

Mr M Hayhurst

Barn No. 2 at Wheatley Farm, Four Acre Lane, Thornley with Wheatley , PR3 2TD

Structural Condition Survey for Conversion to Dwelling



PSC-001

November 2016

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1.0 Terms of reference

Paul Snape was appointed by Mr M Hayhurst to carry out a visual structural inspection and produce a structural condition survey report for the existing barn to the east of the farmhouse at Wheatley Farm, 4 Acre Lane, Thornley with Wheatley. The stone barn is one of two buildings surveyed at this location.

2.0 Purpose of the survey

It is proposed to convert the barn to form a new dwelling. The proposals are currently being prepared by PGB Architectural Services Ltd and they have provided details of the existing layout which are included in Appendix A, together with the proposed layout. The visual structural survey is required to confirm the current condition of the buildings and to assess their suitability for conversion. There are photographic records of the building in Appendix B and these are referenced throughout the report.

The drainage and electrical systems of the building have not been inspected. These will be renewed as part of the proposals and detailed for Building Regulation purposes.

We have not inspected parts of the structure that are covered, unexposed or inaccessible. Hence we are unable to report if such parts of the property are free from defect.

Our inspection was undertaken on 2nd November 2012 at which time the weather was fine and sunny.

The survey was undertaken by a Chartered Civil Engineer, Paul Snape BEng (Hons) CEng MICE

3.0 Description of Building

The barn is a sandstone, random stone building with a slated, pitched timber roof and concrete ground floor. The first floor hay loft is timber boarded, with timber and steel beam supports. It has been used as a shippon on the ground floor and for hay/straw storage on the first floor. The building is constructed into the slope of the hillside and has changes of floor level through the building as indicated on the drawings.

The building, together with the other building to be converted (Barn No. 1) and a small outbuilding, are to the east of the farmhouse on the opposite side of Four Acre Lane.

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4.0 External Survey

North West Elevation (Gable) (Photos 1 to 3)

The owner advised that this gable wall has been re-built in the past, following previous movement. The wall is now constructed of 200mm random stone outer face, backed by a 140mm concrete block (photo 3). The wall is plumb, in good condition, free from any sign of movement and well pointed. There are 4 existing openings and it is proposed to keep these and introduce a further opening at second floor level. The large opening at ground floor level has a steel beam and the other openings have stone or concrete lintels.

There is a concrete yard to the front of this elevation and an existing surface water system with a downspout on this elevation (photo 1).

North East Elevation (photos 4 to 8 and photo 23)

This elevation is a 450 mm random stone wall. The wall is plumb, well pointed and free from signs of movement. There has been some damage at the corner with the north west gable (photo 5). This will need repair or re-building over a maximum of 1m². The outrigger shown in photos 6 to 8 is in good condition but it should be noted that the lower section of the wall is protected at the base by a block/concrete retaining wall. This may have been placed to retain the founding stones when the adjacent yard was excavated and concreted to the current level. The upper section of this elevation is hidden by an existing steel lean-to building (to be removed) but is shown on photo 23. This section is again in reasonable condition with no sign of movement.

There are 4 existing openings to this elevation and they are all proposed to be retained with no further openings introduced. There are two further openings, to the north west and south east elevations of the outrigger, which are to be retained.

South West Elevation (Photos 9 to 19)

The elevation is a 450 mm random stone wall. It has a large outrigger to the mid-section which includes the large barn doors. There are two further window openings, one to each of the sections above and below the outrigger. In addition, there are two existing openings to the north west elevation of the outrigger which are to be retained. The proposals do indicate one new opening from the porch to the hall.

The lower section of the elevation (photo 9) is generally in good condition but has an area above the window opening where the outer skin of stone has suffered from movement leaving a slight bulge (photo 10). The re-constructed gable has also settled slightly as indicated by the pointing adjacent to the downspout (photo 11). This wall will benefit from the strength provided by a new internal leaf of block but up to 2m² of the outer face may need to be re-built to remove the bulge noted. Re-pointing this elevation will remove the cosmetic crack from slight settlement of the re-built gable.

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The mid-section of the elevation is occupied by the outrigger housing the barn entrance and a store area. All the walls to this section are 450mm random stone and are in good condition, free from movement and reasonably well pointed. Photo 15 shows a through tie although the wall is in good condition and this may have been put in place for a different purpose. The internal wall inside the store where a new opening will be introduced is in good condition.

The upper section of this elevation (photos 16 to 18) is generally in good condition but there is evidence of damage/movement to the corner with the gable (photos 17 & 18). This may have been caused by vehicle impact and the lower section has been repaired but is not quite plumb. Some re-building of this corner may be necessary, up to 2m².

South East Elevation (photos 20 to 22)

This gable wall is a 450mm random stone wall. There is a single existing opening at a high level to the right, together with an owl box at the apex. It is proposed to retain these openings and not introduce any further openings.

The gable is in reasonable condition and is plumb. However, externally the wall appears to bow inwards at the centre. There are no visible signs of ongoing movement or cracking and internal inspection revealed a reasonably plumb, straight wall. There would therefore be little to be gained from any re-building.

Roof (Photos – External - 4 & 14 & 16, Internal – 27 & 30)

The main roof is slate on traditional rafters, purlins and 3 trusses. It is in good condition with little sign of movement, rot or infestation. The roof will be re-constructed under the proposals but existing elements may be retained subject to structural checks and treatment for rot/infestation.

5.0 Internal Survey

Ground Floor – Lower End (Photos 24 to 26)

The ground floor is in two separate sections divided by a solid 200mm thick stone wall at ground floor level with a door opening between the two sections (photo 26). The lower section has a solid concrete floor with animal stalls. The first floor above is carried by steel and timber purlins and joists with exposed floorboards. The walls and floors are in good condition with little sign of movement. The timbers do not exhibit any sign of rot or infestation

It is proposed to introduce a new cross wall in this area in addition to leaving a wall in place at the existing location (extended to floors above). This will add structural stability allowing the new openings from the porch and the light well to be introduced.

There is a level difference between this lower section and the main barn which is indicated by the steps on Photo 26. This level difference is to be retained and the reconstruction and raising of the existing wall will need to consider this in terms of a retaining structure.

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Upper End – Main Barn and Mezzanine (Photos 27 to 32)

The upper end of the barn is an open area with a mezzanine above the lower ground floor described above. The mezzanine is currently used to store hay. The walls to this area are all in good condition with lime mortar pointing in reasonable condition. There is no sign of movement and unusually no signs of stress cracking below the seats of the trusses (photos 29 & 30). Internal inspection of the south east gable (photos 31 & 32) shows the wall to be in good condition with no sign of the bow evident externally.

The timbers to the roof can be seen on photos 27 & 30 and show little or no sign of rot or infestation. The roof is to be reconstructed but some of the timbers may be re-used either structurally or cosmetically subject to design checks and appropriate treatment.

6.0 Suitability for Conversion and Method of Construction

It can be seen from the survey detailed above that this barn is in very good condition with little sign of previous movement and no sign of ongoing movement. The area identified for re-build is around 5m² which is negligible in percentage terms given the size of the building. It is considered suitable for conversion to a dwelling. When converting barns, it is essential that the construction techniques and sequence are carefully considered.

PGB Architectural have indicated the construction of a masonry inner leaf. This may comprise of a cavity with insulation plus a block inner leaf or a backing block to the stone with a cavity and a further block inner leaf. With this technique, care must be taken as the existing walls may be founded at a shallow depth. Trial holes should be dug to ascertain the actual depth. Ground floor levels should be set as high as possible and we would recommend the use of a concrete floor slab with thickened edges along external walls and thickenings under new internal walls. The thickening can be taken down to a similar depth as the existing walls. We would recommend a minimum depth of 400mm for the thickenings. Levels lower than the existing foundations should be avoided and if this is necessary an Engineer should be consulted as underpinning may be required. The new inner leaf (and backing block if used) should be tied to the existing wall with suitable cavity and/or specialist ties.

It is recommended that this new internal skin is in place and the ground, first floor and second floor are put in place prior to the roof being removed and reconstructed. This will add stability to the exiting walls.

The architectural layout introduces only one new opening to the external walls and 2 new openings internally. As noted in section 5 above, the layout introduces two full height cross walls and these will add stability to ensure that the new openings from the porch and the light well do not affect the overall integrity of the structure.

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It was noted that the outrigger to North East Elevation has an existing retaining structure to the founding stones. The external re-profiling and internal construction must take account of this and adequate provision made in terms of a retaining structure.

Internally, there is a level difference in the floor proposed to be retained at the wall between the kitchen/sitting and the hall/utility. Adequate provision must be made to retain the upper level. This cross wall is currently a stone wall up to the mezzanine level. It is expected that this will be replaced with a full height wall in blockwork. The lower section of this can be upgraded to form a retaining wall.

The existing trusses and purlins appear to be in good condition with little sign of rot or infestation. Any timber retained should be assessed by a timber specialist, with regard to rot and infestation. All retained timber should be treated against rot/infestation and an indication of residual section given for structural purposes. All retained timber to be used structurally should be checked for structural adequacy.

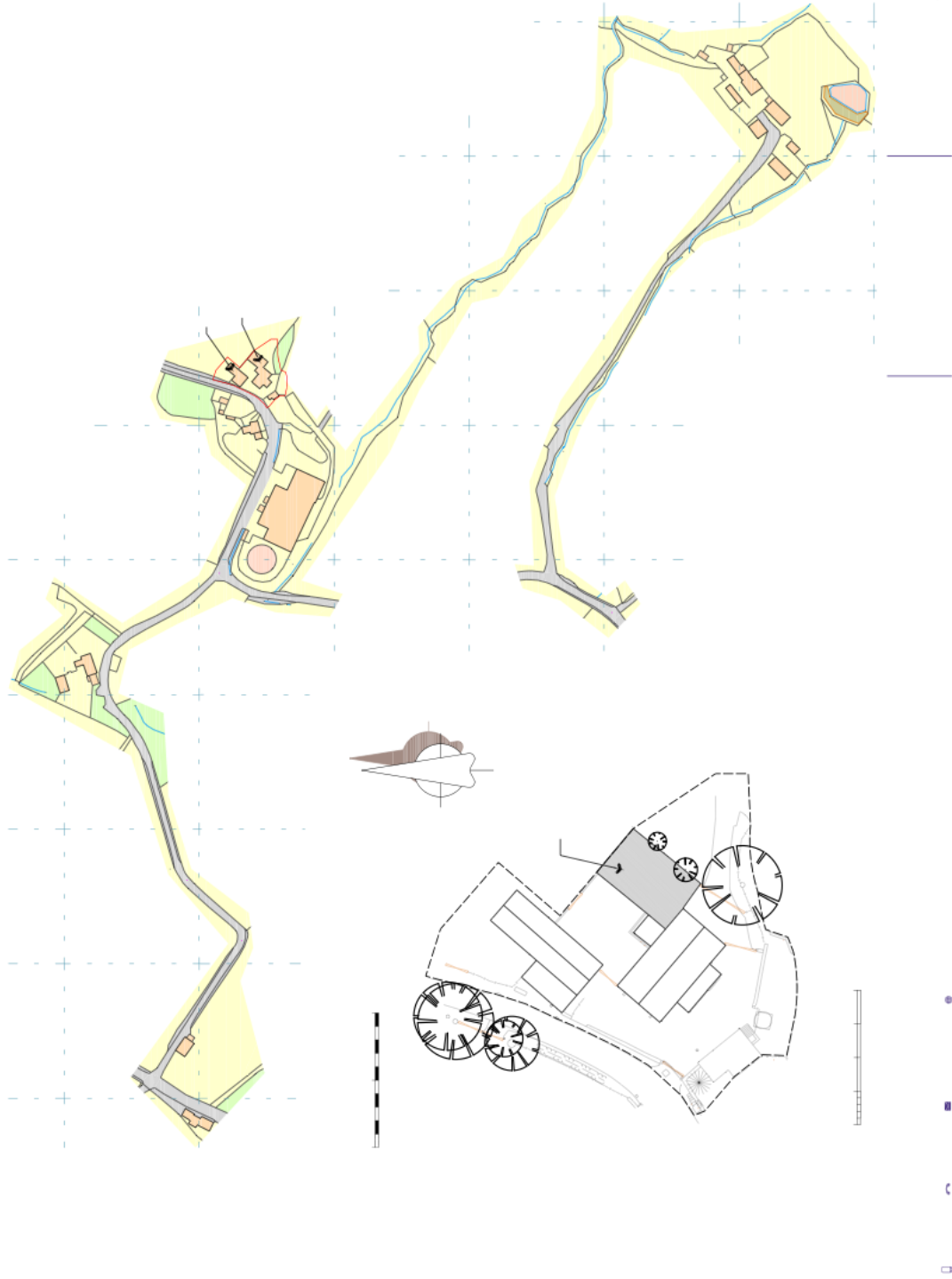
7.0 Conclusions

The barn is in a good structural condition and is considered suitable for conversion. The construction should follow the guidance set out above and a structural engineer should be consulted with regard to the final layout for Building Regulation compliance.

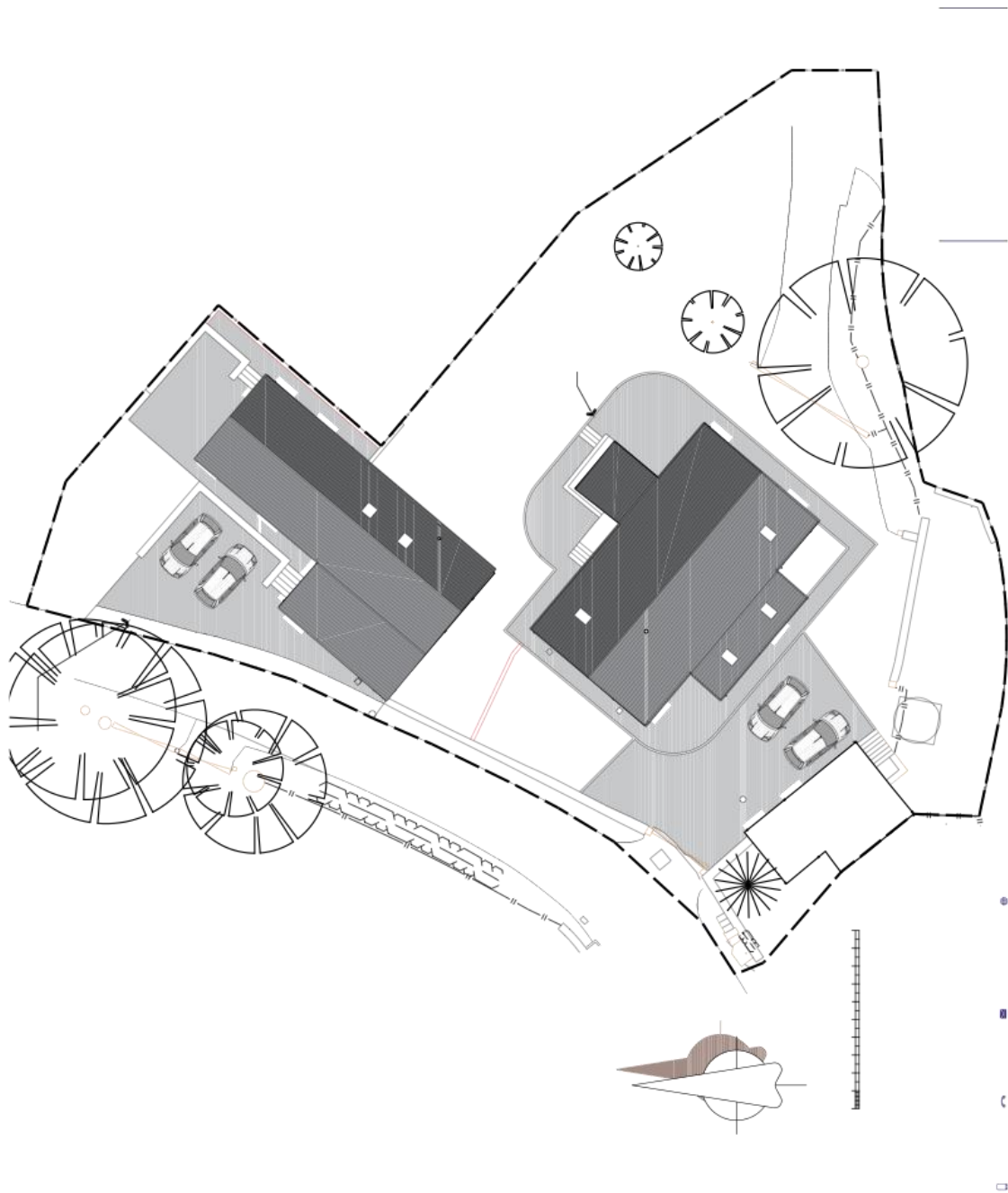
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Appendix A
Drawings

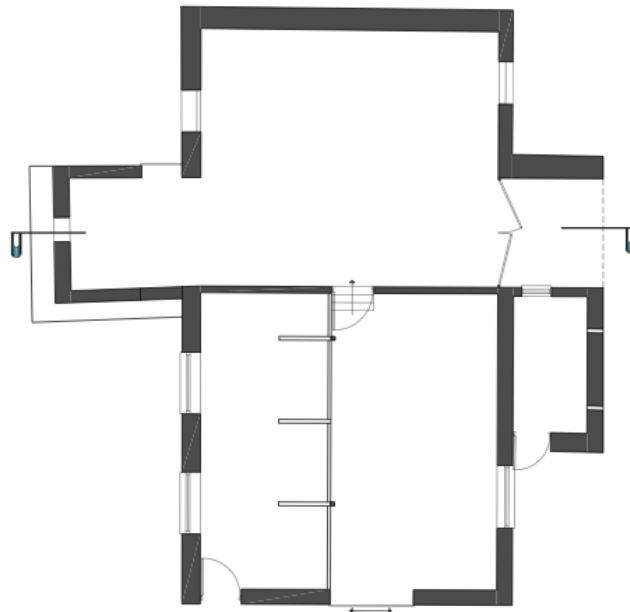
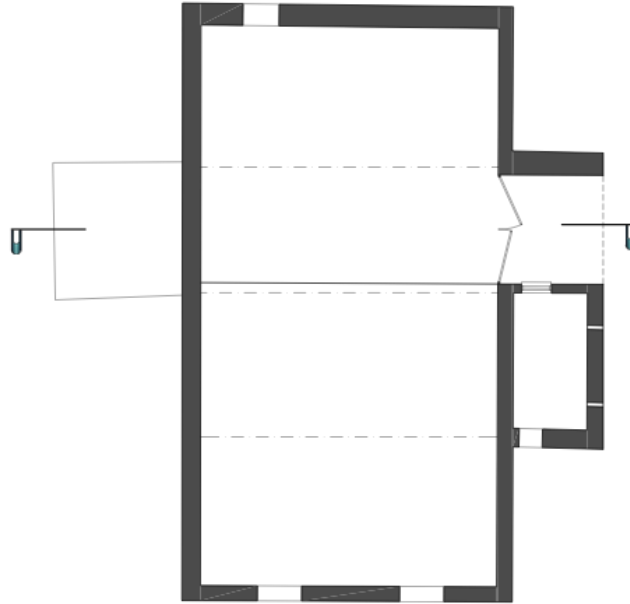
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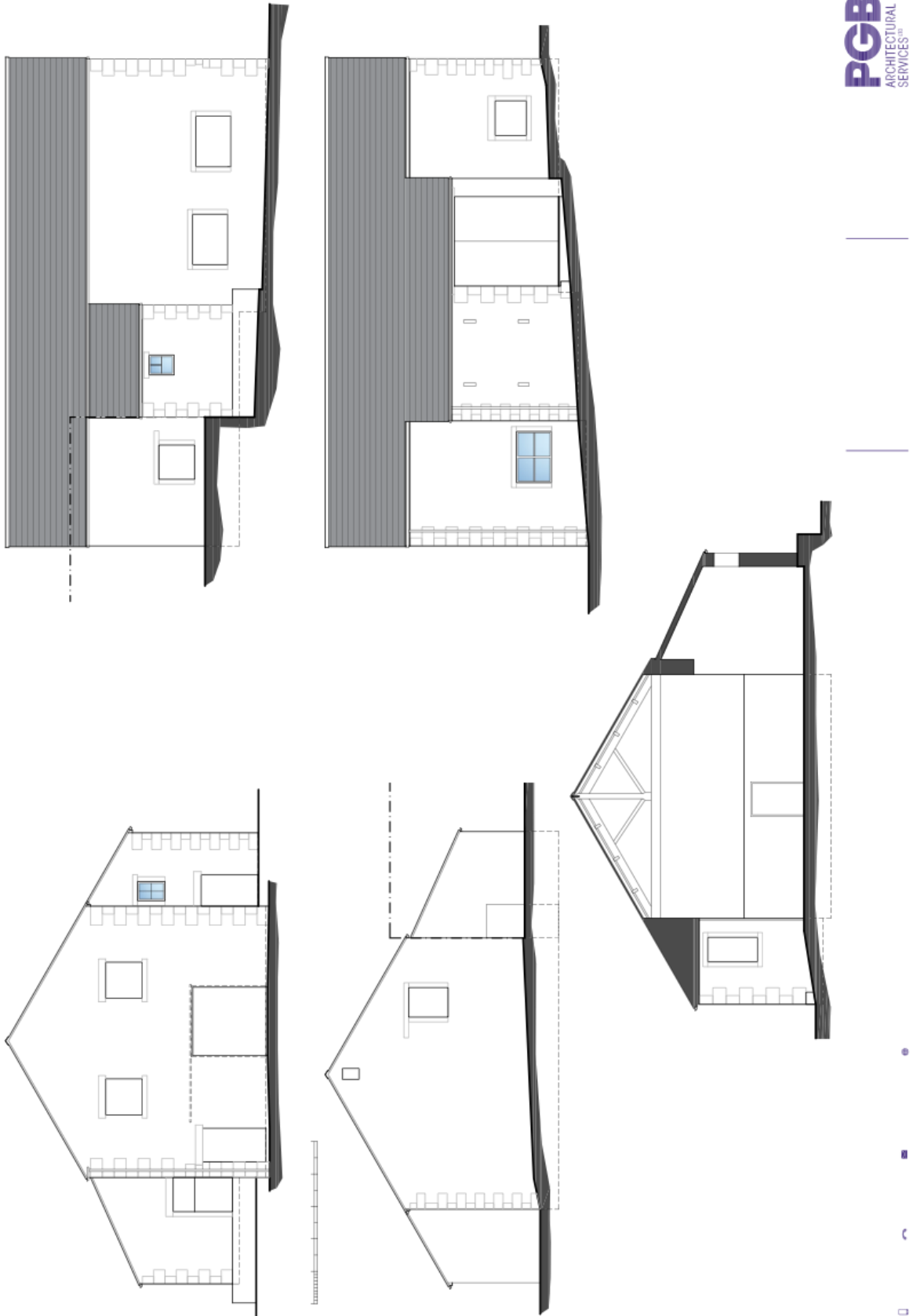
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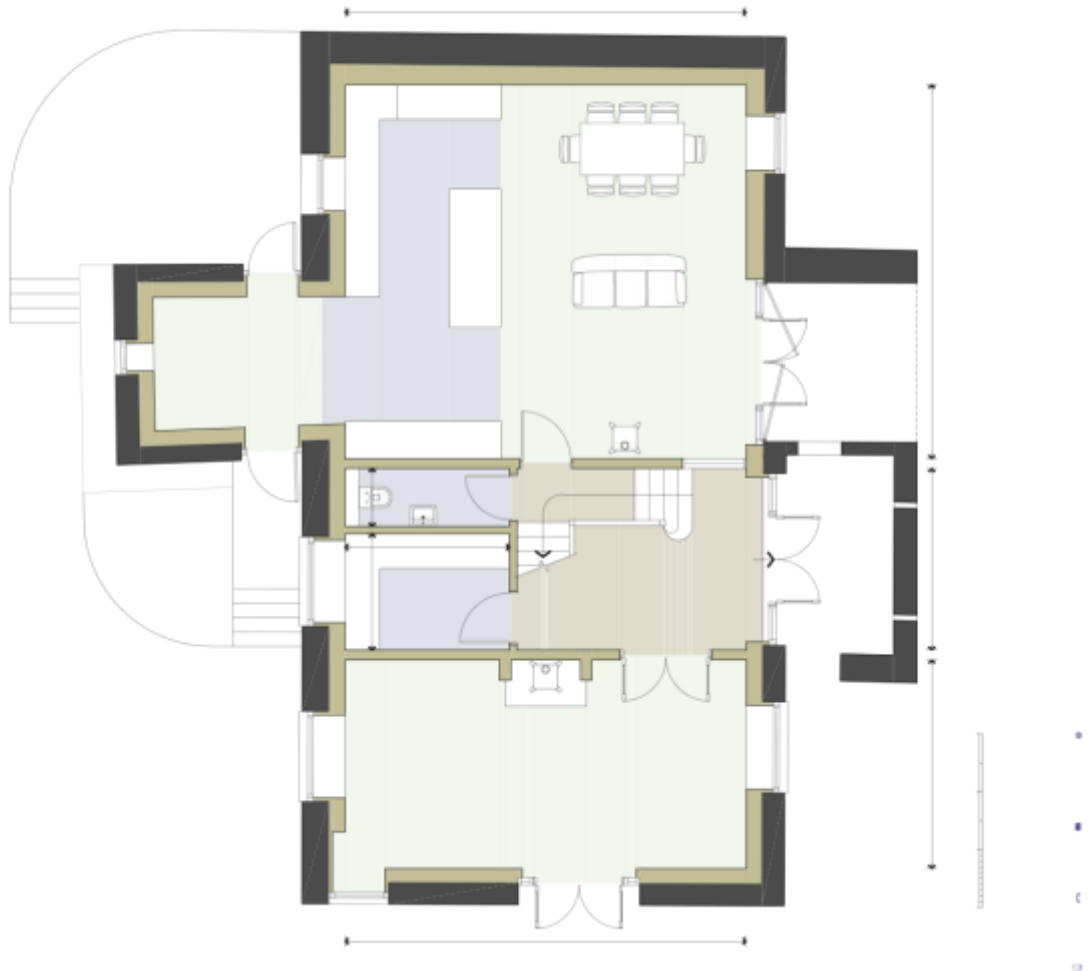
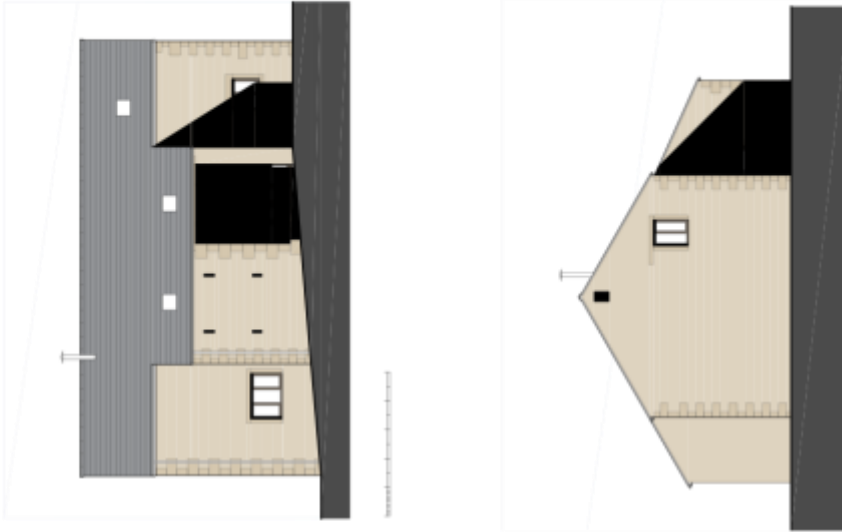


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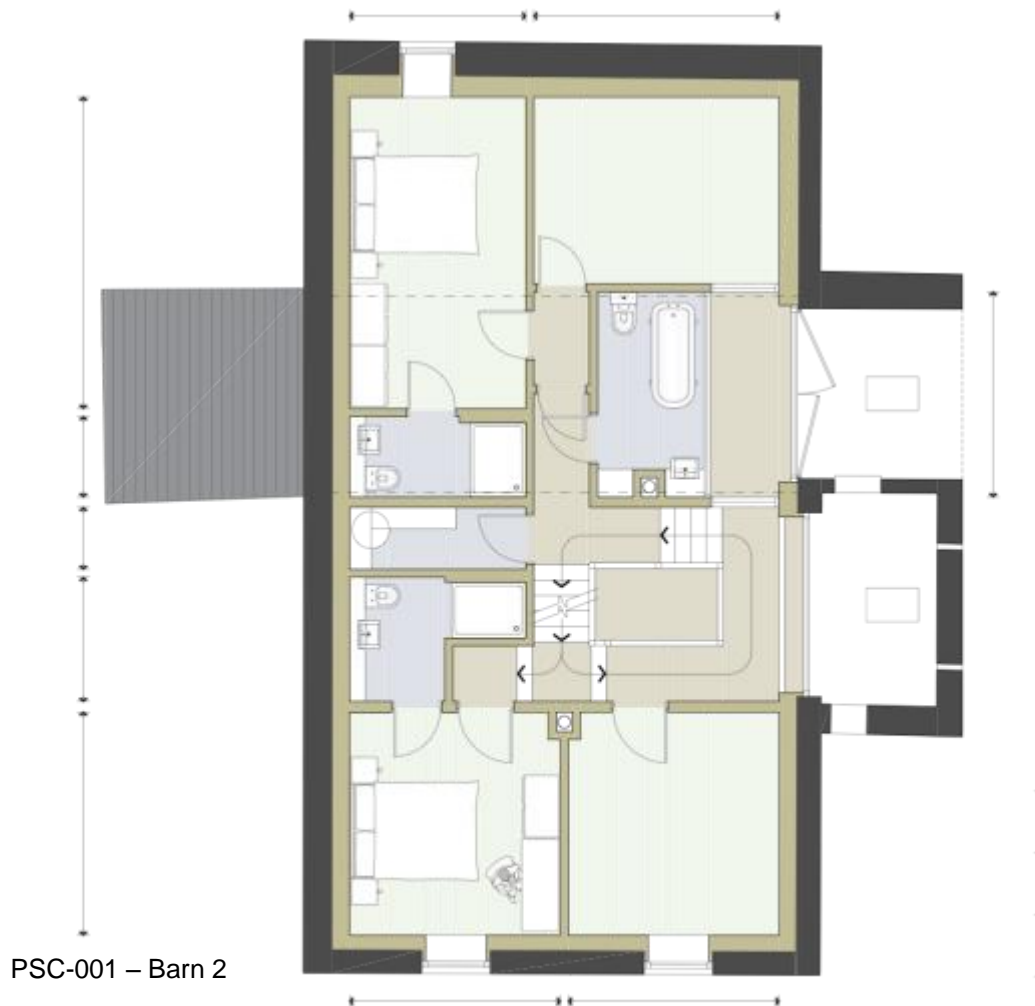
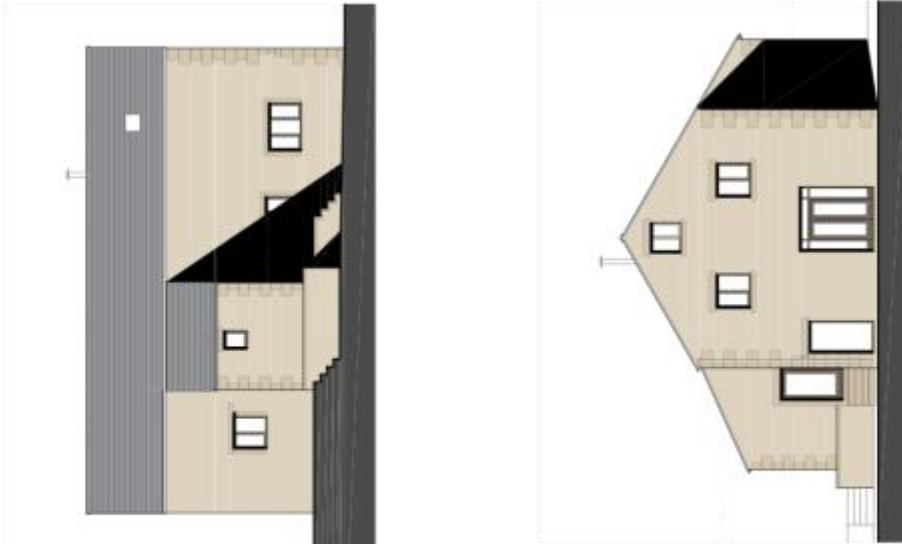


PSC-001 – Barn 2

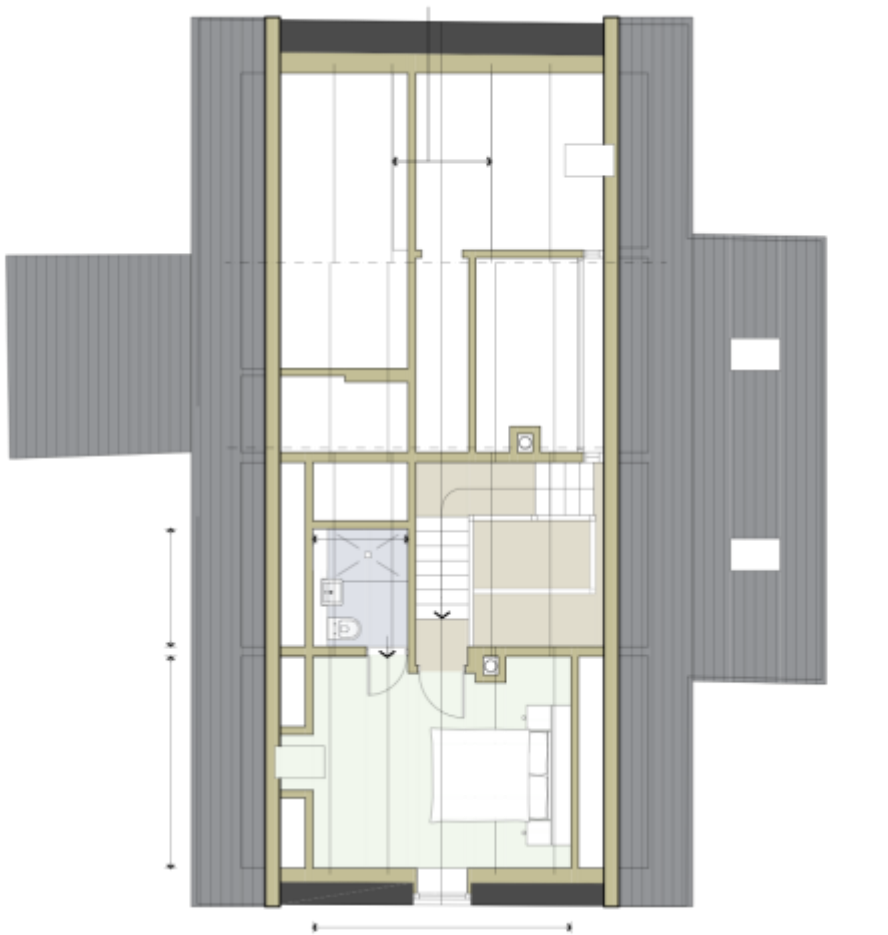
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Appendix B
Photographs



Photo 1 - North West Elevation



Photo 2 – North West Elevation



Photo 3- North West Elevation – Re-built wall detail



Photo 4 – North East Elevation



Photo 5 – North East Elevation – Damage at corner with gable



Photo 6 – Outrigger to North East Elevation



Photo 7 – Outrigger to North East Elevation



Photo 8 – Outrigger to North East Elevation – block/concrete cladding



Photo 9 – South West Elevation – lower section



Photo 10 – South West Elevation – lower section – bow over window



Photo 11 – South West Elevation – joint to re-built gable



Photo 12 – South West Elevation - outrigger



Photo 13 – South West Elevation – mid section



Photo 14 - South West Elevation – mid section

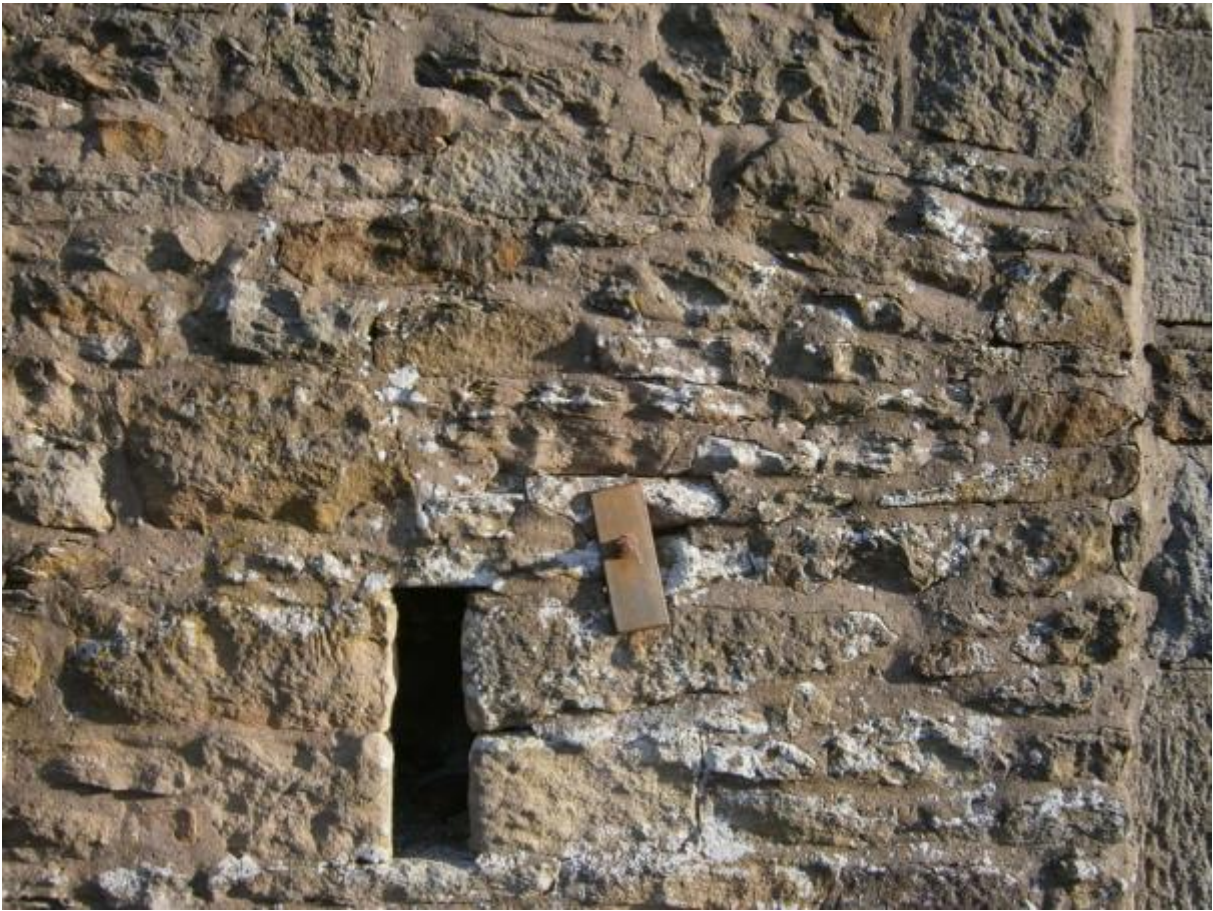


Photo 15 - South West Elevation – mid section – through tie



Photo 16 - South West Elevation – upper section



Photo 17 - South West Elevation – upper section



Photo 18 - South West Elevation – upper section – re-built corner



Photo 19 - South West Elevation – outrigger



Photo 20 – South East Elevation



Photo 21 - South East Elevation



Photo 22 - South East Elevation- indicating bow inwards



Photo 23 – North East Elevation – upper section (inside lean-to)



Photo 24 – North West Elevation – internal in lower section



Photo 25 – North east elevation – internal in lower section



Photo 26 – Internal wall – lower to upper divide



Photo 27 – Roof structure and North West Gable



Photo 28 – Upper section of South West Elevation



Photo 29 – Truss sat on walls – no cracking or movement



Photo 30 – Truss and purlins – North East and south east walls



Photo 31 – Upper section of North East internal



Photo 32 – Internal of South East gable