

**STRUCTURAL REPORT, BUILDING SURVEY &
COST ASSESSMENT**

FOR PROPERTY KNOWN AS:-

**LOWER HONKLEY FARM,
BURTON,
ROSSETT,
CHESTER.**

Ref. Z.2/01

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1.0 Location and Property Details

1.1 Property Type and Locale

The property is the former Farmhouse for Lower Honkley Farm whose land has previously been amalgamated into a larger farm holding. The dwelling which dates back to the 1600s is located on an individual plot that fronts the Public Highway and was last occupied some five years ago.

1.2 Construction.

The Roof is constructed of Welsh Blue Grey and Purple slates laid in coursed fashion with clay ridge tiles .

The Main Walls are solid clay brickwork with internal partitioning of timber with wattle and daub finishes.

1.3 Accommodation.

The Accommodation afforded extends over two floors and comprises of Porch, Hallway, Store, Lounge, Living, Kitchen and Dining room on the Ground Floor with three Bedrooms, Bathroom, Store and Landing to the First Floor.

1.4 External Grounds and Yards.

The dwelling stands in a garden plot but is abutted by what were the buildings and yard to an Engineering Workshop. To the rear of the property, the steel and profiled steel sheeted structure is attached to the dwelling at wall and roof positions.

1.5 Access.

The property and adjacent yard are accessed directly from the Public Highway that abuts the front boundary.

1.6 Inspection Brief.

The property is being Surveyed and Inspected for the purposes of carrying out a Structural Appraisal, Condition Report and Cost Evaluation to enable a Schedule of Works for the Repair and Refurbishment Scheme to be prepared for Tendering purposes.

2.0 Inspection and Construction.

2.1 Structural Movement

Considerable settlement and subsidence to the external and internal walling has occurred. This is predominantly due to the foundations to the property being founded at a relatively shallow level onto a sub strata of clay.

As a result of seasonal effects upon the clay sub soil due to drying shrinkage in Summer months and expansion due to water absorption in the wetter Winter months, the building has suffered due to movement attributed to the shrinkage causing subsidence and settlement with the expansion of the sub strate causing ground heave resulting in displacement and cracking of the walls along with dislodging of roofing timbers from their seatings and housings. The ridge line of the roof appears bowed in places which indicates considerable movement having occurred, however this bowing may also be further attributed to other factors as detailed later in the Report. Movement in previous years has caused doors to become wedged tight in their openings. Windows also appear to have suffered displacement with opening lights appearing difficult to open due to loading being applied to the frames as a result of movement.

Decorated finishes internally have been considerably affected by crazing and cracking of the plastered areas with the cracking revealing clean and sharp edges which indicates that the movement has been recent and that it is still considered to be progressive.

Excessive deflection of roof timbers and bowing of ceilings resulting in cracking of the ceiling finishes are further evidence of structural movement. To address the damage caused by drying shrinkage and ground heave, the foundations to the property require to be taken down to a depth where the clay can be considered stable and unaffected by changes in moisture content of the sub strata. Normally this depth would be in the order of 1.2 - 1.5 metres, however this will be subject to further exploratory investigation. The most economical method of providing new foundations to the dwelling will be by a system of Mini Piles formed in concrete and located and centered following a further structural loading assessment by Specialist Piling Contractors.

2.2 Timber Defects.

Most of the windows and doors have been renewed in recent years with cottage style casement style with side openers in Meranti or other similar low grade hardwood. Whilst the fenestration pattern reflects the cottage status of the dwelling, the sections along with the arrangement of the single sash as opposed to double casements that would have been in situ originally detract from the aesthetic appearance of the cottage. The joinery to the windows has been poorly maintained with the most suitable option being to replace them throughout in a style more sympathetic to the original. The stain finish to the windows is also considered inappropriate when the original would have been a white painted finish.

Inspection of the Roofing timbers have revealed damage by rot due to water ingress along with infestation by insects. In a number of locations, rafter ends have been damaged due to water ingress. Similarly, principal timber members such as purlins where they enter the brickwork of the external walling for seating have been subject to mechanical breakdown due to penetrating dampness. It is recommended that the worst of the defective timber members are cut out and replaced with new members of similar grade and section spliced to the existing in approved fashion. The whole of the timbers to the roof structure should be irrigated with a proprietary Insecticidal / Fungicidal Solution such as Cuprinol 5 Star. Timber members affected by rot which must remain in location without splicing repairs should be treated with Deep Kill paste which will penetrate the affected section and harden to stabilise the timbers.

Moisture meter readings indicate damp ingress which has caused rotting of the timber grounds supporting the internal partitioning. The affected timbers should be replaced as before described with all of the structural members being given a spray treatment.

2.3 Rising and Penetrating Dampness.

Tests with a moisture meter revealed very high levels of damp ingress from both rising and penetrating dampness. Due to the absence of a damp proof course in the brickwork walls or damp proof membrane to the solid ground floor, rising damp will inevitably be present. Similarly, penetrating damp is occurring due to the defective quality of the original pointing to the brickwork. The solid wall construction along with a lime based pointing mix allows the passage of moisture to the inside surfaces and finishes.

The particular effect of the damp ingress manifests itself in a number of locations with the plaster finishes blowing from their backing coats and efflorescence to the face of the plaster as a result of salt deposits following evaporation of the ingressing moisture. Painted and decorated finishes are particularly badly affected as a result of the damp.

Wall reveals to door and window openings area also affected as a result of the ineffective seals at the abutment of the joinery item with the brickwork walling.

a. Insulation.

The walls are of solid construction and are not insulated. Whilst the original floor has been replaced some years previously, it does not incorporate any insulation. No insulation of the roof void has been carried out.

b. Exterior of Structure.

(i) Roof Structure and Covering.

The roof covering has been replaced some years previously and has been re covered with Natural

Blue Grey and Heather Purple slates from quarries local to the area. The slates have been laid in gauged manner and would have been considered to be Medium Strong quality when supplied. The verges are finished with half slates when good practice dictates that slate and a half pieces should have been used.

From the differing sizes and colours of slates utilised, it would appear that the re roofing works have been carried out at differing times in the life of the building. In a number of locations, slates are either missing or have worked loose from their fixings. The slippage of the slates is evidence of nail fatigue where the fixings have corroded due to chemical attack or mechanical breakdown resulting in the loss of integrity of the fixings and causes displacement of the affected slates.

The roof slopes are at differing pitches which indicates that parts of the house are latter additions. The shallow pitched slopes over the Living Room and Bedroom above are considered to be on the limit of acceptable pitches for slated construction and that they should be raised to provide a more acceptable pitch to marry in with the other slopes and to provide a more aesthetically pleasing aspect. It is considered that re slating of all of the roof slopes will be required with a breathable membrane and proprietary insulation incorporated into the construction. The uncapped clay ridge tiles along with the Blue Grey coloured slates should be salvaged for possible re use.

The roof timbers are of traditional form for a dwelling of this age with predominantly exposed rafters laid on square section purlins onto king post trusses. In locations of ceilings being opened up to the apex, ridge purlins have been positioned to counter the effect of roof spread of the respective rafters to the adjacent slopes.

The timber sections appear to have been adversely affected by structural movement and due to loading conditions imposed upon them. This has been further exacerbated by the

ingress of water through slate slippage causing rotting of the sections and in particular the bearing ends resulting in further loss of effective section and load bearing capability. Inspection has also revealed that the structural timbers have been affected by wood boring insects with the powdery frass around the exit holes indicating that the damage is progressive.

It is recommended at the time of re slating that the principal roof timber members are inspected for the effect of damage by insects and in particular rot with new timbers introduced as replacement or repairs and utilising timbers of suitable section which can offer suitable resistance to the loading imposed upon them. Prior to re covering with a breathable membrane, the roof timbers require to be irrigated by spray treatment using Cuprinol 5 Star Insecticidal / Fungicidal solution or similar approved treatment.

(ii) Chimney Stacks and Flues.

The brickwork chimneys have been reduced in height and are now considered to be below the necessary height to be effective in dissipating the products of combustion. The chimneys require to be re built in matching brickwork to a minimum height of 600mm above the ridge line. At the junction of the slating and base of the brickwork to the stack, a lead tray should be introduced to resist moisture ingress to within the roof void. The flues are obstructed by fallen masonry along with other debris and it is recommended that following clearing of the flue that the opening is lined to form an effective route for combustion gases utilising a Vermiculite and cement mix coating.

(iii) Rainwater Fittings.

The Rainwater Gutters and Down pipes are mostly missing and what remains are poorly maintained modern plastic sections. It is recommended that all of the plastic sections are removed and are replaced with traditional Cast Iron beaded half round sections. Gutters due to the absence of fascias should be fixed using proprietary rise and fall brackets. To avoid further ponding of rainwater at the base of the rainwater pipe which will affect the clay sub strata, suitable gulleys and drainage to soakaways a minimum of five metres from the building should be employed to facilitate adequate drainage.

(iv) Main Walls.

The main walls to the property are solid brickwork and ranging in thickness from 250mm to 390mm. The bricks themselves are of clay quarried from a pit on the nearby farmland. Inspection reveals that the outer surface of the bricks have spalled badly as a result of

frost action which is primarily caused by moisture ingress and poor firing of the brick during formation.

The bricks have also been covered to all elevations with a white limewash and although there may have been aesthetic reasons for this, it is felt that the primary reason was to cover the damaged brickwork and also to form a coating to resist moisture penetration. To remedy the poor condition of the brickwork, it is recommended that the limewash coat is taken off and the pointing to the bricks hacked out to approximately 38mm. The walls should be re pointed in a 1:1:5 Cement:Lime:Sand mix and the joints finished with a neat weatherstruck pointing. Damaged or missing bricks should be replaced with Imperial sized bricks to match the existing.

Due to the action of ground heave and shrinkage upon the clay sub strata, the walls have been affected by movement resulting in cracking and displacement. The subsidence that has occurred in the external and internal walls requires to be addressed by a scheme of underpinning using an approved concrete piled system. It is envisaged that some repairs and re building works will be required to the walling once the underpinning works have been carried out to correct areas of brick walling and panels that have been displaced as a result of the movement.

The walls have not been constructed with a damp proof course installed them therefore rising dampness will always be present. The external and internal walls should be injected at a height of 150mm above the external ground level with a silicon solution to form a continuous barrier against damp ingress. The external ground level which in places is level with the internal floor level should be reduced to 150mm below the floor level to resist the likelihood of dampness tracking across the walling.

(v) External Joinery.

The Front Door is a relatively modern replacement to that which previously existed. The French doors have been set in an enlarged opening which was probably a window originally.

As has been described earlier in the report, the windows and doors are replacement sections which are not considered to be in accord with the original fenestration pattern. The joinery has been poorly maintained and at a number of locations, has suffered through rot damage. It is envisaged on both aesthetic and functional purposes that the doors and windows will be replaced throughout in a suitable casement style in treated softwood sections.

Due to the roof having no overhang at it,s verges, there are no barge boards and similarly, the slated roof at eaves level oversails a corbelled course of brickwork with no timber fascias or soffites being present.

(vi) External Decorations.

The Timber Doors and Windows have been finished with a Stain coat however no maintenance or upkeep of the protective coating to the timber appears to have been carried out and this is in poor order throughout.

The Limewash finish to the walls has peeled and flaked in many places due to poor maintenance and damp ingress. The decorative coating now appears unsightly and has become discoloured with staining from damp and moss growth.

The existing brickwork to all elevations requires to be powerwashed with water and in certain locations sand blasted using carborundum grit to remove the whole of the limewash coat and clean the brick back to its original face with care being taken not to cause further spalling of the brick. Once a true assessment of the condition of the brickwork to the external facing can be made, it can be determined whether the brickwork can remain fair faced or alternatively, protected by a masonry paint or wash that will resist any further deterioration of the bricks.

c. Interior of Structure.

(i) Roof Space

As has been previously reported, the Roof timbers require to be treated with an approved insecticide fungicidal solution. Repairs to timber elements affected by moisture ingress need to be undertaken and the void should be insulated with fibreglass insulation where a void exists or with a dense insulating foil backed board such as Kingspan where the line of the ceiling follows the roof pitch. Care should be taken to ensure that the roof voids are suitably ventilated to avoid the risk of condensation occurring. The roof space is not adequate to accommodate any storage or other purpose due to its lack of available headroom and due to the loading limitations of the present timber members which are considered able to support ceiling loading only.

(ii) Ceilings.

The ceilings predominantly follow the line of the roof timbers and are sloping at the eaves with the central part under the high collar ceiling joists laid flat. Ceilings throughout are the original lath and plaster which are in poor order with much evidence of cracking and displacement due to the affects of age and considerable moisture ingress. The moisture ingress has caused mechanical breakdown of the plaster finish. The ceilings will require removal and replacement with new laths and a traditional lime based plaster finish. Whilst the ceilings as replaced will not afford the necessary required period of fire resistance, a

dispensation of the Building Regulations may be sought from the Building Control Officer due to the importance of the conservation refurbishment.

(iii) Floors.

The original earth / tile floors to the ground floor have been renewed some time ago with concrete flooring. Moisture meter readings reveal a very high level of damp ingress due to the absence of an effective damp proof course. The affected flooring throughout requires to be removed and replaced with solid construction that incorporates a suitable membrane of a minimum of 1200 gauge. If allowable by CADW, the floors should be insulated with the introduction of dense board insulation under the membrane.

The upper floors are constructed of close edged boarding onto rough sawn Oak joists 100mm x 80mm wide and set at approximately 400mm centres. The joists are supported on Oak beams over the larger spans. Inspection of the floors reveals that they have been affected by excessive deflection and movement due to the timber sections not being able to accommodate the loading imposed upon them without being overstressed..

(iv) Internal Walls and Partitions.

To the Ground floor, the internal walling are a mix of timber frame with the original wattle and daub infilling still in place though mostly hidden from view by it,s plaster coating. The framing timber appears to have been affected by damp ingress at it,s sole plate level with repairs and possible replacement of the affected sections being required. The remaining timbers require insecticide and fungicidal treatment as before described with the worst of the affected timbers to remain in situ to be treated with Deep Kill paste. The masonry internal partitions show ingress of rising damp with their plaster finishes becoming loose from their backing. There is also much evidence of evaporated salts and efflorescence to the plaster which are indicators of rising dampness. The partitions will require complete re plastering.

(v) Internal Joinery.

Much of the Doors, panelling, skirtings and architraving are modern additions or replacements. The works have been poorly executed with inappropriate sections and styles. These modern works should be completely removed as part of the refurbishment process. The kitchen units are recent replacements, however due to damp ingress, many of the carcassing panels and timbers have been affected. It is envisaged that the units would be completely replaced during the refurbishment.

(vi) Internal Decorations.

Due to the problems that arise with moisture ingress from the defective roofing, rising and penetrating damp, the internal decorative paper and paint finishes have been left in poor order with total re decoration required. Much of the exposed timberwork to the ceilings and floors have been finished in wood stain or paint however the timbers are seen to be covered in mould due to the damp atmosphere within the property. All of the timbers require initial preparation of treatment as before described prior to receiving a decorative coating.

3.0 Services.

The property has Mains Electricity and Water installed with Drainage to a Septic Tank.

(i) Electricity

The Electrics circuitry was disconnected at the time of inspection, however it was noted that the wiring appeared to have been in place for some considerable time and would now be due for a re wire. The Meters and Fuse Board are aged and would benefit from replacement with a new Electrical panel with circuit breakers and a Current Trip switch. It is recommended that an Approved NICEIC Electrical Contractor is instructed to prepare a schedule of works for the full re wire of the property.

(ii) Drainage and Waste pipes .

Inspection and Testing of the drainage runs indicates that they are leaking and do not suitably discharge the waste water and stormwater from the property. Closer investigation revealed that the drains have been damaged and fractured as a result of the ground movement due to the property bearing onto shrinkable clay. The damaged drain runs have further exacerbated the settlement and subsidence by allowing water to drain and pond in close proximity of the foundations and causing softening of the sub strate causing isolated areas that were exposed further to ground movement. The drain runs should be grubbed up and re laid in modern clay or pvc materials and located a minimum of 1.0 metres away from the dwelling. All drain runs should be tested for airtightness and fall prior to backfilling of the trenches.

3.1 The Site.

(i) Grounds and Boundaries.

The property is set in its own garden with the Front Elevation bordering the Public Highway. The gardens are badly overgrown however following clearance, there will be ample parking and turning areas for vehicles within the curtilage of the property. The site is considered to be relatively flat and is understood to be very waterlogged in the Winter months when ground water levels are high.

4.0 Conclusions and Recommendations.

(i) Maintenance Considerations and Schedule of Works.

1. Survey by Approved Underpinning Contractors. The property will require underpinning throughout with the new foundations taken down to suitable bearing strata.
2. Remove all of the existing roof coverings, salvage ridge tiles and slates for re use. Re slate with medium strong local slates and un capped clay ridge tiles.
3. Remove all existing modern door and windows and replace with Cottage style fenestration pattern windows in treated softwood. Doors to be ledged and braced or similar in treated softwood.
4. Thoroughly irrigate all timbers that are to remain in situ with Insecticide fungicidal solution. Works to be carried out by specialist Company offering insurance backed guarantee.
5. Re new the Rainwater system in beaded half round sections in Cast Iron with black paint finish.
6. Clean down all lime washed elevations to expose brickwork and masonry. Carry out necessary repair and replacement of any badly spalled bricks.
7. Remove existing drain runs and relay new clay or pvc pipes with suitable fall to septic tank.
8. Hack off and remove internal plastering throughout and replace with sand cement scratch coat ready to receive lime wash decorative finish.
9. Install chemical damp proof course throughout external and internal walls.
10. Grub up existing ground floors and relay with damp proof membrane and concrete finish.
- 11 Carry out timber repairs to roof members, flooring and partitioning. Ensure that suitable replacement sections are employed
- 12 Completely re wire the property to meet the current edition of the Institute of Electrical Engineers requirements.
11. Allow for re plumbing and installation of central heating.
12. Re decorate throughout.

5.0 Cost Assessment.

Having prepared approximate quantities for the items of work and elements of structure requiring repair and renewal and having based the costings on present available Cost Index data along with carrying out comparisons with Contract Tenders received for similar refurbishment projects, it is anticipated that a budget of between £105,000 to £125,000 subject to further Specialist Surveys and findings should be adopted.

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