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STRUCTURAL SURVEY REPORT

Blakenham Farm – Watering Farm, Nettlestead, Ipswich,
Suffolk, IP8 4QL

HAT Projects, Trinity Works, 24 Trinity St, Colchester

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Title: STRUCTURAL SURVEY REPORT
 Project: Blakenham Farm – Watering Farm, Nettlestead, Ipswich, Suffolk, IP8 4QL
 Client: 24 Trinity St, Colchester, CO1 1JN
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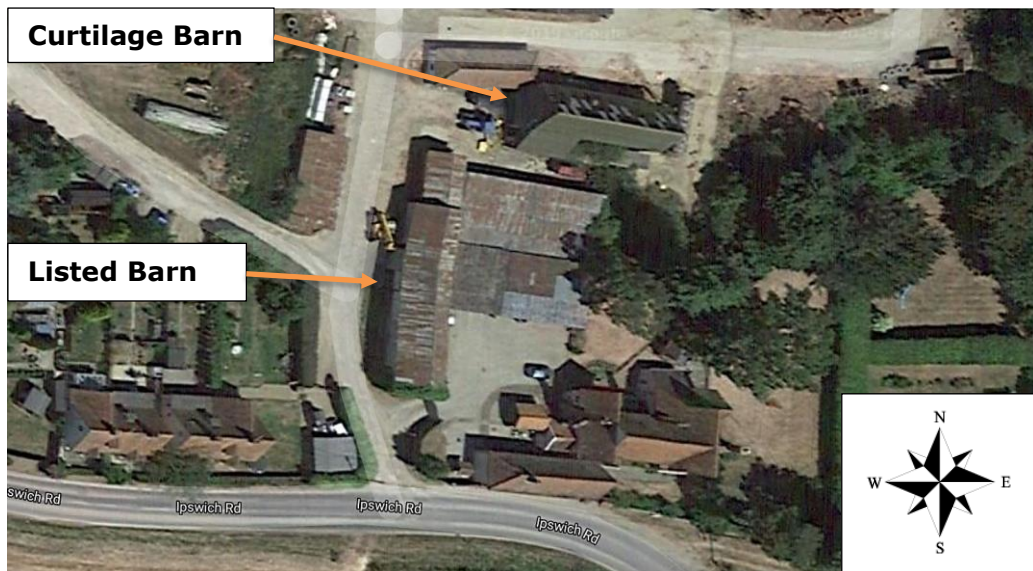
Appendices

Appendix A - Drawings

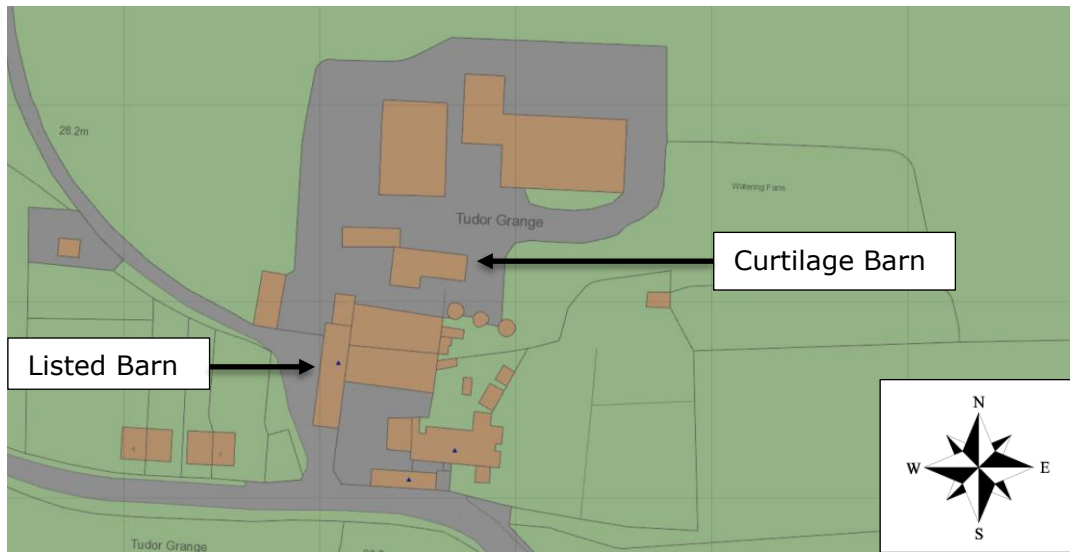
Appendix B - Photographs

1. Introduction and Client's Brief

- 1.1. We have been appointed by Hana Loftus of HAT Projects on behalf of our mutual Client – Proprietors of Blakenham Farm - Watering Farm, Nettlestead, Ipswich, Suffolk, IP8 4QL.
- 1.2. We understand that the Listed Barn Building is listed in its own right, with the less significant barn building is listed under curtilage only.
- 1.3. The survey was carried out on the morning and through the day of the 11th October 2019. The weather at the time was wet and overcast. The buildings are orientated with the gable end of the smaller Listed barn facing the north.
- 1.4. The principal barn list description as follows: *NETTLESTEAD SOMERSHAM MAIN ROAD Barn 20 metres west of Tudor Grange - GV II Barn and stable, early C17. Six bay barn; two bay stable with hayloft above at south end. Timber-framed and weatherboarded, retaining in part the wattle-and-daub infill. Corrugated iron roof, renewed in C20 (the roof was formerly thatched). Studwork has wind-bracing of shortened tension form. The C17 stable is clearly constructed from components of the demolished hall range of the adjacent Watering (or Water-run) Farmhouse, now known as Tudor Grange. A main beam has roll and scotia mouldings matching the mid C16 work surviving in the house; unmoulded reused floor joists and other substantial components are also of C16 type.*



Indicative Satellite Location Plan. Not to scale.



Indicative Location Plan. Not to scale.

- 1.5. Currently both the curtilage and listed barns are timber framed and both appear to have a brick plinth to the perimeter, with the listed barn used for storage.
- 1.6. A further survey inspection on the 19th May 2021 was carried out of the north east end of the listed barn was carried out following clearance work within the barn to provide access to all the ground floor frame, and the upper frame viewed from the first floor structure.

2. Brief Description

2.1. Listed Barn

- 2.1.1. The principal listed barn located 20m west of Tudor Grange is a substantial timber framed barn structure, seen with a brick plinth to the external walls, which are covered with ship lap boards above the plinth to the full north and south gables, and rendered with lime rendered to the west and east (assumed) elevations.
- 2.1.2. The roof is covered in a relatively modern corrugated steel sheeting, and the west double access door has been modernised to a sliding steel framed door to maintain security to the storage structure.
- 2.1.3. The principal 6 bayed timber framed barn structure is a typical timber framed barn, formed with large original timber posts sitting on sole plate and brick plinth. The principal posts are connected to the eaves beam and have wind braces to the tie beams.
- 2.1.4. The small single storey timber framed building attached to the north of the listed barn is externally clad in weather boarding with a brick plinth and currently covered with a corrugated, possibly asbestos, roof. The building is currently used to store various liquid containers and firewood.

2.2. Curtilage Barn

- 2.2.1. This barn can be seen with the gable elevation facing east and west and the north (front) elevation having the large double door entrance with various raking members seen to the north elevation. There is a lean-to structure located to the south west corner of the main barn. See photographs 151 to 169.
- 2.2.2. The barn is a traditional built timber framed building formed with brick plinth walls, sole plate, 5 principal bays, with good quality studs, principal posts, ties and mid-rail and eaves wall plates.
- 2.2.3. The barn roof is formed with modern timbers and covered with a modern corrugated sheeting.
- 2.2.4. The barn structure has been compromised, and is currently shored to the north elevation, with large timber poles, which act as raker members attached to the eaves plate of the structure.

3. **Structural Survey Details**

3.1. Listed Barn - North Single storey Structure.

(See Photographs 1 to 55)

External Elevation

North Elevation

(See Photographs 1 to 9)

- 3.1.1. The north gable elevation of the single storey structure is weather boarded with some missing boards to the eaves wall and missing barge boards. The lower section of the weather board up to eaves level has been replaced in the recent past and the upper boards appear to be historic. See photographs 1 to 5.
- 3.1.2. The brick plinth appears to have failed and is seen undulating across the elevation and shows open joints and cracking to the brick work. There is evidence of the existing sole plate which has failed. See photographs 1 to 6.
- 3.1.3. The wall generally undulates, and it is likely that the elevation will need to be rebuilt, possibly on a new foundation.

East Elevation

(See Photographs 4 to 8)

- 3.1.4. The east elevation is only seen to the north-east corner which currently shows weather boarding sitting on a brick plinth which steps at lower level whereas the north elevation has been covered up by the road build-up. See photographs 6 & 7.

- 3.1.5. The brick plinth appears to be in a better condition along this elevation, although there are some open joints seen with cracking to the corner. The plinth may require some localised rebuilding where it has settled and also undulates slightly. See photographs 7 & 8.
- 3.1.6. The tops of the brick plinths at the junction of the weather boarding has been chamfered with a mortar finish and this has failed in areas.
- 3.1.7. Some of the sole plate can be seen exposed and will need to be inspected more closely to understand whether this can be retained and reused or whether repairs are required.
- 3.1.8. The upper boarding appears to have been renewed and the wall maintains a reasonable verticality.
- 3.1.9. To the north gable end at the east corner, we note that the principal rafter shows decay to the external face where the boarding is missing, particularly to the top, adjacent to the ridge and at eaves level. Also, the exposed ends of the wall plates can be seen.

West Elevation

(See Photographs 10 to 16)

- 3.1.10. The west elevation of the single storey structure is weather boarded and has a concrete ramped single door entrance, with a redbrick plinth painted black.
- 3.1.11. The walls are timber framed and the weather board appears to be old, although they have been installed in small lengths. Remnants of the gutter brackets and cast iron down pipe can be seen, although no guttering exists. See photographs 10 to 13.
- 3.1.12. There is cracking seen to the brick plinth either side of the door entrance, with the righthand side showing more significant cracking in the order of 15 to 20mm. see photographs 13 to 16.
- 3.1.13. There is also evidence of a window opening to the right-hand side of the door. See photograph 12.

Roof

(See Photographs 9 & 10)

- 3.1.14. The roof is covered in a corrugated steel sheeting which has failed in areas, mostly towards the west eaves position where holes exist. See photograph 10.
- 3.1.15. The roof ridge flashing has failed and can be seen with open holes adjacent to the large barn north wall.
- 3.1.16. The east roof elevation is similar to the west side with corrugated steel sheeting seen to the elevation. The ridge generally appears to be fairly level as does the eaves, suggesting that the roof is generally fairly dry. Some degrading of the roof sheeting can be seen. See photograph 9.

Internal Survey

(See Photographs 17 to 55).

- 3.1.17. The single storey timber frame structure has two bays with a single central tie beam spanning east west and what looks like a later tie beam added adjacent to the main barn, and rainwater discharge pipe below the tie beam (see photograph 32).
- 3.1.18. The north elevation can be seen with the failed brick plinth, which has been made good in areas by pointing internally. The sole plate has failed, and the brick plinth has settled over time. See photographs 17 to 21.
- 3.1.19. The north wall studs appear to have been replaced in places with slender modern studs seen, which will require replacing. See photographs 17, 19 to 21.
- 3.1.20. The studs can be seen part renewed towards the west corner, with the main studs generally appear fairly sound, although the connections, top and bottom, to the sole plate and the eaves beam appear not to exist in some instances. See photographs 17 & 20.
- 3.1.21. The east side of the north gable is covered at lower level with stored timbers, which conceal the condition of the sole plate and studs at lower level. See photographs 18 & 22.
- 3.1.22. The upper stud that is visible appears to be connected to the tie beam fairly well and the principal post to the north east corner appears to be fairly sound to the upper section, although the lower section we suspect will require splicing back onto a possible new sole plate. See photograph 18.
- 3.1.23. There is a diagonal brace attached to the wall, set on the front face of the studs, and a large tank site on blockwork walls to the north gable elevation. See photographs 19 & 20.
- 3.1.24. The upper tie beam generally appears fairly sound, with the structure above being modern, and is falling away externally to its top and has no restraint at this time. See photographs 20 & 21.

East Elevation

(See Photographs 22 to 28)

- 3.1.25. The east wall internally can be seen with the brick plinth at lower level, timber sole plate across part of the elevation only, with a single door entrance. The south end of this elevation shows a brick plinth which appears to be fairly sound, with some modern infill brick work seen around the door openings where this has failed in the past. See photographs 24, 25 & 27.

- 3.1.26. The sole plate along the length of the wall, in part, appears to be in a fairly reasonable condition, although the studs over, in some cases, may not be fully connected. Some decay to the top of the sole plate can be seen, although the main length of the sole plate appears to be fairly sound. See photographs 22, 24, 28 & 29.
- 3.1.27. The junctions of the studs with the sole plate will need to be checked to ensure connections are adequate for future use. The studs generally appear to be of reasonable size, approximately 4" to 5" wide x 4" deep.
- 3.1.28. There is one bracing towards the north end, across from the principal corner post across the 1 no. stud to the eaves plate. See photographs 21 to 23.
- 3.1.29. The studs all appear to be pegged, some pegs still exist, although there are some missing pegs seen which will need to be checked and reinstated as required.
- 3.1.30. The door entrance, we suggest has been tampered with and some decay around the entrance door can be seen. We also note that the brick plinth around the door entrance has been rebuilt.
- 3.1.31. The base of the posts adjacent to the opening will require re-splicing down onto the sole plate and a possible new foundation along this length. See photographs 25 & 27.
- 3.1.32. The right-hand side of the east door shows 3 no. studs and then the principal post adjacent to the main barn.
- 3.1.33. The weather boarding along the elevation appears to be in a reasonable condition, some water staining can be seen generally around the south side of this elevation at upper and lower level. See photographs 27 & 28.
- 3.1.34. The lower level is covered by firewood. The east wall south length of the sole plate appears to have been re-bedded onto the brick plinth which shows some modern repointing work carried out to it. See photographs 25, 27 to 29.

South Gable Elevation

(See photographs 28 to 33 & 36)

- 3.1.35. The south gable elevation can be seen with the timber studs sitting on a sole plate that sits on a lower brick plinth to this elevation. The principal barn north wall can be seen.
- 3.1.36. The studs to the elevation appear in a reasonable condition. Some historic movement has occurred to the south-east corner, where the structure has settled, and the junction of the east wall with the south wall has parted. See photographs 28 to 30.

- 3.1.37. The studs and cross bracing elements generally appear to be fairly well fixed and the timber generally appears to be more modern than the added on single storey structure.
- 3.1.38. Part of the upper eaves plate can be seen, and this again shows relatively well jointed studs up to the underside of the tie beam which shows peg connections.
- 3.1.39. The mortice holes to the studs appears larger and it may well be that this elevation has been rebuilt in the past.
- 3.1.40. All the studs, braces and also the weather boarding seen from this side of the building appears to be whitewashed and in a reasonable condition.
- 3.1.41. There is no physical tie between the main barn and the single storey structure to the north, which is why some large gaps have opened up between the single storey structure and the main barn specifically to the south east corner.
- 3.1.42. The south of the single storey range has a historic timber stable wall located centrally, perpendicular to the south wall which has two posts, mid rail and boarding with vertical boards forming the stable stud structure. The structure appears to sit on the ground. See photographs 33 to 36.
- 3.1.43. The stable structure to the top post is restrained back onto the east wall, and the stud posts show a large notch taken out of it centrally and also at lower level. The timbers generally appear to be fairly sound and will need to be cleaned and checked to ensure that they are suitable for reuse.
- 3.1.44. The upper sections of the timber framed gable roof, adjacent to the main barn, are new softwood or later added timbers.

West Elevation

(See Photographs 37 to 46)

- 3.1.45. The west elevation has the entrance door to the single storey structure, a higher brick plinth is seen internally which is not connected to the main barn structure. See photographs 37 to 39.
- 3.1.46. The studs are approximately 1.5 metre height and sit on a sole plate on the higher brick plinth.
- 3.1.47. The eaves plate appears to have sagged and has a modern timber packer to pick up the roof. The south length of the eaves plate appears not to be tied back into the main structure of the barn and has spread outwards by approximately 6 inches (see photograph 37). We suspect the later added modern tie was introduced to limit the roof spread to the south.
- 3.1.48. There is a central tie beam located adjacent to the entrance door stud which has helped tie and limit the spread of the roof in this location. See photographs 49 to 51.

- 3.1.49. The upper roof can be seen with holes in the corrugated sheeting at eaves and this has been packed off the original timber studding with modern timber members. See photographs 32 & 42.
- 3.1.50. The main roof structure over is fairly modern and this is formed with 3 no. intermediate what appear to be high collared soft wood trusses and purlins that run through which carry the steel corrugated roof. See photographs 47 to 50.
- 3.1.51. The west elevation plinth on the elevation appears to be in a reasonable condition, but has internal cracking seen in the location of the external crack, noticeable behind the door position, which has also been re-built. Some open joints and holes can also be seen to the elevation internally, although half of the elevation is covered with large containers. See photographs 37, 38 & 41.
- 3.1.52. There is no tie to the high plinth wall at the north corner and the sole plate also at this junction appears to be decayed in part. The internal faces of the boarding can be seen and these show water staining across the whole elevation. See photographs 37 to 46.
- 3.1.53. We note that the tie beam located centrally across the single storey building only has a brace attached to the east side with the west brace missing, although the pegs and mortice for this brace still exist and can be reinstated.
- 3.1.54. Some of the ground slab has been renewed, although some of the original paving blocks can be seen, sat on dirt.

3.2. **Principal Listed Barn**

(See Photographs 1, 9, 56 to 150)

External Elevations

North Elevation

- 3.2.1. The north elevation of the barn externally can be seen with weather boarding sitting on a brick plinth and an upstand at lower level. The weather boarding appears to be modern. See photograph 1, 56 to 58.
- 3.2.2. The wall appears to be relatively vertical, and in reasonable condition as does the brick plinth, although the sole plate in areas is not visible.
- 3.2.3. The principal north-west post can be seen with large notches and sits lower on the brick plinth. The eaves plate to the principal post can be seen exposed and will need to be checked to see if it is decayed. See photographs 1 & 56.

West Elevation

(See Photographs 56 to 70)

- 3.2.4. The long west elevation is approximately 20m long, with a modern steel framed sliding entrance door.

- 3.2.5. The lower wall is seen as a brick plinth which is partly rendered in areas partly exposed, with weather boarding over seen for approximately 1.5m in height and is cement rendered with patch repairs seen up to eaves level. See photographs 56 to 70.
- 3.2.6. The lower section above what appears to be a concrete cast plinth to the left-hand side of the entrance door can be seen with a sole plate and studs simply sitting on this which appear not to be connected as seen externally. See photographs 56 to 59.
- 3.2.7. The render panels north of the large door appears to be fairly sound, although there are vertical cracks seen in one or two locations of the upper render. See photographs 58 to 60.
- 3.2.8. There is a downpipe located to the left-hand side of the entrance door, which services the full gutter length. The wall south of the door and steel frame shows rendering which has vertical cracks in two or three locations and upper patch repairs. See photographs 56, 60 to 64.
- 3.2.9. The boarding across the elevation is partly original and renewed boards with some missing boards seen to the north corner. See photographs 58 to 69. The weather boards south of the slide door is largely renewed in later modern boards.
- 3.2.10. The barn appears to settle towards the south west corner of the building, with a significant undulation seen. See photographs 56 & 58.
- 3.2.11. The brick plinth towards this south length of the barn shows brickwork which is exposed and has failed patch repaired render in areas. See photographs 63 & 65.
- 3.2.12. The south corner has significant vegetation climbers attached to the wall above the brick plinth location and which can be seen to the complete south gable elevation attached to the structure. See photographs 65 to 73.
- 3.2.13. The gutter appears to be relatively watertight, although this undulates along the elevation. The wall elevation verticality appears to undulate, and the barn wall has a distinct lean towards the bottom of the barn wall which pushes out slightly. See photographs 63, 65 to 67.
- 3.2.14. The right-hand side of the double door entrance shows defective rendering above the horizontal boarding, with the lower boarding having been pulled off at the sole plate level, exposing part of the sole plate which, in part, has decayed and failed. See photographs 60 & 61.
- 3.2.15. The section of wall thereafter, between the steel post and the first vertical separating member to the boarding shows some exposed studs with one boarding missing. The render above is again is cement based and shows some cracking vertically in two locations. See photographs 60 & 61.
- 3.2.16. There is a steel rod end attached to the stud at the sixth board up from the plinth (see photographs 61 & 63).

- 3.2.17. The next section of wall shows brickwork exposed and render attached to this, although the render has failed in areas. See photographs 63 & 65.
- 3.2.18. The brickwork shows some missing faces and the render has been added over to try to protect the faces of the brickwork. The brickwork appears to be built in a lime mortar where seen. See photographs 63, 65 & 67.
- 3.2.19. The lower south corner shows that the brick plinth has failed, and the render has also failed to this corner, due to the vegetation climbing plants that have attached to wall. see photographs 66 to 68.

South Elevation

(See Photographs 71 to 73)

- 3.2.20. The south gable elevation can be seen with the large Blakenham Farm's western farm Nettlestead board. The remaining elevation is covered in climbers and part of the brick plinth can be seen at lower level which appears to be in a reasonable condition from the area visible. The upper section can be seen with some visible weatherboarding.
- 3.2.21. Consideration should be given to removal of the climbing vegetation to allow assessment of the gable wall.

East Elevation

- 3.2.22. The East elevation was not surveyed. Access is only via the Tudor Grange.

Roof

(56 to 58 & 66)

- 3.2.23. The main barn roof is covered with a steel corrugated sheet which has failed in areas towards the lower eaves level and can be seen over the door head where it has been underslung with new corrugated sheeting.
- 3.2.24. The steel corrugated sheeting is generally in a reasonable condition, although the ridge flashing appears to have failed in areas.
- 3.2.25. The steel corrugated sheeting to the south eaves has degraded adjacent to the climbing vegetation. See photograph 66.

Internal Survey

(See Photographs 74 to 150)

- 3.2.26. The north elevation of the barn can be seen with a rendered brick plinth, with the east side of the brick plinth seen exposed. Some holes can be seen in the brickwork, although the remaining plinth appears to be in a reasonable condition with some stepped cracking noted towards the east side. See photographs 74 & 79.

- 3.2.27. The west side of the brick plinth has been overcast in concrete, which continues to the west elevation. The framing internally is covered with a ply boarding and cannot be seen. The upper boarding can be seen which appears to be original towards the east side. See photographs 74 to 76.
- 3.2.28. The upper wall cannot be seen in totality as this is covered by black sheeting, which we assume has been introduced keeps the barn dry.
- 3.2.29. The upper stud walls can be seen, and these appear to be in a reasonable condition, although this is seen from ground level.
- 3.2.30. The upper studs and principal post can all be seen from the east side only.
- 3.2.31. The east corner of the north plinth has been undermined, which is why it has cracked and failed to this corner, and the plinth appears not to tie in with the east elevation corner. See photograph 79.
- 3.2.32. The barn structure is accessible giving access to 6 no. open bays, although there was limited access to the north east corner. The remaining bays to the south side of the barn were accessed via the south caged barn bay, and a door to the south west side.
- 3.2.33. The east elevation wall, bay 1, shows a brick plinth with sole plate which, in part, has failed and appears to have rotated outwards. The ground floor level studs are covered with ply boarding and these cannot be seen at this present time. See photographs 74, 75, 79 & 81.
- 3.2.34. The upper studs appear to be in a reasonable condition, and the connections up to the eaves plate appear to be intact. See photographs 74, 75 & 81.
- 3.2.35. The structure above, including the roof and timbers thereover, are modern to pick up the corrugated steel sheet roof.
- 3.2.36. The east wall principal stud between bays 1 and 2 appears to be fairly sound and of substantial size. The original brace appears to be missing and this has been substituted with a brace attached to the outside face of the south side of the principal frame. See photographs 75 & 78.
- 3.2.37. The second bay on the east side has a brick plinth and sole plate at lower level, which shows that the sole plate has rotated slightly. Part of the sole plate to the opening has been covered in a render. There is an opening to the east elevation which cuts through the sole plate and forming what looks like a later modern store area. See photograph 77.
- 3.2.38. The bay two, substantial east mid rail appears to be in a reasonable condition and connects into the principal post. The studs appear to be in a reasonable condition, and these currently appear to be built into the rendered timber plate. See photograph 77.

- 3.2.39. The upper studs have traditional wattle and daub or lime panels between the timber studs. There is a diagonal cross brace to the studs that connects into the eaves plate which appears to be fairly sound. There is no significant cracking across the panels, and these appear to be intact. See photographs 80 & 81.
- 3.2.40. The east wall, bay no. 3 appears to have been rebuilt, and coincides with the historic open barn entrance, which has been infilled with modern studs. See photograph 89.
- 3.2.41. The lower block wall appears to have kicked out at lower level and sits onto the slab. A relatively modern timber frame has been constructed over this with modern boarding and green covering seen to the upper section. See photograph 89.
- 3.2.42. The upper area under the eaves tie beam appears to be weather boarded in original boards, and there are braces seen to the tops of the door entrance, which are likely to be original. There is a lap joint between the eaves beam across the opening and this appears to have come apart. See photographs 89, 90 & 92.
- 3.2.43. The principal post to the right-hand side of the opening appears to be fairly sound, and currently has its brace attached as does the left-hand side post to the opening.
- 3.2.44. The east wall post base to the left hand of the opening appears to have been compromised and this is built into the wall and seems to taper down in cross sectional size. A possible splice repair may be required to the base of this post. See photograph 89 & 94.
- 3.2.45. The east wall_Bay 4, to the right-hand side of the opening, shows an electrical panel at mid-level. The existing eaves plate is visible, and this falls slightly to the south principal post position. The lower section is all covered and boarded. See photographs 95 & 96.
- 3.2.46. The upper wall is seen with original exposed studs and infill wattle and daub panels. The fourth infill panel from the north principal post has cracked and failed, pushing out, although the panel has not collapsed. See photograph 96.
- 3.2.47. The stud adjacent to this panel can be seen and we suspect that the mid rail plate has dropped in this location as the stud tenon can be seen which has pulled out. See photograph 96. The upper eaves beam appears to be in a reasonable condition
- 3.2.48. We note that the east principal post between bays 4 and 5 has a raking member to the post, which sits on the slab, and is clearly a later intervention. See photographs 96 & 97.

- 3.2.49. The east wall, bay no. 5 lower section is covered with storage material and boarded. The base of the wall appears to sit on a rendered brick plinth. The upper section reveals the mid rail which has dropped towards the south side. See photograph 100.
- 3.2.50. The upper sections of the studs can be seen with one of the studs doubled up, and only two and a half panels of the wattle and daub can be seen at this time. The south panels appear to have been pulled out and replaced with sarking felt seen to the external face. See photographs 100 & 101.
- 3.2.51. The principal post between bays 5 and 6 shows no connection to the tie beam and will need reinstating. The upper roof has been covered in black sheathing which covers the roof internally and the roof above cannot be seen. See photographs 100 & 101.
- 3.2.52. The 7th bay on the east elevation shows the lower section is covered, although there is part of the brick rendered plinth seen, with the upper studs in a reasonable condition with a diagonal brace seen on the upper wall. There is a diagonal brace missing to the principal post between bays 6 and 7. The studs to the 7th bay have no infill panels, which have been replaced with sarking felt. See photographs 100 & 101.
- 3.2.53. The south gable is all covered. There is a steel framed structure at this end. None of the timber framing can be seen to this end.

West Elevation

(See Photographs 76, 82 to 85, 87, 122 to 113)

- 3.2.54. Bay no. 1 to the north has a concrete plinth which appears to be cast over or rendered. Over the brick plinth. This then supports studs, although these are covered in boarding at the lower level up to the mid rail. The upper studs can be seen and these, in one location, are strengthened. The studs appear to be fairly sound up to the underside of the eaves plate. See photographs 76 & 82.
- 3.2.55. The studs at upper level can be seen covered in a sarking felt. The principal post between bays 1 and 2 appears to be fairly sound, with the original principal wind brace seen missing, although the mortices exist and a brace timber has been added to the south side of the post and tie beam. See photograph 84.
- 3.2.56. The bay 1 to 2 tie beam appears to be in a reasonable condition, connecting the east and west eaves plates. See photographs 81 & 84.
- 3.2.57. Bay no. 2 is north of the west door opening, and the north principal post shows a concrete plinth base. The lower studs are covered in boarding, and the mid rail is exposed and appears to be fairly sound. See photographs 83 & 84.

- 3.2.58. The upper original studs have been strengthened in two locations, with the one closest to the north post, appears to have depleted in size. The upper eaves rail appears to be in a reasonable condition. See photographs 83 & 84.
- 3.2.59. The north post adjacent to the double door opening sits on a concrete plinth and appears not to be adequate at this time. The post does tie back to the steel framing which we suspect is restraining the post at present time. See photographs 83, 87 & 112.
- 3.2.60. Bay no. 3 has a double door opening, with principal posts supporting the eaves beam that spans across the opening and appears to be in a reasonable condition. There is a large mortice notch to the north end of the eave beam, which may have housed the diagonal brace historically and these do not exist at this time. See photographs 87, 102, 103, 112 & 113.
- 3.2.61. Bay no. 4 is similar has the lower and mid stud wall covered with boarding, with the upper section showing the exposed original studs with wattle and daub infill panels in three locations, and partly in one location. See photograph 104, 105 & 107. There is a diagonal brace from the top north post down to the south post, although the lower section is covered.
- 3.2.62. The wattle and daub infill panels appear to be compromised in all locations. The eaves beam has been half lap spliced, although the joint has moved laterally, and the eaves plate has settled to the north side. See photographs 104, 105 and 107.
- 3.2.63. The principal post to the south side of bay 4 shows decay and failure of the connection to the tie beam where the post and tie beam location have sheared and failed considerably. Some secondary timbers have been added to strengthen the tie beam to the front wall plate and there appears not to be a connection from the principal post to the tie beam at present. However, we note that there is a horizontal bolted stud connecting the timber frame to the steel frame structure outside. See photographs 108, 109 & 111.
- 3.2.64. Bay no. 5 can be seen with the electrical socket unit fixed to the elevation. The lower and mid - section is boarded and covered, with the upper bay showing one original stud with 3 no. modern studs replaced and covered the infill panels missing replaced with sarking felt. See photographs 108, 109 & 111.
- 3.2.65. The eaves wall plate appears to be in a reasonable condition, there is a bolt through the eaves beam, approximately 1m from the failed post and similarly to the south post, which shows a failed connection between the principal post and the eaves plate and tie beam. Diagonal wind braces have been attached to the principal posts, either side of this bay which are not original. See photographs 108 to 110.

- 3.2.66. The south most open barn bay on this elevation is boarded at low level, although there does appear to be a brick plinth at low level, which appears to be a rendered. The upper original studs can be seen with two intact wattle and daub panels to the south, which appear to have been reinstated in recent years and appear to be fairly new. One stud, adjacent to the wattle and daub panel, has been doubled up, and the next stud over appears to have been reused from elsewhere due to the large notches seen and the mortices seen within the stud. The upper wall structure cannot be seen and cannot be verified. See photographs 108 to 110.
- 3.2.67. The south most end of the barn is accessible via a single door adjacent to bay 6 steel caged area. The south-end barn and hay loft was viewed from ground floor only.
- 3.2.68. The south-end barn is used as a store and is currently open, although access around the end barn is limited.
- 3.2.69. The first-floor hay loft structure is seen with a principal fluted timber beam spanning north-south supported on a primary timber beam spanning east-west, parallel with the joists. The primary timber beam in part sits on some stud walling which may have been added at a later date. See photographs 122, 127 to 135.
- 3.2.70. The principal beam appears to be two doubled up timbers which sit above and below the perimeter mid rail and are likely to be bolted together. See photographs 128 to 130 & 133.
- 3.2.71. The west end of the principal beam has decayed, and has been strengthened, although the bearing has rotated. See photographs 121 & 122. This member should be propped for safety.
- 3.2.72. The timber joists span from the substantial fluted beam on to the perimeter wall plate, which in areas has been affected by rainwater ingress which has compromised some of the bearings. See photographs 116 to 139, 141 to 150.
- 3.2.73. Some of the timbers have been strengthened in the past, where they have been affected by rainwater ingress, which has also affected the perimeter posts and studs which have deteriorated. See photographs 117 to 122, 126, 138 to 140, 145 to 150.
- 3.2.74. Significant water ingress and staining of the timbers has occurred to the west side and has compromised the joist bearings of 2-3 joists which show decay past repair and have been cut off and a board attached to trim the ends. See photographs 118, 138 to 139 & 150.
- 3.2.75. Plastic sheeting, sarking board and felt has been introduced to cover areas to try to manage the ingress of the rainwater. The studs have also been affected in these areas. The south wall is covered in sarking felt and what appears to be straw but we suspect is the ingrowing climbing vegetation which has affected the wall. See photographs 114 to 150.

- 3.2.76. The west wall can be seen boarded at lower level and some of the upper studs and eaves plate can be seen, although part of the structure is covered, which needs to be stripped back to understand its current condition.
- 3.2.77. The east side of the barn is in a better condition and exposed timber can be seen. Boarding still exists at lower level and sarking boards have been installed externally to protect the structure.
- 3.2.78. The north gable wall separating the main barn covered in sarking felt and some boarding. See photographs 131 & 132.
- 3.2.79. The west post adjacent to the entrance door appears to have decayed to its base and the remaining structure will need to be inspected once it is stripped back.

Site Survey Details 19 May 2021.

First Floor

(See Photographs 151 to 177)

- 3.2.80. To the south east internal elevation at first floor level, the eaves wall plate appears to have been cut on the principal post two bays in, and the wall plate then spans across the last but one bay and the panels and one stud appears to have been decayed central to the bay. There is also an opening at upper level to the roof at eaves level letting in rainwater. See photographs 151 to 154.
- 3.2.81. The west wall eaves plate also seems to undulate and has settled historically. We also note that the west wall at the location of the tie beam has crack damage at the junction of the two differing wall plates, with wattle and daub panel missing. See photograph 151.
- 3.2.82. The south end bay on this elevation shows that the timbers have decayed at high level and water has ingressed causing collapse of the lower section to the east corner. See photographs 153 & 154.
- 3.2.83. The south end gable can be seen with timber framing from ground to first floor level at eaves. The upper gable has been re-built in modern timbers as does the roof. See photographs 154 to 156.
- 3.2.84. The timbers at first floor appear to be in a reasonable condition. The east garden side bays show all the studs and wall plates in a reasonably good condition. The east elevation is externally wrapped in a bituminous felt and some lathe and lime plaster panels can be seen internally. See photographs 156 to 158.
- 3.2.85. To the north west elevation, we note again that past the second bay from the end that the wall plate again has been cut.
- 3.2.86. The timber framing on the whole appears to be in good condition and fairly substantial, suggesting that the barn is made of good quality timbers.

3.2.87. The principal beam at first floor level appears to be sited on the mid rail adjacent to the principal post on the bay elevation adjacent to the ladder position. This is not normal and suggests that the timber bays may have been altered or that the south end bays were added at a later date. See photographs 178, 188 to 189.

Ground Floor

(See photographs 179 to 204)

- 3.2.88. The principal beam spanning north to south appears to be a reused fluted timber beam which is not in keeping with the barns. The fluted timber beam section does appear to have been turned in its installation, with the fluted edge facing the west elevation (see photographs 188 & 189). The timber joists that are mortise and tenoned or notched into the principal beam and appear to be of good size and not in keeping with the barns, suggesting a later construction. See photographs 179 to 204.
- 3.2.89. The southwest corner does show that the timbers have failed, which is suspect due to water ingress at roof level, which has affected the timber structure and also the climbing vegetation which no doubt has affected the structure. See photographs 183.
- 3.2.90. The northeast gable elevation at first floor level can be seen with the timber framing, at ground floor this can be seen behind the bituminous felt and battening and seems to line up with the first-floor structure seen.
- 3.2.91. The joists on whole towards the rear left-hand corner appear to be similar across the whole of the first-floor structure. Some of the principal posts seen appear to have been reused timber sections, and we note that the timber wall plate to both the north west and south east sides, runs through approximately 1 to 2m in from the internal gable wall.

3.3. **CURTLEDGE BARN** **(See Photographs 205 to 270)**

External Elevations
(See Photographs 205 to 226)

West Gable
(See Photographs 205 to 209 & 215)

- 3.3.1. The west gable elevation is weather boarded with a modern single storey lean-to block-built structure located to the south-west corner. The weather boarded elevation has a single entrance to the ground floor, and remnants of a loft level door. See photograph 205.
- 3.3.2. The main barn and lower lean-to roofs show exposed eaves wall plates, which should be closely inspected to ensure they are adequate for future use.
- 3.3.3. The weather board to the main barn extends south to the lean-to structure, with the lower lean-to structure rendered and the post to the south-west corner can be seen decayed. See photograph 208.
- 3.3.4. The lean-to structure is a modern rendered block structure formed on a concrete plinth and is in part timber framed to the corner post and roof, which shows signs of decayed timber. See photographs 208.
- 3.3.5. The elevation on the main barn can be seen with a black painted rendered brick plinth which has failed render in areas. The upper boarded wall has missing boarding in areas. The wall generally on this elevation appears to be relatively vertical, although it does appear to 'belly' inwards at its mid-section and back out towards its gable. See photographs 205 to 210.

South Elevation
(See Photographs 210 to 214)

- 3.3.6. The south elevation of the lean-to structure has regular horizontal cracking which coincides with the blockwork bed joints, which has failed, and the plinth is exposed. Two timber framed window openings can be seen, with cracking below the window sills, and horizontal bed-joint cracking below the eaves level. See photographs 210 & 211.
- 3.3.7. The south-west timber post has decayed beyond repair and will need replacement. The exposed concrete plinth foundation can be seen above ground level to the south elevation. See photographs 208 & 210.
- 3.3.8. The lean-to structure has a timber brace built into the structure on the east of the south elevation located at eaves level. The east elevation of the lean-to structure can be seen with a steel corrugated cladding finish externally which is damaged, and this has been repaired in the past, although the damaged structure still exists. See photographs 210 to 212.

- 3.3.9. The south elevation of the main barn is covered with a vertically installed corrugated sheet cladding. The eaves gutter board to the elevation shows some decay. Adjacent to the main barn, is generally overgrown.
- 3.3.10. The south elevation roof to the lean-to forms a catslide roof, and together with the main barn roof is covered in a modern green corrugated sheeting. See photographs 211 to 214.

North Elevation

(See Photographs 216 to 223)

- 3.3.11. The north elevation of the barn can be seen with raking timber poles which rake from eaves level down to ground level, to help stabilise the structure.
- 3.3.12. The north elevation shows boarding to the west side at lower level with a single entrance door, and the upper section is wattle and daub with a rendered finish externally. Some lath and plaster has been added at higher level, adjacent to the double entrance, which show the new laths externally. See photographs 216 to 219.
- 3.3.13. The barn walls appear to be relatively vertical and square to the eye, with the exception of the midstrey bay and adjacent areas, where the eaves plate has dropped and fallen in-wards. See photographs 219 & 220.
- 3.3.14. Where the midstrey eaves plate has dropped to the east onto the principal post, the coinciding raker pole appears to have moved away from the building. We suspect that failure of the foundations and plinth has occurred, resulting in the dropping of the eaves plate and structure here, and note that the weather boarding has been redone adjacent to the large opening. See photographs 219 & 220.
- 3.3.15. The east bays of the elevation remain intact and appears in a reasonable condition. It does show that the structure has failed towards the double entrance door. See photographs 220 to 223.
- 3.3.16. The roof ridge undulates slightly, and has settled over the midstrey area, with the remaining ridge appearing generally level. The roof is covered in a corrugated sheeting, likely to be bitumen based, as the corrugated sheets do not appear to be rigid and show signs of sagging in between purlins. See photographs 216, 218, 221 to 223.
- 3.3.17. The roof corrugated sheeting has failed in areas and has two steel frame vents located to the west of the roof, with an open hole adjacent to the west gable. There are also twelve number corrugated roof lights to the elevation. See photographs 216, 218, 221 to 223.
- 3.3.18. The corrugated roof is covered in moss growth, and appears not to have any guttering, down pipes and means of diverting rainwater away from the barn, which is the primary cause of decay defects to the timber framing of the barn.

East Elevation

(See Photographs 223 to 226)

- 3.3.19. The east gable elevation has a large tanker vehicle parked within 1.5 m of the gable wall, limiting visual inspection of the gable wall. see photographs 223 to 226.
- 3.3.20. The elevation is completely black weather boarded which at lower level appears to be modern weather boarding more recently installed. The upper weather boarding from approximately 4 boards above eaves shows original weather boarding, which is in a reasonable condition. There are remnants of two possible openings to the upper loft area seen by cut boarding, and the lead clad door opening. See photographs 225 & 226.
- 3.3.21. The wall verticality at low level seems relatively plumb, with the upper gable wall appearing to be set back from eaves level upwards. The lower structure currently sits on the floor and not on the main structure of the wall. see photograph 223 & 225.
- 3.3.22. The eaves wall plate to the north is seen partly exposed and will need to be checked for future use. The south eaves plate is not visible and has been covered up. See photographs 225 & 226.
- 3.3.23. The south-east post is partially exposed, and seems to be leaning north, which we suspect may be part of the reason to shore the north elevation. See photograph 225.

Internal Survey

(See Photographs 227 to 264 & 270)

3.3.24. The ground levels vary across the barn, with the main barn set approximately 0.5m above the level of the southwest lean-to structure.

3.3.25. The Curtilage Barn has 5 bays, is of considerable size, and is oriented with the north and south front and rear elevations, and the west and east gable walls.

West gable elevation

(See Photographs 227 to 233)

3.3.26. The west gable exposed timber framed structure is seen with the majority of the timber structure intact. The ground to mid-rail timber studs have all been replaced with modern soft wood, sitting on a modern wall plate which has decayed over time and requires replacement. See photograph 227.

3.3.27. The main sole plate is located below the barn slab level, and we suggest that the use of the barn has meant that levels have been raised over time. The central and corner principal posts have also been built into the slab, as result of raising the slab level. See photograph 227 & (External elevation Photograph 206)).

3.3.28. The west corner post, adjacent to the lean-to structure appears in a reasonable condition, although the post base is built into the ground with a concrete infill attached for the electrical fixings. There is a brick retaining wall structure up against this wall adjacent to the lean-to structure. See photograph 227 & 232.

3.3.29. Settlement of the gable wall can be seen with the mid rail settling towards the south, suggesting that the principal post has decayed or settled over time, resulting in the sloping mid-rail. See photographs 227 to 229.

3.3.30. The west first floor original studs generally appear to be intact, although there is a lot of water staining seen and we suspect some decay exists in the studs. The eaves beam and upper studs all appear to be intact with some doubling up of studs carried out where required. See photographs 228 to 231.

3.3.31. The upper gable shows boarding which is all water stained. Some opening up of the boarding can be seen and some holes exist in the boarding generally on the elevation. See photographs 228 to 231.

3.3.32. The west lean-to elevation shows the weatherboarding being heavily water stained. The studs have been doubled up in some locations and the tie beam appears to slope towards the main barn. See photograph 232 to 234.

Lean-to - South Elevation.

(See Photographs 233 to 236)

- 3.3.33. The south elevation wall shows vertical stepped cracking to the blockwork below the lower window sill. The eaves beam sits on the block wall and picks up the rafters that span from the south main barn eaves beam down to the wall plate. See photographs 233 to 235.
- 3.3.34. The eaves beam to the modern structure show some decay where water has ingressed and the plate has settled with a further modern timber plate added to the top, to provide a level surface for the modern rafters. The rear wall has essentially failed with the bed joints all visible, and the structure attached to it is not ideal with the rafters above installed primarily to carry the corrugated sheeting. See photographs 233 to 235.
- 3.3.35. The concrete slab steps between the main barn and the lower lean-to structure. There is a concrete ramp formed to the south-east corner, and a modern brick plinth built to the east of the lean-to which supports the modern timber structure. The external corrugated sheet has failed, with a large opening and is inadequate. See photographs 235 & 236.

North Elevation

(See Photographs 237 to 249)

- 3.3.36. Bay 1 to the west shows the exposed timber framed structure with studs and/or the principal post sitting on ground below the slab level which will end up in decay of the lower sections. The timber elements themselves have moved out laterally and appear not to have any connection at its base. See photographs 237 & 238.
- 3.3.37. Bay 1: There is a brick on edge pier adjacent to the north-west post, and the lower boarding in the two east panels have been re-newed. The mid rail has been strengthened by bolting another timber member to the existing, across bay 1. See photographs 237 & 241.
- 3.3.38. Bay 1: Four of the six upper infill wattle and daub panels are intact, with two missing. The timber framing generally appears to be fairly square and intact, with a brace to the top west corner. See photographs 237 & 241.
- 3.3.39. The Bay 1 wall is out of plumb, and we suggest the wall has moved out laterally, and has been strengthened at mid rail level. The principal post base between bays 1 and 2 is sitting below slab level, and likely to be decayed (see photograph 238). The upper post and tie beam are in a reasonable condition.
- 3.3.40. Bay 2 shows studs at lower level, similar to bay 1 sitting on sub slab level, likely to be decayed and some remnants of block infill or brick infill on edge between the studs are seen together with original boarding and new cement boards in two locations. See photograph 239 to 241.

- 3.3.41. Bay 2: The mid rail seems to have dropped towards the opening, with 2 of the 5 wattle and daub panels damaged and missing. The studs appear to be fairly sound. The upper eaves plate has been strengthened in this location by bolting on a new timber. See photographs 239 & 240.
- 3.3.42. The upper roof structure has modern rafters, which have been packed to achieve the necessary pitch. See photographs 239 & 240. Part of the sole plate appears to be present at lower level, sitting on the slab.
- 3.3.43. Bay 3: The eaves plate exists and spans over the open elevation but falls towards the east of the bay. The connection between the eaves plate and the principal post on the west does not exist and the plate has rolled off its bearing position. See photographs 243 & 244.
- 3.3.44. The solid braces exist between the post and tie beam which are in a reasonable condition. The east principal post is in a reasonable condition and sits on either the slab or below the slab to its base, and carries the north eaves beam, brace and tie beam back to the corresponding post on the south. See photographs 244 to 246.
- 3.3.45. Bay 4 shows the lower section, again, likely to be sitting on the structure below the slab level. The mid rail falls significantly to the principal post position, adjacent to the double door and the upper level eaves plate has been strengthened by doubling up and bolting to the existing eaves plate. See photographs 245 to 247.
- 3.3.46. The raking shores can be seen butting up tight to the underside of the eaves plate to this elevation. The upper and lower level studs appear original and are in a reasonable condition. See photograph 246 & 247.
- 3.3.47. The principal post to bays 4 and 5 appears to be in a reasonable condition. The base of the post we suspect has decayed as it sits below the slab level. See photograph 247 & 248.
- 3.3.48. The upper post brace and associated tie beam appears to be adequate and the connection still intact. It appears that the original braces generally have been removed, with mortice holes existing in the post and tie beam, and these have been replaced with solid braces which we suspect are a later intervention, due to the use of the barn. See photographs 247 & 248.
- 3.3.49. Bay no. 5 can be seen with the studs at lower level sitting below the slab level, possibly on a sole plate which is likely decayed. The original studs can be seen at ground and upper level, which are in a reasonable condition. The lower studs have a brick on edge infill between the studs, and the lower structure is painted black. See photographs 247 to 249.
- 3.3.50. The inner face of the external boarding can be seen and climbing vegetation is attached to the lower area. See photographs 247 & 249.
- 3.3.51. The mid rail appears to be fairly intact and does fall slightly towards the west (bay 4), and the studs over appear to be intact with the brace to the corner between the eaves plate and the corner principal post also intact.

East Gable Elevation

(See Photographs 249 to 253)

- 3.3.52. The east gable at lower level shows a feature curved central principal post, mid rail and tie beam which appears to be in a reasonable condition. The lower section of studs have been removed and replaced with modern slender studs, with the exception of 1 no. stud south of the central post. See photographs 249 to 251.
- 3.3.53. The first-floor level studs over the mid rail, retain 6 no. original studs and wind brace, with a new slender stud frame and boarding planted to the external face of the original barn frame. See photographs 249 to 252.
- 3.3.54. The gable wall appears to have racked slightly towards the north and the eaves plate can be seen with some of the timber members unattached at the top, and the upper timber studs can be seen which have been affected by rainwater ingress as well as the boarding at upper level. See photographs 249 to 252.
- 3.3.55. The wall appears to dive inwards at upper eaves level, and the collar position can be seen bolted to the upper studs to retain the structure. A doorway can be seen above eaves level and the elevation generally has been affected by rainwater ingress and has been altered or strengthened to try to retain it. Externally, between ground and eaves level, new studwork has been installed which just sits on the existing slab. See photographs 249 to 253.

South Elevation – Main Barn

(See Photographs 254 to 264 & 270)

- 3.3.56. The first two bays of the south elevation from the west side are open to the lean-to structure, with the principal frame eaves beam and principal post. The first bay shows that the eaves beam falls to the west gable, and the principal post sits on a large concrete base which is half broken out and this we suspect has kept the post in position without decaying considerably whereas the gable end has dropped. See photographs 254 & 257.
- 3.3.57. The eaves wall plate seems to be an oddly cut shape timber and this we suspect is a later timber. The principal post between bays 1 and 2 racks over towards the east at its top and the post generally is intact with the original brace missing, although some pegs are seen in this location and the solid timber braces seen at the corner junction. See photographs 254 & 257.
- 3.3.58. Bay no. 2 can be seen with a similar eaves plate which is split at the junction of the principal post. The tie beam in the location of the principal post can be seen which has been affected by rainwater ingress and has decayed, although the strapping is still in place and the tie beam is generally still connected to top of the principal post with the solid timber brace added. See photographs 255 to 257.

- 3.3.59. The junction between the eaves wall plates and the post have split along the eaves plate, and remnants of stud tenons can be seen in the mortice notches. The eaves plate at bay 2 appears to be fairly sound apart from the split at principal post position. See photographs 255 to 258.
- 3.3.60. The principal post to bays 2 and 3 seems to be in better condition, there is a slight racking toward the east side to its top, and the post base appears to sit on a concrete pad and has a solid brace at eaves, with remnants of the mortice holes still exist for the original timber wind brace. See photographs 258 & 259.
- 3.3.61. The tie beam in this location has been affected by water ingress and is heavily stained, although the beam itself appears not to have rotted a great deal.
- 3.3.62. Bay no. 3 shows a modern brick plinth at lower level covered with vegetation, and modern soft wood studs spanning ground to eaves level replacing the original which have been removed.
- 3.3.63. Horizontal timber battening can be seen to carry the vertical corrugated external sheeting, and the upper eaves plate appears to be intact. There is a lapped joint to the eaves plate which appears to have been strengthened to ensure it does not come apart. There is some decay seen at the principal post junction with the eaves plate adjacent to bay 2. See photographs 258 to 260.
- 3.3.64. The principal post to bays 3 and 4 is leaning over towards the east at its top, and the post base sits on the slab. The wall framing appears to be original, with the studs, mid-rail and eaves plate of good size. The lower studs have been blackened and generally appear to be fairly sound, although the base of the studs is decayed in at least two of the studs, although the mid rail appears to be sound and is connected fairly well. See photographs 260 to 263.
- 3.3.65. The upper studs show one stud missing, with the studs generally appearing to be intact as well as the eaves plate. There appears not to be any raking resistance to these wall panels and suspect this is the reason that the structure has racked over towards the east. See photographs 260 to 263.
- 3.3.66. The 5th bay is similar to the 4th, and shows intact original studs and principal posts, with midrail and eaves wall plate. There is a one brace left at high level to the principal gable post and the eaves beam. The studs at lower level sit on the concrete plinth which has rotated and are still generally connected to the mid rail, although the mid rail has pulled out from the principal post between bays 4 and 5 on the 5th bay and upper studs in one or two locations have pulled out also from the eaves plate connection. See photographs 262 to 264.

4. Structural Implications of Proposals

4.1. Listed Barn

- 4.1.1. The proposals indicated on HAT's drawing dated August 2019, Rev B, shows no significant impact on the barn structure with no new openings at ground floor.
- 4.1.2. The main impact will be the introduction of the first-floor structure and access stair to the barn, which we assume will be supported on the existing robust frame but will need to be justified for the proposed loadings.
- 4.1.3. The new mezzanine floor forming the master bedroom to the south can utilise the existing timber floor structure, although some localised checks on the supporting structure will need to be considered. We assume the level of the proposed mezzanine will be as existing.
- 4.1.4. The existing mezzanine structure is likely to be suitable in terms of strength of the floor, although the connection of the timber structure to the walls will need to be reviewed and additional strapping and alike may be necessary to ensure the structure is structurally stable.
- 4.1.5. The west roof elevation shows roof lights to the apex, which should be easily accommodated to the new roof structure.
- 4.1.6. We assume new concrete ground floor slab will be installed to the barn, and any proposed build up must not undermine the existing foundations. Where the foundations are confirmed as shallow, possible underpinning of the barn may be required.

5. Conclusions and Recommendations

5.1. Listed Barn

- 5.1.1. The north single storey structure and the main barn brick plinths and foundations will need to be re-built where considered defective. These should be considered following further trial hole investigations.
- 5.1.2. The north single storey brick plinth has failed and will need to be re-built on a new foundation, with the perimeter relationship with the built-up ground re-considered.
- 5.1.3. The west wall where seen leaning adjacent to the main barn, will need to be carefully straightened, and strapped back to the main barn.
- 5.1.4. Allowance should be made to carefully strip and inspect the existing weather boarding, which we assume will need replacing.
- 5.1.5. The cracking seen to the west brick plinths will need to be locally re-stitched or re-built introducing stainless steel helical bed joint reinforcement.
- 5.1.6. The roof structure for the listed barns will need to be re-built, with new members sized to meet current building regulations requirements in terms of structure and insulation requirements.
- 5.1.7. All pegged connections and bearings should be closely checked to ensure they are adequate for the proposed use. Load checks on the individual elements should be carried out to confirm suitability for the increased roof loads.
- 5.1.8. The guttering system is non-existent at present and a new system should be installed to meet current building regulations.
- 5.1.9. Where any principal posts have been compromised in terms of connection of their base, these should be locally re-built on to the plinth, with a new sole plate introduced to match existing, and connected appropriately to the new structure.

- 5.1.10. The existing eaves plates should be checked for continuity, and allowance made to connect any parted eaves wall plates with a steel plate jointed connection, ensuring the ends of the wall plates are strapped back to the supporting return walls, and adequately strapped down to the external walls.
- 5.1.11. Where the single storey structure is not tied into the main barn, we suggest adequate strapping of the structure is carried out to ensure the walls and principal members are restrained.
- 5.1.12. The timber frame structure to the single storey building will need to be re-assessed once the external boarding has been removed, and the following various repair checks are recommend as part of any proposals for re-use and these would include, but not be limited to the following:
- Generally checking all fixings of timber to timber elements, re-instating or enhancing these as necessary;
 - Structural firing out of rafters to strengthen where necessary;
 - Replace undersized timber members;
 - Splice defective sections of soleplates where found;
 - Reconstruction of the north gable timber framed structure where the studs have been replaced with modern.;
 - Check bearings of principal members and allow to scarf in new sections if decay is found.

The majority of the existing fabric to the building should survive the conversion proposal.

- 5.1.13. All external climbing vegetation should be killed off with an approved biocide, and the vegetation removed. Allow to strip the internal and external boarding to the large barn and carry out further inspection of the structure to establish any further defects. Ensure any removal of boarding is carried out in a coordinated manor to ensure the barn structure is not compromised.
- 5.1.14. Where the principal wind braces are missing or have been replaced with planted braces, these should be reinstated and re-pegged ideally using reclaimed oak timbers to limit any structural shrinkage.

- 5.1.15. Where the new entrance to the west side is to be glazed, allow to install a new foundation to the glazed entrance, and provide adequate structural framing to the glazing.
- 5.1.16. The guttering system to the main barn should be replaced to meet current building regulations.
- 5.1.17. The external boarding and rendering we assume will need to be re-newed, with the exception of any original historic panels which must be protected with localised boarding, and then repaired and decorated accordingly.
- 5.1.18. Where the existing east sole plate has been cut to form the single door opening to bay two, we recommend reinstating the soleplate spliced in to the existing.
- 5.1.19. There are various repair checks which we would recommend as part of any proposals for re-use and these would include, but not be limited to the following:
- Generally checking all fixings of timber to timber elements, re-instating or enhancing these as necessary;
 - Structural firing out of rafters to strengthen where necessary;
 - Replace odd badly deflected or undersized rafters;
 - Steel plate overlong and deflected timbers;
 - Replace defective soleplates where found;
 - Check bearings of principal members and allow to scarf in new sections if decay is found.

The majority of the existing fabric to the building should survive the conversion proposal.

- 5.1.20. The south ground and first floor structure is in need of some initial propping to ensure the structure is safe, prior to stripping the structure for further inspection. The above philosophy of repairs should then be implemented to suit.

5.1.21. The failure of the brick plinth and foundations to the south west corner may require a new foundation with brick plinth to be re-built subject to trial hole investigations.

5.2. Curtilage Barn

5.2.1. The barn has been subjected to a build-up of modern ground/ slab levels which have compromised the foundations and brick plinth and resulted in failure of the foundations and brick plinth, which has resulted in defects to the structural frame.

5.2.2. We also suspect that the roof covering has in the past been compromised, and holes currently exist in the north roof slope, which have allowed rainwater to ingress and affect the timber elements.

5.2.3. Stability of the barn has been compromised, and the raking poles introduced to the north elevation are helping to retain the leaning structure.

5.2.4. We suggest that approximately 30% of the original barn structure is missing, having been replaced with soft wood to contain the existing frame and keep the structure reasonable weather tight.

5.2.5. The south-west single storey lean-to structure appears not to be significant, and is beyond repair, with our recommendations to take it down and re-build it.

5.2.6. The curtilage barn can we believe be partially re-constructed, stabilised and repaired. However, the process would require new foundations to be installed, and the plinth and frame structure raised to ensure it is out of the ground, and the frame re-installed.

5.2.7. Alternatively, the existing modern concrete slabs would need to be broken out, the foundations strengthened or replaced, and then the appropriate sole plate/ plinth and post repairs carried out to stabilise the structure. The new floor level can then be installed below the existing slab levels, and appropriate perimeter drains considered.

- 5.2.8. The barn structure would need to be carefully taken apart if necessary, and re-constructed on the strengthened foundations, with the likelihood of a new sole plate, for the existing or new studs to be installed.
- 5.2.9. The remaining upper structure can then follow. The sequencing of the work will need to be carefully considered with a suitable builder to ensure the structure is not compromised in its temporary condition, and whilst the works are carried out.
- 5.2.10. The roof structure will need to be designed to match the original frame or modernised and replaced with a new soft wood roof.
- 5.2.11. The visibility of the proposals will need to be considered, and we expect that the strengthening of the foundations and stabilising of the barn structure will require a budget in the region of £75K.
- 5.2.12. The re-construction work will require an appropriately experienced conservation builder or timber framed builder to be involved, to ensure that the works are sequenced and constructed correctly.

6. Limitations

- 6.1. It should be stated that we have not inspected woodwork or other parts of the structure unless specifically detailed in the report, which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.
- 6.2. This report has been carried out to the Client's requirements and no liability is intended or will be accepted from any third party whatsoever.
- 6.3. The limits of liability are restricted to the contents of this report. No opening up or investigation of foundations etc. was carried out unless specifically detailed in the report, the inspection being visual only.
- 6.4. No checks on load bearing capabilities have been carried out.

Appendices

Title: STRUCTURAL SURVEY REPORT
Project: Blakenham Farm – Watering Farm, Nettlestead, Ipswich, Suffolk, IP8 4QL
Client: 24 Trinity St, Colchester, CO1 1JN
Project No.: 60225

Appendix A
Drawings

Title: STRUCTURAL SURVEY REPORT
Project: Blakenham Farm – Watering Farm, Nettlestead, Ipswich, Suffolk, IP8 4QL
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Appendix B
Photographs

Title: STRUCTURAL SURVEY REPORT
Project: Blakenham Farm – Watering Farm, Nettlestead, Ipswich, Suffolk, IP8 4QL
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