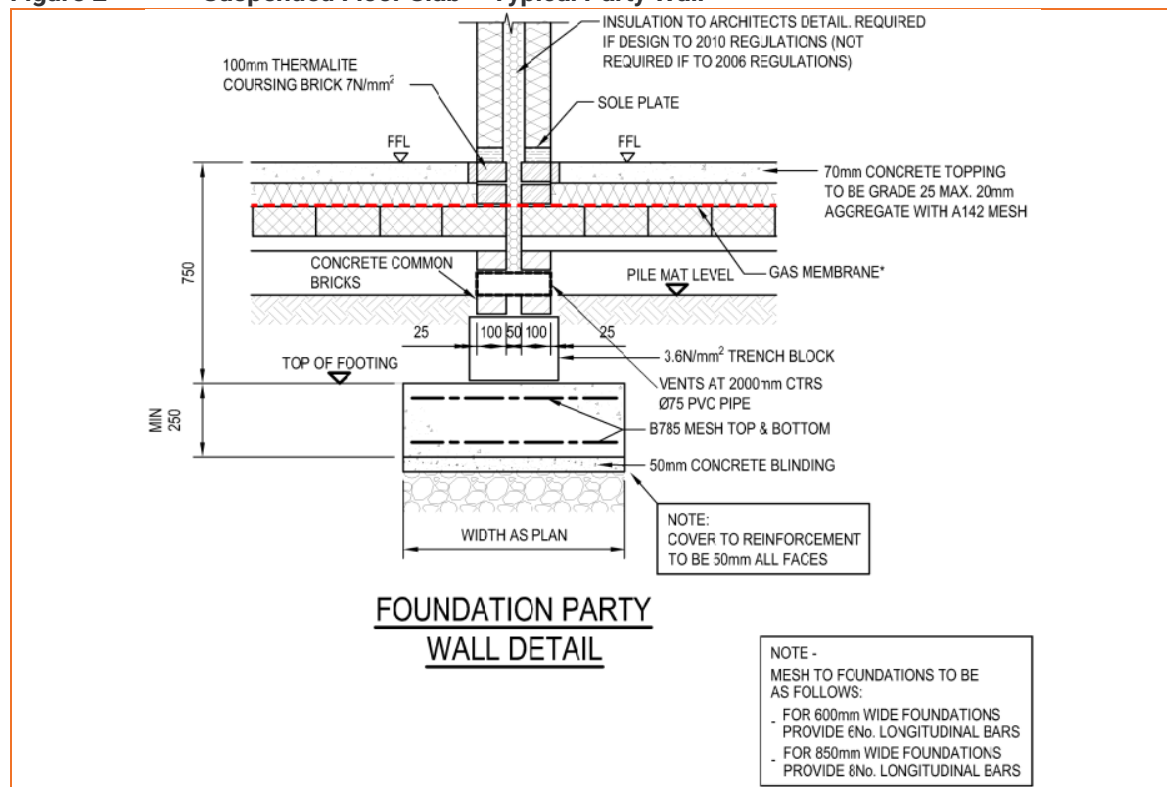
The sub-structure design forms a key component of the validation procedure to ensure the constructed mitigation requirements meet the specified design criteria.



**Figure 1**      **Suspended Floor Slab – Typical Edge – VSC**

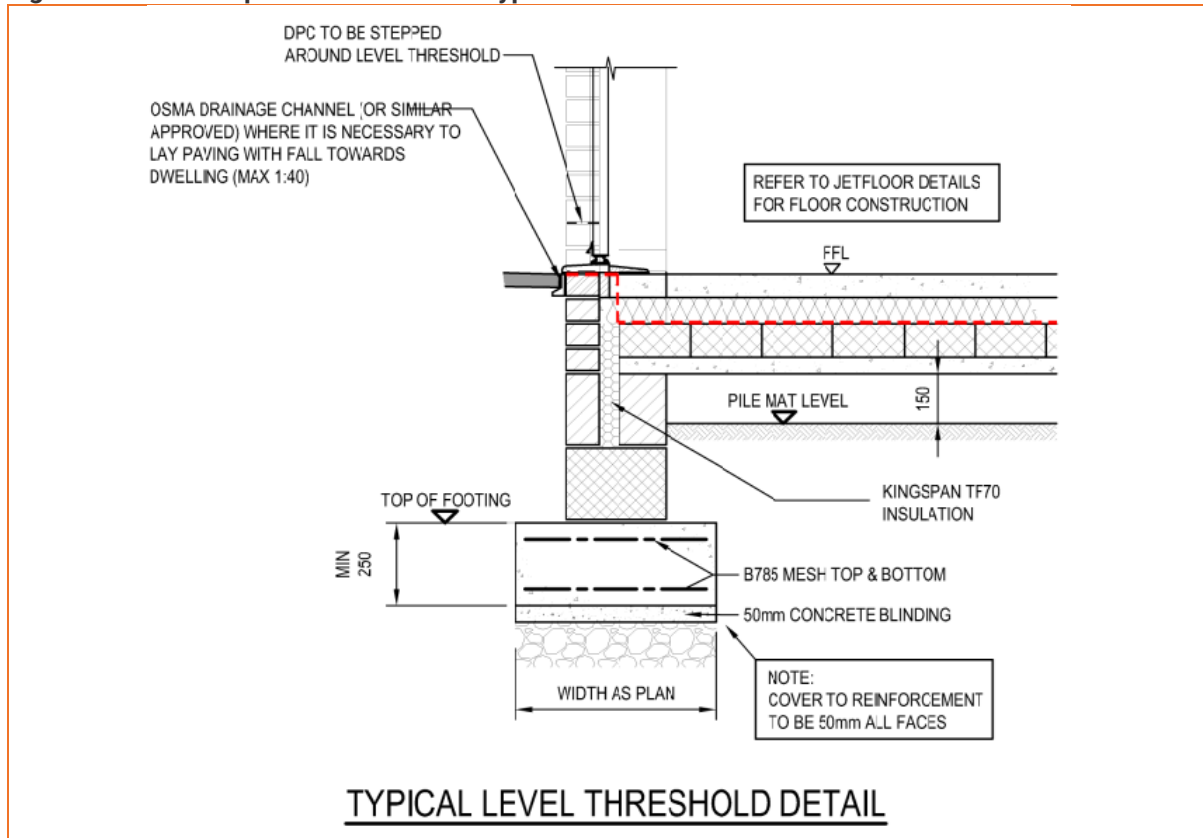


**Figure 2**      **Suspended Floor Slab – Typical Party Wall**

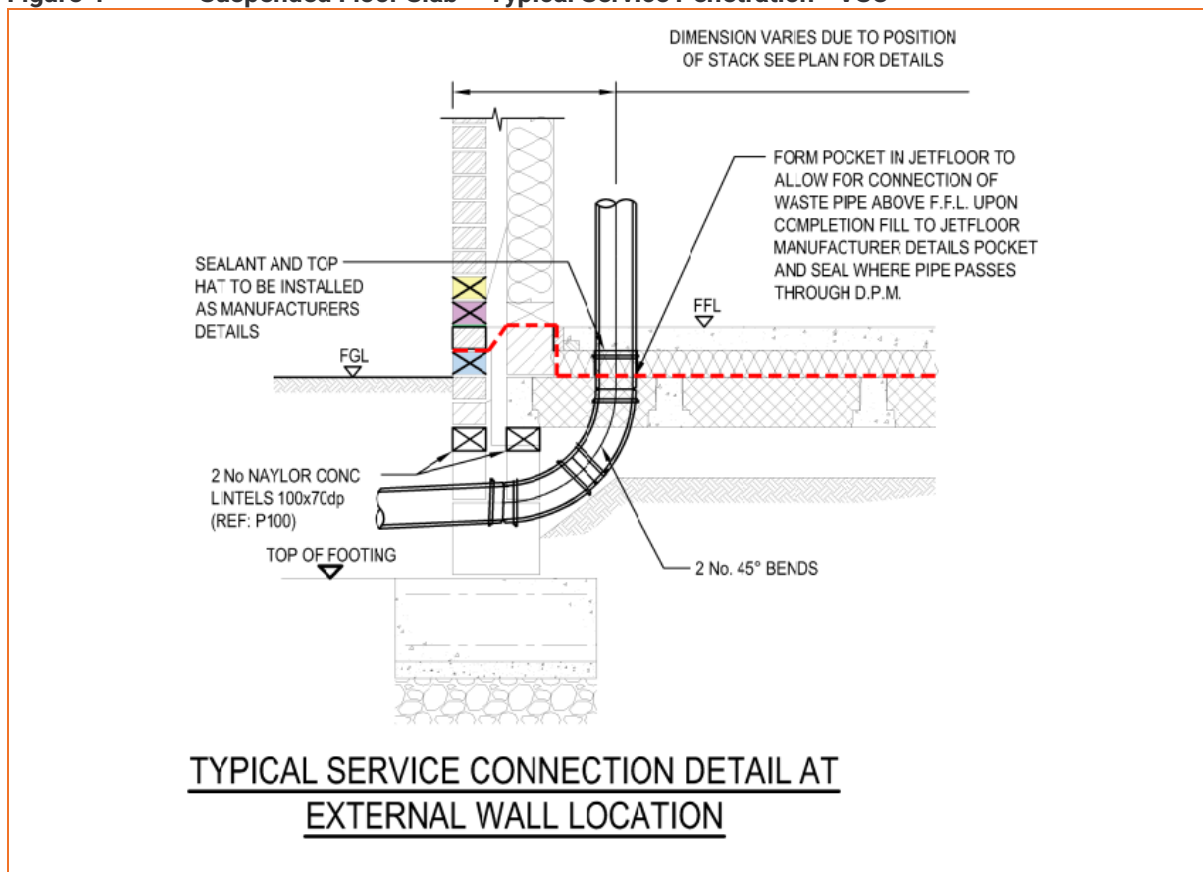




**Figure 3**      **Suspended Floor Slab - Typical Level Threshold Detail - VSC**



**Figure 4**      **Suspended Floor Slab – Typical Service Penetration - VSC**





## SUMMARY OF VALIDATION INSPECTION & APPROVAL

### SUB-FLOOR VOID

As per NHBC guidance and the structural engineers design, the sub-floor voids should be a minimum of 150 mm with no visible inclusions that would limit the performance of the ventilation mechanism.

The GPDR requires sub-floor voids to be inspected every plot for the first ten structures to establish protocols (as and where possible), and then every ten plots thereafter for sub-floor void (minimum 150 mm sub-floor void) and internal sleeper wall ventilation (to ensure uninhibited airflow). Plots requiring vapour-resistant membranes (i.e. Plots 1-10) will require 50% of sub-floor voids to be inspected.

The sub-floor voids for Plots 13-14 were previously inspected on 10th June 2025 as part of a previous visit (CQA Validation Report V12 dated 10-06-2025). The sub-floor voids were observed and inspected to be a minimum of 150 mm with no visible inclusions that would limit the performance of this ventilation mechanism.

Photographs of the sub-floor voids for Plots 13-14 are included in the final section of the previous CQA Validation Report (CQA Validation Report V12 dated 10-06-2025)

### AIR BRICKS & TELESCOPIC VENTILATION

As per NHBC guidance and the structural engineer's design as part of the mitigation a telescopic vent and vent brick is required at 2.00 m intervals in the brick course. E3P can confirm these have also been fitted accurately on all elevations of the plot (party walls exempt) to allow the sufficient function of the passive sub-floor ventilation system.

### GAS RESISTANT MEMBRANE

The membrane utilised on-site comprises: Juta - GP1 Gas Barrier resistant to Carbon Dioxide, Methane and Radon.

It has been confirmed as part of the validation that the membrane utilised in the plots discussed herein matches that of **Figures 1-4**.

The E3P Technician has inspected the installation of this membrane in line with the structural engineer's specifications in terms of placement and position (**Figures 1-4**), and the manufacturer's detail in terms of the workmanship.

E3P can confirm that sand blinding has been utilised to protect the membrane and there were no holes or rips at the inspection time.

Where any rips or tares have been noted patches have been applied in line with the manufacturer's detail with sufficient overlap to ensure long-term performance of the membrane.

E3P inspected all joints including corner details, and can confirm that the membrane was overlapped in accordance with the manufacturer's specification and heat welded

All the overlaps were then additionally taped to avoid damage/trip hazards using foil-backed girth tape.

Where any penetration or service duct is present within the floor area, E3P inspected each one in turn and can confirm that rigid black polyethylene top hat units have been adequately sealed against the membrane with double-sided jointing tape at both the base and the protruding pipe as well as being secured against the pipe with a metal jubilee clip.



Upon confirmation of suitable installation, the membrane is to be covered with a floor insulation material which is considered to provide a high degree of protection before the application of the cast in situ concrete monolithic floor slab.

Based on the information provided within this report, the site inspection and validation checklists, E3P can confirm that **Plots 13-14** have been installed with gas protection measures in accordance with the detailed structural design and the requirements of BS8485:2015 (+A1 2019) Characteristic Situation 2, to an acceptable level of workmanship.

## E3P ENGINEER'S SITE CHECK SHEET

The engineer check sheet completed whilst on-site during the validation on a plot-by-plot basis is attached, and a complete set of images is presented as evidence. Larger images are presented at the rear of this section.

All information provided within this validation letter report was accurate at the time of construction. E3P operates under the assumption that all data provided by installers is reliable.



## WELDED GAS MEMBRANE VALIDATION

Complete

|                                                                                  |                                                                                                                                         |               |   |         |   |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------|---|---------|---|
| Score                                                                            | 25 / 25 (100%)                                                                                                                          | Flagged items | 0 | Actions | 0 |
| Site Name                                                                        | Edenfield Road                                                                                                                          |               |   |         |   |
| Location                                                                         | Tenterhouse Mill, Greenbooth Road<br>Rochdale<br>England<br>OL12 7TD<br>United Kingdom<br>(53.629022178099426, -<br>2.2179773981719864) |               |   |         |   |
| Project Manager                                                                  | M. Wilson                                                                                                                               |               |   |         |   |
| Project number                                                                   | 16-465                                                                                                                                  |               |   |         |   |
| Developer                                                                        | Stonebond                                                                                                                               |               |   |         |   |
| Site representative Signature                                                    | <br>David<br>20 Jun 2025 10:02 AM BST                |               |   |         |   |
| Conducted on                                                                     | 20 Jun 2025 9:51 AM BST                                                                                                                 |               |   |         |   |
| Prepared by                                                                      | Richard Webster                                                                                                                         |               |   |         |   |
| Have you got the correct Gas Membrane detail (attached to the job in synergist)? | Yes                                                                                                                                     |               |   |         |   |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b><u>Gas Membrane Inspection</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 24 / 24 (100%)           |
| <b>Plot Inspection 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 12 / 12 (100%)           |
| <b>Plot Number</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 13                       |
| <b>Type of Development: if other add Note</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | House                    |
| <b>Floor Slab Type</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Block and beam suspended |
| <b>Are telescopic vents present?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Yes                      |
| <b>Gas Membrane Type: Manufacturer, gauge, and colour.<br/>(Take photos were possible showing Label)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Juta - GP1 Gas Barrier   |
| <b>Installer's name, company and qualification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Arch and Wood            |
| <b>Gas Membrane Condition: Open punctures, tears, rips, stretching, Presence of debris, Repairs, Signs of weakness such as raised or sunken indentations, Protection plan in place to restrict access to lain gas membrane? IF FAIL DESCRIPTION IN ACTIONS AND PHOTOS REQUIRED</b>                                                                                                                                                                                                                                                                                                             | Pass                     |
| <b>Are welds complete?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Yes                      |
| <b>Are Joints lapped and sealed in accordance with manufacturer's requirements/ specification?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Yes                      |
| <b>Service entries seals: Top hats seal arrangements fixed around service entries? Use of Jubilee clips or Bitumastic Sealant</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Pass                     |
| <br>Photo 1 <br>Photo 2 <br>Photo 3 <br>Photo 4                                                                                                                                                                                                    |                          |
| <b>Corners / Internal joints: Check all corners are correctly formed or contractor has used preformed corners.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Pass                     |
| <br>Photo 5 <br>Photo 6 <br>Photo 7 <br>Photo 8 <br>Photo 9 <br>Photo 10 |                          |
| <b>Are folds running in line with joints? (no joints cutting across folds)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Pass                     |



**Extent of Coverage: Is the membrane covering the entire plot? Does membrane span over outside walls?**

Yes



Photo 11



Photo 12

**Sealant to the underside of the membrane at the sole plate position (Check with PM if not noted on schedule)**

N/A

**Condition of sub-grade and underside of gas membrane: Check that the subgrade does not contain rough/uneven surfaces, is appropriately clean and that there are no hard/sharp objects. That protective sand blinding or geotextile (if specified) is present and meets the design criteria. ( Lift back the membrane and photo the subfloor)**

Pass

**Slab / membrane condition (is membrane clear of snow, standing water, debris or insulation): Can membrane be fully seen and photographed – ask contractor to remove any debris so membrane can be fully seen an inspected – this is a requirement of NHBC and local authorities.**

Pass

**External Wall Air bricks: Numbers, size. positions as design drawing? (Minimum of 3 walls)**

Pass



Photo 13



Photo 14



Photo 15



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------|
| <b>Plot Inspection 2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          | 12 / 12 (100%) |
| <b>Plot Number</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          | 14             |
| <b>Type of Development: if other add Note</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | House                    |                |
| <b>Floor Slab Type</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Block and beam suspended |                |
| <b>Are telescopic vents present?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Yes                      |                |
| <b>Gas Membrane Type: Manufacturer, gauge, and colour.<br/>(Take photos were possible showing Label)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Juta - GP1 Gas Barrier   |                |
| <b>Installer's name, company and qualification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Arch and Wood            |                |
| <b>Gas Membrane Condition: Open punctures, tears, rips, stretching, Presence of debris, Repairs, Signs of weakness such as raised or sunken indentations, Protection plan in place to restrict access to lain gas membrane? IF FAIL DESCRIPTION IN ACTIONS AND PHOTOS REQUIRED</b>                                                                                                                                                                                                                                                                                                                  | Pass                     |                |
| <b>Are welds complete?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Yes                      |                |
| <b>Are Joints lapped and sealed in accordance with manufacturer's requirements/ specification?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Yes                      |                |
| <b>Service entries seals: Top hats seal arrangements fixed around service entries? Use of Jubilee clips or Bitumastic Sealant</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Pass                     |                |
| <br>Photo 16 <br>Photo 17 <br>Photo 18 <br>Photo 19                                                                                                                                                                                                     |                          |                |
| <b>Corners / Internal joints: Check all corners are correctly formed or contractor has used preformed corners.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Pass                     |                |
| <br>Photo 20 <br>Photo 21 <br>Photo 22 <br>Photo 23 <br>Photo 24 <br>Photo 25 |                          |                |
| <b>Are folds running in line with joints? (no joints cutting across folds)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Pass                     |                |
| <b>Extent of Coverage: Is the membrane covering the entire plot? Does membrane span over outside walls?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                      |                |



Photo 26



Photo 27

**Sealant to the underside of the membrane at the sole plate position (Check with PM if not noted on schedule)**

N/A

**Condition of sub-grade and underside of gas membrane: Check that the subgrade does not contain rough/uneven surfaces, is appropriately clean and that there are no hard/sharp objects. That protective sand blinding or geotextile (if specified) is present and meets the design criteria. ( Lift back the membrane and photo the subfloor)**

Pass

**Slab / membrane condition (is membrane clear of snow, standing water, debris or insulation): Can membrane be fully seen and photographed – ask contractor to remove any debris so membrane can be fully seen an inspected – this is a requirement of NHBC and local authorities.**

Pass

**External Wall Air bricks: Numbers, size. positions as design drawing? (Minimum of 3 walls)**

Pass



Photo 28



Photo 29



Photo 30

### **Passive Venting**

**Sub-floor Void: Is a check possible on future plots (insert Plot number or NO in text box)**

No



## Media summary



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23



Photo 24



Photo 25



Photo 26



Photo 27



Photo 28



Photo 29



Photo 30