

Wellan

Structural Report

Former Pig Barn

To the Rear of

5 The Colony, Sibford Gower

For

Ms C Tucker

July 2018

Wellan Ltd

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Approved 

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Project No.....18/129

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1.0 Introduction

This appraisal and report has been commissioned by Ms C Tucker, the owner of this building, in order to advise on its structural condition. The report will comment on the existing structure regarding defects and will provide advice and comments on the proposed conversion of the building for residential use and associated measures necessary to provide long-term structural stability of the property.

A site visit was made on 18th July 2018 by Mr M Walker, B.Sc C.Eng. M.I.C.E. Mr Walker is a Chartered Engineer with more than 30 years of experience, much of which has involved investigating older buildings (including listed buildings), identifying defects and specifying remedial measures.

An external and internal inspection of the visible parts of the buildings was carried out. Inspection of the buildings was carried out from ground level and with the aid of a 2.4 metre ladder. Close examination of the upper parts of the upper surface of the roof was, therefore, not possible. No opening up of the structure or foundations was carried out and the comments in this report are therefore based only on a visual inspection.

The comments in this report are illustrated by the sketches in Appendix A together with photographs.

An overall review regarding damp and timber condition are given in the report but an investigation by a specialist damp and timber company may be appropriate with their recommendations instigated as appropriate.

This report has been produced for the sole use of Ms C Tucker and her professional advisers in connection with the proposed conversion of the property and should not be relied upon by any other party or any other context.

2.0 Background, Site and Description of the Existing Building

This structure is a former agricultural building. The main part is divided into pens with corridor routes providing access. It was clearly built for animal use. The size and arrangement of the runs suggest that it housed pigs. A lean-to section has been added at the east end. The initial phase of this lean-to (as noted on SK/01 of Appendix A) appears to be original from the initial construction but the open fronted section is likely to have been added later. This later section has the appearance of a domestic car part (see photographs below) but the original lean-to is likely to have been constructed to provide storage (including feed).



The building is accessed through a drive beside 5 The Colony which is a semi-detached domestic residence. The redundant farm building is now in the same ownership as the domestic property but this may not necessarily always have been the case as it is located approximately 28 metres away. This building is relatively close to the eastern boundary of the site. To the opposite of this boundary there is a modern domestic garage and the nearby property that it serves. To the south there are a number of externally accessed pig houses and their associated pens all of which appear to have been unused for some period. There are no other adjacent buildings but the trees on the boundary are very close as can be seen from the photograph.

The Colony comprises a number of domestic properties lying to the south-western limit of Sibford Gower and accessed from it by Colony Road. The site is somewhat lower than the main part of Sibford Gower and Colony Road is on a significant downward slope. The land also slopes to the south from 5 The Colony so that this former pig building is below the road and the land continues to fall beyond the building to the south. It is, therefore, cut into the bank to a moderate degree, as shown below.



The area to the north-west and north-east is domestic garden but the land to the south, which is falling away from the building, is grassed paddock.

The British Geological Survey map indicates that the site is close to the boundary between Whitby Mudstone Formation and Ferruginous Limestone (known locally as Hornton Ironstone). Excavation for a domestic extension at 5 The Colony indicates that Hornton Ironstone or brash is present at a depth of approximately one metre.

The building is constructed with concrete blockwork walls and a pitched corrugated fibre cement roof covering. The roof structure comprised timber purlins supported on what appears to be two timber trusses. Closer inspection shows the trusses are actually propped from internal piers. There is a very large roof space as shown below.



The area is boarded but there is no permanent access and it appears to have been used only for storage.

3.0 Structural Details, Condition and Comments Regarding Conversion

This section should be read in conjunction with sketches in Appendix A

3.1 Roof

3.1.1 Roof to Main Building

The roof section is shown on SK/02. The corrugated roof sheeting spans between the timber purlins which are at approximately 1.4 metre centres which is comfortably within its span capacity. This sheeting is generally in good condition though there is evidence of a possible leak.

It is not known whether this sheeting contains asbestos fibre but it should be treated as an asbestos containing material (ACM) unless proved otherwise. It must be tested prior to any remedial work is carried out. If the sheeting is an ACM, as is likely to be the case, it is recommended that it is removed and replaced by a suitable material.

The purlins are 100x75mm softwood timber. They have performed satisfactorily with very little deflection evident and are in good condition. They are, however, relatively slim for their 3 metre span and will require replacement or reinforcing if an increase to the roof design loading is required. This can be easily undertaken by fixing a larger timber section alongside or, if the roof height is not to be raised then a steel angle reinforcement should be used.

The timber props are also 100x75mm are comfortably adequate for the present or future loading.

The loft space floor comprises 90mmx50mm joists spanning up to approximately 2 metres. They are near to the limit of their span based on domestic loading but are performing adequately with no evidence of overstressing or excessive deflection.

3.1.2 Roof of Lean-To

The roof of the lean-to section of the building comprises similar fibre cement roof sheeting spanning to purlins. However, in this case, there is no ceiling and the purlins span directly to bearing walls. Although the span of the purlins is relatively large for their span, there is again no evidence of sagging or excessive stress. However, if the roof were to be retained, it would be prudent to provide strengthening.

3.2 Walls and Foundations

The walls are single leaf blockwork throughout.

The external walls of the main building and the internal loadbearing walls have been constructed in 150mm block walls apart from the lean-to. Here the external walls are 200mm thick on the older section. This thicker wall has been adopted as the external ground level is raised compared with the internal floor level resulting in the wall needing to resist the lateral earth pressure. The newer open fronted section of the lean-to is constructed with 100mm blocks. This is not adequate for the ground pressure being exerted resulting in the wall being displaced laterally and cracking has resulted as shown below



The wall has been displaced inwards at the bottom but the top has been retained in position by the roof. A horizontal crack has therefore been caused due to the wall 'bellying' inward. The distortion has resulted in a lean of 1 in 80 as indicated on SK/03 in Appendix A. Remedial measures to both parts on the lean-to to address damp penetration in addition to the structural reinforcing required. This would require excavation for strengthening and tanking to the outside of the building. This would require considerable excavation within the root protection zone of the adjacent trees. Demolition of this section of the property and new construction at the opposite end of the building is the preferred solution.

The remainder of the walls are mostly vertical. There is an outward lean of approximately 1 in 400 to the south wall. This may be due to a small amount of horizontal thrust from the roof but is not sufficient to be a concern,

There is no evidence of settlement in any of the walls. This is probably the result of the relatively modest vertical loading and the presence of very firm ground at shallow depth. Vertical cracks are present in some of the blockwork walls. They are of reasonably consistent width from bottom to top suggesting that they are the result of longitudinal movement rather than settlement. The cause is due to a combination of initial shrinkage and the effects of wetting/drying cycles resulting in continued moisture movement. Concrete block walls of this type should have expansion joints at maximum of 6 metres in external walls subject to moisture and thermal changes. The walls are approximately 10 metres long and have no protection from moisture variation.

Internal walls are generally not loadbearing but there are eight square masonry piers supporting the roof. These are identified on SK/01. They are more 225mm square and are more than adequate to support the applied load.

It would be preferable to control moisture variation in the walls by application of render or rainscreen cladding in combination with an injected damp proof course. This may be sufficient to prevent further cracking as initial moisture movement is not an issue.

4.0 Proposed Conversion Works

The proposed architectural layouts is shown in Appendix A. This has been marked with the position of the existing structural elements which could easily be retained within the proposed layout.

It is proposed to lower most of the ground floor level by approximately one metre in order to create sufficient height for a partial first floor. This will require a new foundation to the external walls at a lower level. Additionally the existing single leaf walls will need to be modified to allow them to be adequate to withstand damp penetration and also to incorporate adequate insulation. This could be achieved by constructing a new foundation, in sections, at the lower level and building up the the underside of the existing wall. The foundation would be sufficiently wide to incorporate a new masonry leaf to the external face of the existing wall. At the north side the additional height to wall would be below ground level and would need to incorporate tanking and the wall would be thickened to resist lateral loading.

A new first floor is required at a lower level than the existing first floor and would require a large trimmed opening for the stairs. The new floor would allow the incorporation of the elements to provide support within first floor walls where required to support the roof.

If a roof covering similar in form to the existing (e.g. corrugated fibre cement or corrugated metal) then the roof could be retained in its current form, reinforced as suggested above. If a slate or tile finish is to be provided then it would be desirable to incorporate rafters and it will be appropriate to provide new purlins propped from the first floor structure within new wall layouts.

As the lean-to element is proposed to be demolished it will not be necessary to address the structural issues causing it to crack

5.0 Summary

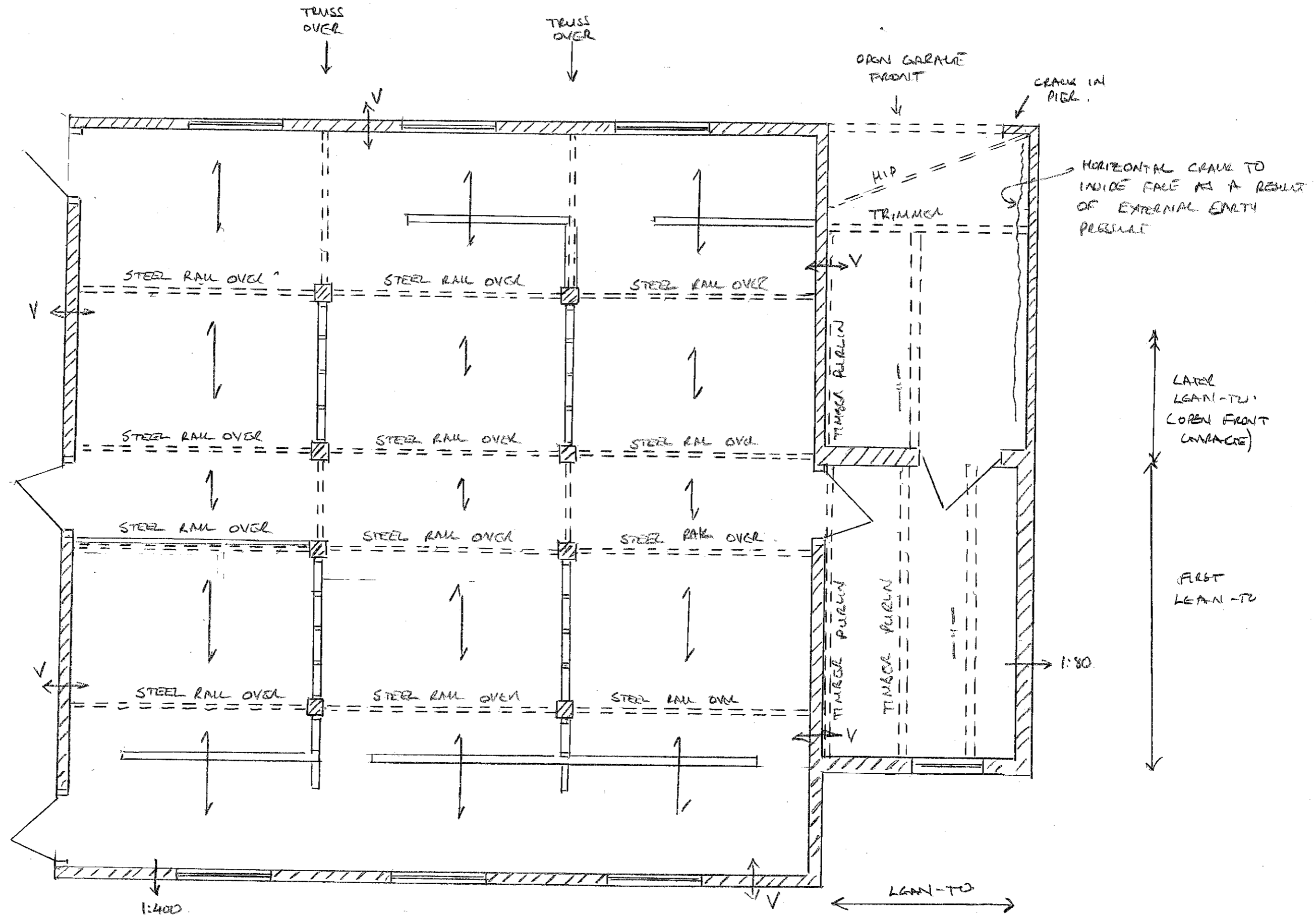
The existing building is in fair condition and is performing well except for lateral movement and associated cracking in the open fronted garage lean-to. Demolition of this section and an addition at the opposite end, away from the trees, is recommended.

Reduction of the ground floor level will have to be undertaken with care but the ground conditions are good and can therefore be undertaken whilst retaining the existing structure. The new masonry facing will be tied to the retained walls. Roof construction will be based on the existing arrangement but will be strengthened as necessary to suit the loading of the selected roof covering.

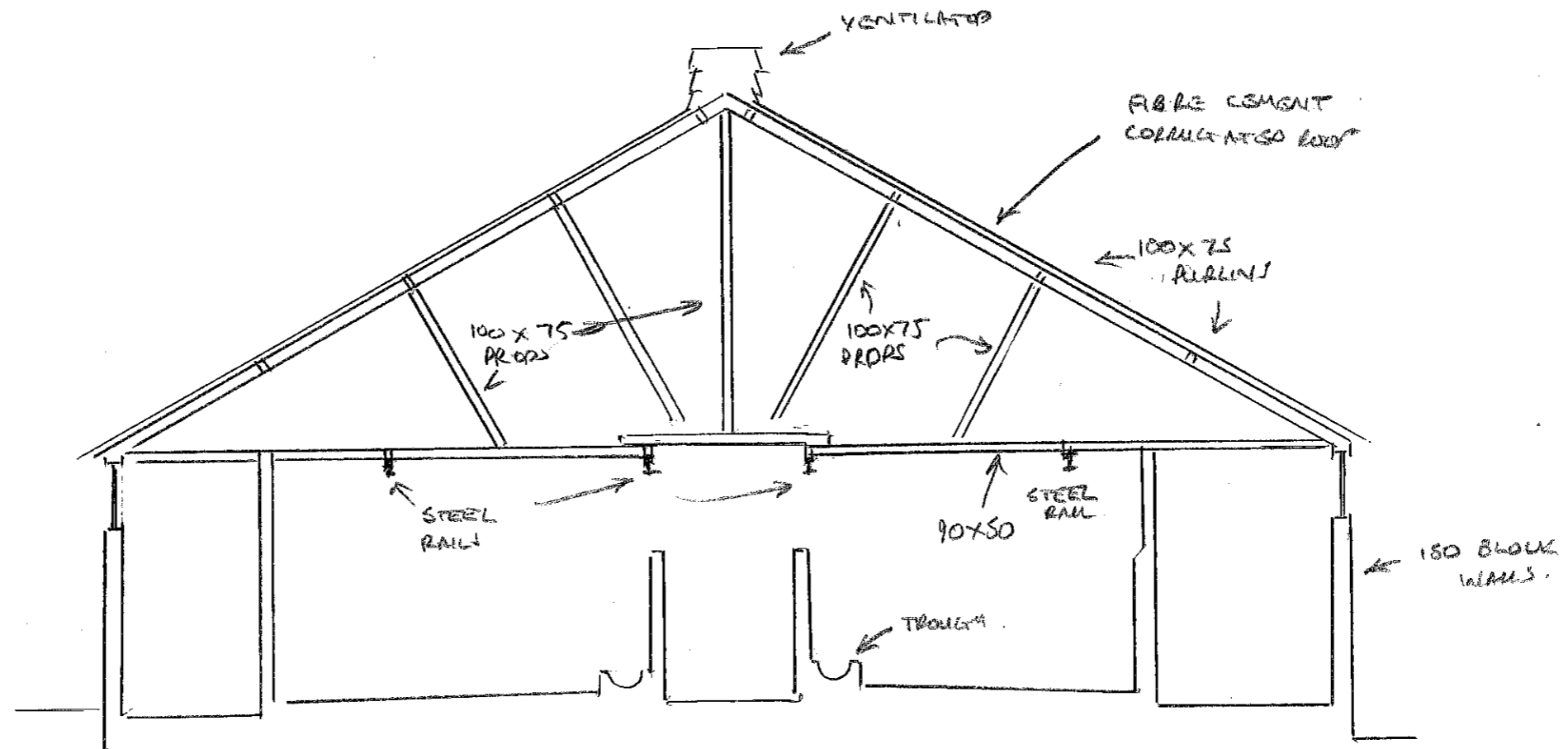
Appendix A

Sketch SK/01 Ground Floor Plan Showing Construction Over - Existing
Sketch SK/02 Typical Section - Existing

Wellan Tel 01608 685753	Wellan House, Aylesmore, Warks, CV36 5EJ
Scale 1:100 @ A Proj No 18-129	Title GROUND FLOOR PLAN SHOWING CONSTRUCTION OVER - EXISTING
Date JULY '18 Drg No SK/01	Project FORMER PIG PEN A 5 THE COLONY, SIBFORD GOWER



GROUND FLOOR PLAN SHOWING CONSTRUCTION OVER

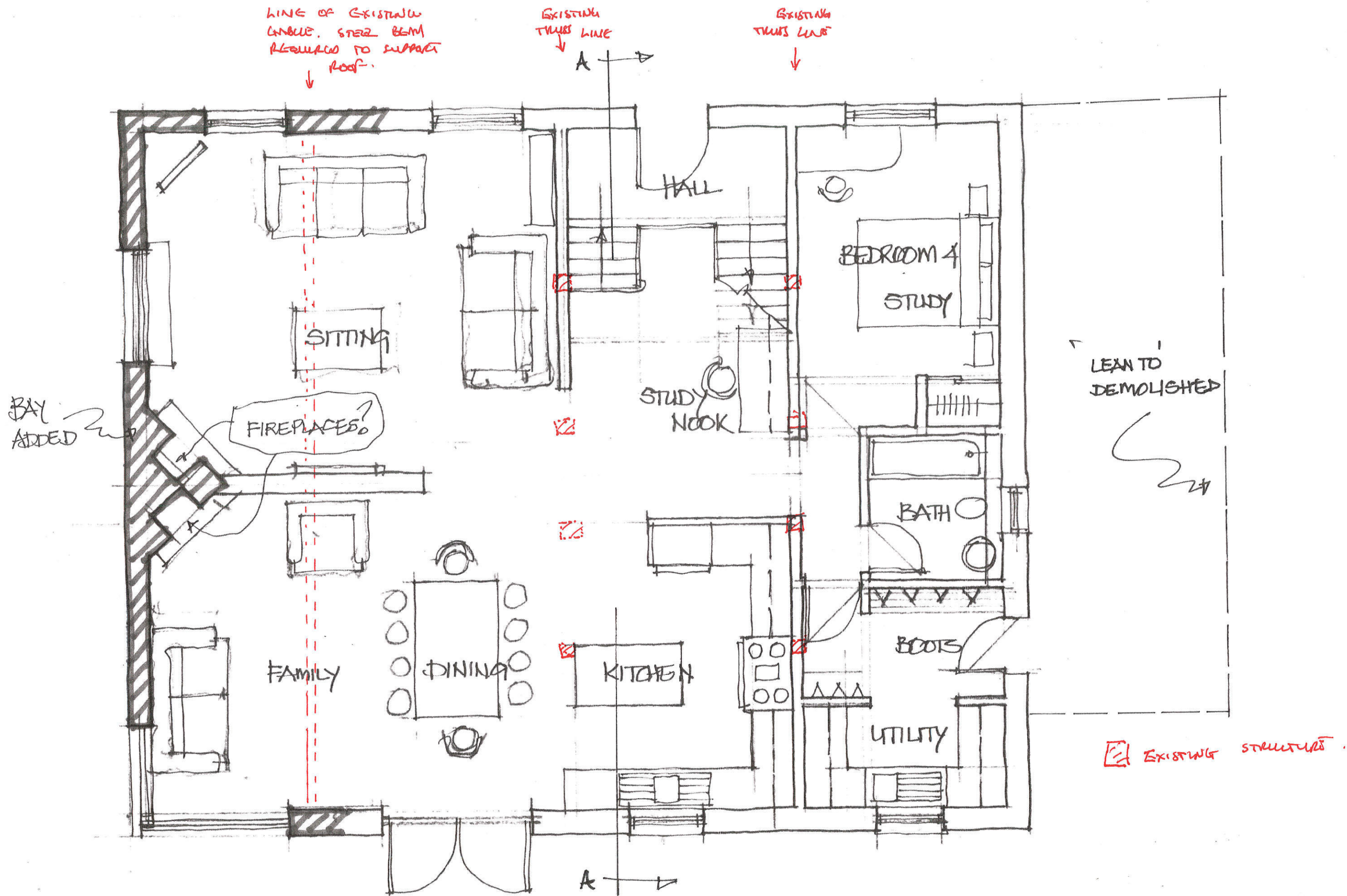


TYPICAL SECTION

Wellan Tel 01608 685753	Wellan House, Aylesmore, Warks, CV36 5EJ
Scale 1:50 @ A3 Proj No 18-129	Title TYPICAL SECTION
Date JULY 11 8 Drg No SK/02	Project FORMER PIG PEN AT 5 THE COLONY, SIBFORD GOWER

Appendix B

Sketch SK/03 – Existing Structure Overlaid on Proposed Plan



EXISTING STRUCTURE OVERLAID ON PROPOSED PLAN

Wellan	Tel 01608 685753	Wellan House. Aylesmore, Warks, CV36 5EJ
Scale NTS	Proj No 18-129	Title EXISTING STRUCTURE OVERLAID ON PROPOSED PLAN
Date JULY '18	Drg No 514/03	Project FORMER PIG PEN AT THE COLONY, SIBFORD GOWICK