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Smelt Farm, Minera Road, Brymbo, Wrexham

Structural Appraisal Report

July 2025

Job No. 2025/138

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Appendix A – Architect's Drawings

1.0 Executive Summary

The outbuildings comprise two separate units arranged parallel to the highway. The outbuildings occupy a site sloping away from the highway with the rear and side elevations supported by retaining walls. The section to the right is supported off rubble masonry retaining walls and would appear to be much older than the remainder of the outbuildings which are supported off brick retaining walls. External walls comprise brickwork to full height except to the left of the smaller outbuilding where a render rubble masonry wall is apparent. External openings are filled with steel sliding doors and steel framed windows. The roof over is finished with a mixture of profiles steel cladding and asbestos cement sheets. The finishes are supported off timber purlins spanning between the elevations and load bearing walls over intermediate angle frame trusses and cranked steel frames.

Access to the lower ground at the rear is provided by a ramp supported by rubble masonry retaining walls.

Foundation type and depth were not proven. Given the age of the outbuildings and retaining walls, it is assumed that shallow brick spread foundations are present.

Elevations and rooms are referenced as if viewing from the highway.

The inspection was carried out during the afternoon of Friday 18th July 2025.

The overall condition of the property is considered to be fair.

It is apparent that the outbuilding has been modified and extended on several occasions in the past. The right hand part is constructed atop a rubble masonry retaining wall and is considered to the be the original part. The left hand part is constructed off a brick retaining wall and it is apparent that the superstructure was constructed at a later date.

The elevations to the superstructure appeared to be generally straight and plumb whilst the retaining walls at the rear show slight outwards leans which appeared historic. Evidence of settlement is apparent on the rear elevation at the junction of the original and later additions. The pattern of cracking is indicative a settlement and outwards movement in the brick retaining wall relative to the original part. The vertical and lateral movements are significant but would appear to have abated. The ramp structure extending down from the door opening on the rear elevation has suffered from significant movement and has been stabilised by the provision of brick buttresses. Cracking to the external wall and a void below the top landing would suggest that movement is progressive. The ramp structure will be removed as part of any conversion of the outbuilding. Therefore, additional buttressing will be required to restrain the retaining wall as part of any proposals.

Although the foundations were not exposed, it is apparent that they are satisfactory and would not require modification in the proposed scheme. All of the elevations will require localised repair and repointing as part of the conversion scheme. Lintels to openings comprise concrete and timber sections which have degraded over time. It would be prudent to replace all of the lintels as part of the conversion scheme to ensure long term durability.

The provision of cement ribbon pointing to the masonry retaining walls has caused erosion to the masonry and degradation of the mortar within the joints. This type of pointing was common in the past, but acts to trap moisture within the body of the wall promoting frost damage to units and lime mortar. All ribbon pointing should be removed and new lime pointing provided.

No dpc is apparent to the original part of the building and a bitumen dpc provided to the later addition. Although no evidence of rising damp was apparent, it would be prudent to include for a new dpc as part of any conversion scheme. Any new dpc should carry an insurance backed guarantee.

The ground floors to the outbuildings generally comprise brickwork and concrete laid over earth. The existing floors will not have a suitable damp proof membrane or insulation and will also need to be adjusted to suit the proposed levels. Therefore, new floors incorporating a dpm and insulation to modern standards will be required as part of the conversion scheme.

The condition of the roof over the outbuilding is good with no evidence of distortion. Historic water penetration has led to rot in several of the timber purlins. The roof finishes will need to be replaced as part of the proposed conversion which are likely to be heavier that the sheeting currently in palace. Therefore, a new roof will be required over the proposed dwelling.

Gutters are broken or dislodged on the rear elevation with downpipes discharging onto the ground close to the elevation. New roof drainage will be required as part of the conversion scheme. Any new downpipes on the rear should discharge into a new drainage system linked to a soakaway remote from the building. The guttering intact on the front elevation with the downpipes discharging into gulleys and can be retained.

The Client, David Roberts, is seeking planning permission to convert the outbuilding into a self-contained dwelling. The proposed works will include an extension to the rear, new openings in external and internal walls, new ground floors and a new roof.

The outbuilding is robustly constructed and is considered to be suitable for conversion into self-contained dwelling following repairs and alterations as necessary.



2.0 Client's Brief

This report was commissioned by David Roberts in support of the proposed planning application to convert the outbuilding into a self-contained dwelling. The purpose of this report is to identify whether the outbuilding is suitable for conversion and to confirm the extent of repairs required to ensure viability in the long term.

3.0 Inspection

3.1 General

The outbuildings comprise two separate units arranged parallel to the highway. The outbuildings occupy a site sloping away from the highway with the rear and side elevations supported by retaining walls. The section to the right is supported off rubble masonry retaining walls and would appear to be much older than the remainder of the outbuildings which are supported off brick retaining walls. External walls comprise brickwork to full height except to the left of the smaller outbuilding where a render rubble masonry wall is apparent. External openings are filled with steel sliding doors and steel framed windows. The roof over is finished with a mixture of profiles steel cladding and asbestos cement sheets. The finishes are supported off timber purlins spanning between the elevations and load bearing walls over intermediate angle frame trusses and cranked steel frames.

Access to the lower ground at the rear is provided by a ramp supported by rubble masonry retaining walls.

Foundation type and depth were not proven. Given the age of the outbuildings and retaining walls, it is assumed that shallow brick spread foundations are present.

Elevations and rooms are referenced as if viewing from the highway.

The inspection was carried out during the afternoon of Friday 18th July 2025. The weather during the inspection was warm with occasional showers.

The inspection comprised a visual inspection of those elements readily visible from ground level and from within the outbuilding. No excavations were undertaken to uncover buried elements and any notes on the condition of these elements are made based on the visible condition of the property. Testing requiring the use of specialist equipment or training, e.g. electrical systems, gas appliances, water systems, etc., has not been undertaken. Manhole covers were not lifted and drains were not tested. No internal nor external finishes were removed and therefore it is not possible to confirm whether hidden elements are free from defect.

3.2 EXTERNAL INSPECTION

3.2.1 Front Elevation

The elevation comprises brickwork to full height with concrete lintel and cill units. Windows comprise single glazed units in steel frames with stell sliding doors. The roof over is finished with profiled steel cladding and asbestos cement sheeting.

The overall condition of the elevation is considered to be good/fair.



Front Elevation of larger unit.

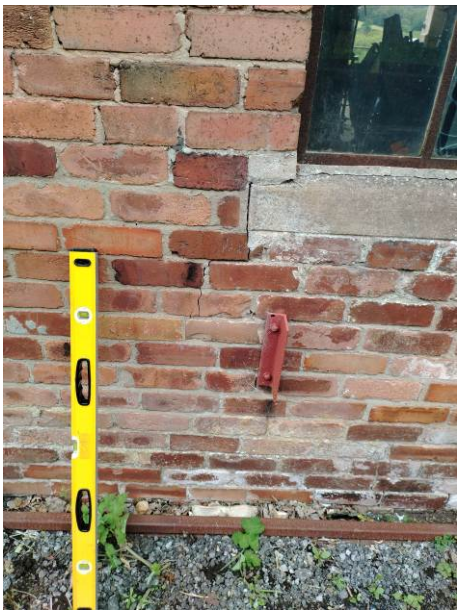


Front Elevation to smaller unit.

Cracking up to 4mm wide was noted across the top of a concrete lintel over a large door opening. The presence of fixings in the bed joint would suggest that corroded fixings are present. Vertical cracking was noted extending down from a window cill. The cracking was noted as up to 4mm wide and extends down for a short distance. The reason for the defect is not readily apparent.



Cracking along top of concrete lintel.



Cracking extending down from cill unit.

The pointing is cement based and was noted as hard when probed.

The elevation was noted as reasonably plumb and straight.

The roof over appears to be reasonably straight and level. The guttering and downpipes were intact. The downpipes discharge into gulleys which would appear to extend into the drainage system.

3.2.2 Left Hand Side Elevation

The elevation to the large unit comprises brickwork to full height with concrete lintel and cill units to the window openings. Windows comprise single glazed units in steel frames. The elevation to the smaller unit comprises render finishes over rubble masonry.

The overall condition of the elevation is considered to be good/fair.



Left Hand Side Elevation to small unit.



Left hand side elevation to larger unit.

The render finishes to the smaller unit have degraded with a significant cracking throughout and a section in the centre delaminated and fallen away. The exposed masonry shows evidence of significant pointing losses and minor vegetation growth.

No significant defects were noted to the elevation on the larger unit. The pointing is cement based and was noted as hard when probed.

The elevation was noted as reasonably plumb and straight.

The roofs over appear to be reasonably straight and level. The guttering and downpipes were intact. The downpipes discharge into gulleys which would appear to extend into the drainage system.

3.2.3 Rear Elevation

The elevation comprises brickwork to full height over a retaining wall. The left hand section of the retaining wall and the ramp comprise rubble masonry with a brick retaining wall provided to the right hand half. Brick buttresses are provided to the ramp and the right hand end of the elevation.

Lintel and cill units comprise concrete. Windows comprise single glazed units in steel frames with steel sliding doors. The roof over is finished with profiled steel cladding and asbestos cement sheeting.

The overall condition of the elevation is considered to be fair.



Rear Elevation.

Diagonal bed joint cracking is apparent extending upwards from the junction of the masonry and brick retaining walls. The cracking was noted as 15mm wide in the retaining wall. The cracking to the brickwork shows a 10mm vertical displacement and a 4mm lateral displacement. There is also a 20mm step in the elevation locally. A 30mm step was also apparent between the brick face and the retaining wall below. The pattern of cracking is indicative of a vertical and lateral movement in the brick retaining wall.



Cracking to centre of elevation.



Step in elevation at cracking.

Diagonal cracking up to 4mm wide was apparent extending upwards from the buttress on the right of the elevation. The edges of the cracking were noted as weathered indicative of a longstanding defect.



Cracking extending up from buttress.

The masonry to the retaining wall shows evidence of erosion at low level and at the intersection with the ramp. The erosion has been caused by water cascading down the elevation from the broken guttering above. Close to the corner, eroded pointing up to 70mm depth is apparent.



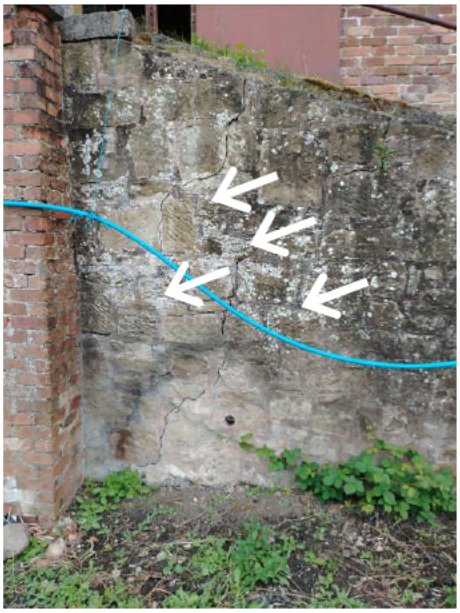
General view of masonry retaining wall.

Severe distortion is apparent to the wall supporting the ramp. The elevation shows an outwards lean of up to 11.2% which is significant. Two brick buttresses are provided to the face which appear to have abated the movement. Although a gap between the right hand buttress and the elevation was apparent. A series of cracks up to 8mm wide are apparent to the face between the buttresses. The edges of the cracks are only slightly weathered which is indicative of a progressive issue.

A gap up to 120mm high was apparent between the landing slab and the ground below at the top of the ramp. The slab was firm and would appear to be adequately supported off the ramp walls. Loose slabs were also apparent at the threshold. Theses defects are indicative of significant settlement of fill materials behind the ramp walls.



Severe distortion to ramp wall.



Cracking to face of ramp wall.

Isolated erosion was apparent to the pointing on the elevation. The remaining mortar to brick bed joints was noted as hard when probed. The masonry retaining wall has been repointed using ribbon cement in the past over the original lime mortar. This type of pointing tends to hold moisture in the body of the wall causing damage to the lime mortar which was noted as soft and friable when probed.

The elevation to the outbuilding was noted as generally plumb with the bed joints noted as generally level. The elevation has a distinct kink at the junction of the older and newer brickwork. The masonry retaining wall shows an outwards lean of up to 4.7% with the brick retaining wall showing an outwards lean of up to 3.5%.

The roof over appears to be reasonably straight and level. The guttering and downpipes were present. However, the guttering is dislodged over a significant length and is ineffective. The downpipes discharge onto the ground adjacent to the elevation.

3.2.4 Right Hand Side Elevation

The elevation comprises brickwork to full height with concrete lintel and cill units to the window openings. Windows comprise single glazed units in steel frames. The elevation is supported off a rubble masonry retaining wall.

The overall condition of the elevation is considered to be fair.



Right Hand Side Elevation.

Isolated spalled brick units were apparent with eroded pointing noted locally. Staining locally would indicate that water is cascading down the elevation. The remaining mortar to brick bed joints was noted as hard when probed. The retaining wall has been repointed using cement in the past over the original lime mortar. The lime mortar was noted as soft and friable when probed.

The elevation was noted as generally straight and plumb.

3.3 INTERNAL INSPECTION

3.3.1 Detached Store Room

The room comprises washed and rendered walls and a concrete floor. The roof over comprises a single purlin supporting finishes. A ceiling is provided within the rear part of the store. Stored materials prevented full access to all areas.

Peeling paint finishes were apparent to the walls throughout indicative of a damp atmosphere within.



Peeling paint finishes to elevations.

Cracking up to 4mm wide was noted to the end of the concrete lintel over the internal door. Cracking up to 3mm wide was noted in the brickwork above.

The pattern of cracking is indicative of minor settlement at the rear elevation.



Cracking above internal door.

The roof finishes and purlins appear to be in reasonably good condition apart from at the front elevation where rot is apparent o both purlins. The low level purlin shows very severe rot. The location matches the rot noted within the adjacent room and is indicative of weather penetration through abutment flashings.



Rot to end of low level purlin adjacent to front elevation.

The walls to the room were noted as generally plumb and the floor generally level where accessible.

3.3.2 Small Store Room

The room comprises bare stone and brick walls a concrete floor. The roof over comprises two timber purlins supporting finishes. Stored materials prevented full access to all areas.

Staining is apparent to the stone wall extending down from roof level. The stone is discoloured and eroded pointing is apparent locally. Vegetation is noted growing from the face of the wall. The location would appear to coincide with the missing render externally.

The timber purlin adjacent to the wall has severe rot at the front elevation bearing.



Vegetation and staining to external wall.



Rot to end of purlin at front elevation.

The walls to the room were noted as generally plumb and the floor generally level where accessible.

3.3.3 Central Store Room

The room comprises washed and partially rendered walls, a concrete floor incorporating steps and a timber purlin roof supported off a single cranked steel frame and the elevations and internal wall. Stored materials prevented full access to all areas.



General view of store room.

Cracking is apparent to the rear elevation. Diagonal bed joint cracking is apparent behind stored materials extending upwards from floor level near to the internal wall. Diagonal bed joint cracking was noted to the gable elevation extending down from the rear purlin and then along the rear elevation. The cracking was noted as up to 2mm wide.



Cracking to rear elevation behind materials.



Cracking at rear corner of room.

The roof finishes and purlins appear to be in reasonably good condition apart from the front purlin above the door to the left hand store which shows evidence of severe rot. Peeling paint finishes are apparent locally which would indicate weather penetration through abutment flashings.

Surface corrosion is apparent to the cranked frame. No section losses or distortions were noted.



Rot to end of low level purlin adjacent to front elevation.

The walls to the room were noted as generally plumb where accessible. The floor was noted as generally level except where it is laid to falls to aid drainage.

3.3.4 Right Hand Store Room

The room comprises washed and partially rendered walls, a brick and concrete floor incorporating steps and a timber purlin roof supported off two angle frame trusses and the elevations and internal wall. Stored materials prevented full access to all areas.

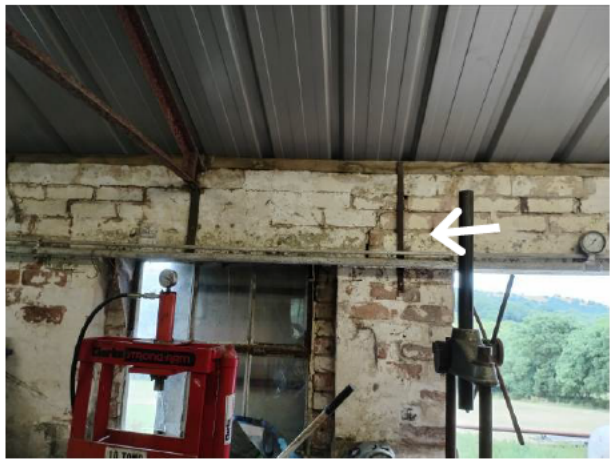


General view of store room.

Peeling paint finishes were apparent to the elevations extending down to lintel level from the wall plate. As no weather penetration was apparent at the time of inspection, it is assumed that this defect is historic.



Peeling paint finishes to brickwork.



Cracking to brickwork above pier.

The roof finishes and purlins are in good condition and would appear to have been partially renewed in the recent past. The steel cladding and timber purlins are in very good condition with no evidence of weather penetration apparent. The timber purlins are secured at the walls using galvanised straps.

Surface corrosion is apparent to the intermediate trusses. No section losses or distortions were noted.

The walls to the room were noted as generally plumb where accessible. The brick floor was noted as uneven but generally level with the concrete floor sections laid to falls to aid drainage.

4.0 Discussion and Conclusions

The overall condition of the property is considered to be fair.

It is apparent that the outbuilding has been modified and extended on several occasions in the past. The right hand part is constructed atop a rubble masonry retaining wall and is considered to the be the original part. The left hand part is constructed off a brick retaining wall and it is apparent that the superstructure was constructed at a later date.

The elevations to the superstructure appeared to be generally straight and plumb whilst the retaining walls at the rear show slight outwards leans which appeared historic. Evidence of settlement is apparent on the rear elevation at the junction of the original and later additions. The pattern of cracking is indicative a settlement and outwards movement in the brick retaining wall relative to the original part. The vertical and lateral movements are significant but would appear to have abated. The ramp structure extending down from the door opening on the rear elevation has suffered from significant movement and has been stabilised by the provision of brick buttresses. Cracking to the external wall and a void below the top landing would suggest that movement is progressive. The ramp structure will be removed as part of any conversion of the outbuilding. Therefore, additional buttressing will be required to restrain the retaining wall as part of any proposals.

Although the foundations were not exposed, it is apparent that they are satisfactory and would not require modification in the proposed scheme. All of the elevations will require localised repair and repointing as part of the conversion scheme. Lintels to openings comprise concrete and timber sections which have degraded over time. It would be prudent to replace all of the lintels as part of the conversion scheme to ensure long term durability.

The provision of cement ribbon pointing to the masonry retaining walls has caused erosion to the masonry and degradation of the mortar within the joints. This type of pointing was common in the past, but acts to trap moisture within the body of the wall promoting frost damage to units and lime mortar. All ribbon pointing should be removed and new lime pointing provided.

No dpc is apparent to the original part of the building and a bitumen dpc provided to the later addition. Although no evidence of rising damp was apparent, it would be prudent to include for a new dpc as part of any conversion scheme. Any new dpc should carry an insurance backed guarantee.

The ground floors to the outbuildings generally comprise brickwork and concrete laid over earth. The existing floors will not have a suitable damp proof membrane or insulation and will also need to be adjusted to suit the proposed levels. Therefore, new floors incorporating a dpm and insulation to modern standards will be required as part of the conversion scheme.

The condition of the roof over the outbuilding is good with no evidence of distortion. Historic water penetration has led to rot in several of the timber purlins. The roof finishes will need to be replaced as part of the proposed conversion which are likely to be heavier that the sheeting currently in palace. Therefore, a new roof will be required over the proposed dwelling.

Gutters are broken or dislodged on the rear elevation with downpipes discharging onto the ground close to the elevation. New roof drainage will be required as part of the conversion scheme. Any new downpipes on the rear should discharge into a new drainage system linked to a soakaway remote from the building. The guttering intact on the front elevation with the downpipes discharging into gulleys and can be retained.

The Client, David Roberts, is seeking planning permission to convert the outbuilding into a self-contained dwelling. The proposed works will include an extension to the rear, new openings in external and internal walls, new ground floors and a new roof.

The outbuilding is robustly constructed and is considered to be suitable for conversion into self-contained dwelling following repairs and alterations as necessary.

5.0 Recommendations

The following items should be addressed as part of any works to the barn to ensure structural viability in the long term:

- Replace roof over the outbuilding to suit proposals.
- Install new guttering and downpipes. Roof drainage shall discharge into the existing drainage system or a new drainage system routed to a soakaway at least 5m from the outbuildings.
- Replace existing lintels with new precast concrete units as required.
- Repoint masonry retaining walls by raking out existing pointing to a minimum depth of 30mm. New pointing shall comprise a traditional lime mortar packed tight into the joint and finished flush with the elevation.
- Repoint brick retaining walls and elevations by raking out pointing to a minimum depth of 30mm. New pointing shall comprise a 1:1:6 lime:cement:sand mortar packed tight into joints and finished flush with the face of the wall.
- Install injected chemical or sheet dpc at least 150mm above ground level to external and internal walls. A ten-year insurance backed guarantee should be provided for all materials and installation. As an alternative, provide vertical damp proofing to internal walls lapped and sealed with floor dpm.
- Provide new concrete ground floors throughout incorporating insulation to modern standards. A dpm should also be provided which shall be lapped or tucked into the new dpc or damp proofing.

6.0 Limitations and Liability

This report has been prepared for the exclusive use of the commissioning party and unless otherwise agreed in writing by Andrew Hannett Limited, no other party may use, make use of or rely on the contents of the report. No liability is accepted by Andrew Hannett Limited for any use of this report, other than for the purposes for which it was originally prepared and provided.

Opinions and information provided in the report are on the basis of Andrew Hannett Limited using due skill, care and diligence in the preparation of the same and no explicit warranty is provided as their accuracy. It should be noted and it is expressly stated that no independent verification of any of the documents or information supplied to Andrew Hannett Limited has been made.

The timber or other parts of the building which are covered, unexposed or inaccessible to the Structural Engineer without the assistance of a ladder in excess of 3m have not been inspected. The report does not cover the condition of the dpc, possible damp penetration or condensation unless specifically highlighted as part of the inspection. Where the property was furnished at the time of inspection those elements of the structure covered over have not been fully inspected. Therefore, it is not possible to confirm that those elements are free from defect.

No excavations were undertaken to uncover buried elements or foundations and any notes on the condition of such elements are made based on the visible condition of the property. No intrusive testing was carried out. Manhole covers were not lifted and drains were not tested. Testing requiring the use of specialist equipment or training, e.g., electrical systems, gas appliances, water systems, etc., has not been undertaken.

This report is not intended to be an exhaustive list of all defects and only significant structural faults which could lead to instability of the structure in the present or future have been reported. Further defects may become apparent during more extensive investigation or during future refurbishment works.

Detailed calculations to determine the adequacy of structural members are outside the scope of this report and have not been undertaken. However, evidence of distress as a result of overloading or deterioration will be identified so that provision for additional works can be made during any future refurbishment scheme.

The report shall be solely used by the Client to determine the extent of works to the property and liability in this respect will be limited to the instructing Client.

Nothing in the Contract confers nor purports to confer on any third party any benefit nor any right to enforce any terms of this Contract pursuant to the Contracts (Rights of Third Parties) Act 1999.

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Appendix A – Architect's Drawings