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**Structural Inspection Report on the
Existing Detached Stone Barn, Keelham Farm,
Hebden Bridge, HX7 8TG.**

Prepared by

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Our Reference

CM/Y21189/Structural Report September 2021

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Existing Detached Stone Barn, Keelham Farm,
Hebden Bridge, HX7 8TG.**

1.0 Client.

Mr Will Vaughan.

2.0 Inspection Date.

8th September 2021.

3.0 Scope of Report.

Frederick G. Markland Associates Limited were instructed by Mr Will Vaughan to carry out a structural inspection of the existing detached stone barn at the above address. Along with preparation of a written report outlining our observations and conclusions as to the structural feasibility of existing structure being suitable for conversion to a domestic dwelling.

A selection of survey record photographs can be found within Appendix A.

4.0 Exclusions.

The inspection was a visual inspection of the areas that were readily accessible on the day of the inspection. No areas of the structure were opened up and no samples were taken.

5.0 External Inspection.

- i. The existing detached full height stone barn is an agricultural building of which the main barn structure has a partial existing first floor structure. There is an existing single storey stone extension attached to the left hand gable of the barn which is also of agricultural use. The far right hand end of the full height barn structure is attached to a stone 2 storey domestic dwelling. The right hand gable of the dwelling has a single storey stone extension which houses a domestic kitchen. For clarity this report is concentrated on the existing agricultural portions of the existing buildings and not on the domestic portions of the existing buildings.
- ii. The external elevations of the main barn comprised of coursed stone construction. The inspection revealed that the stonework bed joints were generally level with no signs of any significant foundation movement. The external walls were noted to be of a substantial 450mm overall thickness. A spirit level inspection to all elevations identified that the

- external walls were plumb and true with no signs of any significant lateral distortion or cracking. Additionally the stonework bed joints were generally level with no signs of any significant foundation movement.
- iii. The inspection progressed to the external walls of the single storey stone extension to the left of the main barn. The external elevations of the extension comprised of coursed stone construction. The inspection revealed that the stonework bed joints were generally level with no signs of any significant foundation movement. The external walls were noted to be of a substantial 450mm overall thickness. A spirit level inspection to all elevations identified that the external walls were plumb and true with no signs of any significant lateral distortion or cracking. Additionally the stonework bed joints were generally level with no signs of any significant foundation movement. The mortar joints within the stonework were noted to be open and weathered on all 3 external elevations, however despite these open joints the stonework had remained stable.
 - iv. The pitched roof covering to the main barn was noted to be stone flags with an exposed inclined stone coping up the gable verges. The roof profile appeared true and relatively level with no signs of any significant deflection or distortion. Generally the stone flag roof covering was noted to be intact with no significant signs of missing or slipped flags. There were existing gutters at each eaves location which have discharged rainwater to the downspout locations. This has protected the perimeter walls from becoming saturated and damaged from frost heave.
 - v. The pitched roof covering to the single storey extension was noted to be stone flags with an exposed inclined stone coping up the gable verge. The roof structure was noted to be deflected significantly to the point where a large portion of the stone flags had fallen through to the internal areas. This has resulted in large voids within the roof which has compounded in terms of deterioration of the timber roof structure due to prolonged exposure to wet weather and ultimate rot.

6.0 Internal Inspection.

Main Barn.

- i. The internal inspection commenced within the main barn. This revealed the exposed traditional roof structure, comprising of 3No equally spaced substantial timber trusses. The trusses were noted to be clear span across the width of the barn taking support at each end within the front and rear stone walls. Each timber truss supported 3No lines of substantial sized timber purlins per roof slope with a centrally aligned timber ridge beam. The purlins and ridge were noted to be performing adequately with no signs of any significant deflection, twisting or lateral distortion. The purlins were providing support to the existing timber rafters. Above the rafters sarking felt was visible providing an additional layer of protection against water ingress. The stone flag roof covering was secured in place with fixings in to the existing timber battens. In summary the existing roof structure was considered to be in good condition. Signs of past water ingress were noted in an isolated location adjacent to the verge of the left hand gable wall. The sarking felt was noted to be hanging down and unsupported at this location which had provided a pathway for driving rain. Internal staining to the upper portion of the gable wall and purlins ends was noted at this location.

- ii. There were no internal structural walls within the barn area resulting in an open plan internal space. The perimeter walls were checked with a spirit level and were noted to be acceptably plumb. The perimeter walls were finished with random stone to the internal face. There was a single former high level opening to the rear elevation which had been infilled with stonework in the past. The large access opening to the front elevation was noted to have a substantially thick steel plate lintel which was performing satisfactorily.
- iii. The existing partial first floor structure was of timber construction within internal steel supports providing intermediate support to the first floor joists. Additional support was also provided to the first floor via the perimeter stone walls in isolated locations. The first floor was noted to be at varying levels and generally was purpose made to coincide with the feeding pens for the farm stock at ground floor level.
- iv. The ground floor was noted to be ground bearing concrete slabs that had been constructed to create the feeding pens for the stock whist providing a central drainage/wash down channel. The slabs were noted to be performing satisfactorily.

Single Storey Extension.

- v. The internal inspection progressed to the single storey left hand extension. This revealed the exposed traditional roof structure, comprising of 1No offset substantial timber truss, supporting 2No timber purlins per roof slope with a central timber ridge beam. It was clear that the roof purlins had been subjected to significant deflection and rotation due to their distorted shape. Additional strengthening members had been added in the past adjacent to these purlins to share the roof load. However these members were also suffering from deflection. Partial collapse of the roof flags had occurred at this location resulting in large open voids within the roof covering.
- vi. The internal faces of the perimeter walls were checked with a spirit level were safe access was available. This revealed that the perimeter walls were generally plumb.

7.0 Photographs.

- i. A selection of our survey record photographs are included within Appendix A.

8.0 Conclusions.

The inspection has revealed that the existing detached stone barn can be classified as good. There are some isolated maintenance issues relating to localised water ingress through the roof. However, in the main this existing structure continues to perform satisfactorily.

The single storey left hand extension has suffered from deterioration of the timber roof structure and remedial works including new purlins, ridge, rafters and battens are required at this location. The existing timber truss appears to be worthy of retention and the roof flags could be salvaged for re-use. The perimeter walls remain stable, however external re-pointing will be necessary to help maintain future durability to this structure.

We are aware of the client intentions for conversion to a single dwelling. The structural proposals include the introduction of a new first floor structure within the main barn. This new first floor

structure will be tied to the perimeter walls at the bearing locations. Additionally new internal structural walls will be introduced to provide internal intermediate support to the new first floor structure. This combination of new structure will enhance the structural stability of the existing perimeter walls by the introduction of mid height lateral restraint from the first floor structure along with the buttressing effect of new internal walls.

In summary we conclude that this existing detached stone barn and single storey left hand extension are structurally suitable for the proposed conversion to a single domestic dwelling.

Prepared



Chris Markland
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Director

16th September 2021

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