

Structural Appraisal

of

Scalegill Hall

for

Thomsen Estates

Ref: Y100

October 2022

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**Structural Appraisal
Scalegill Hall**

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	Written By:	Checked By:	Date:
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1. Introduction

Scalegill Hall is a 17th Century farmhouse with Grade II listed status. The farm is located alongside the A595, to the west of the village of Moor Row and 3 miles south of Whitehaven. The farm has outbuildings in a ruinous state dating back to 1615, two traditional barns and various modern agricultural barns. The traditional barns and outbuildings are curtilage listed.

A structural appraisal was commissioned to inform the proposed development of the site as domestic accommodation alongside new build properties.

2. Inspection

Scalegill hall and the adjoining farm buildings were inspected on Thursday 29th of September. It was a clear dry day. All areas were fully accessible for inspection.

The modern agricultural barns have not been considered in this report.

3. General Description

Scalegill Hall is a two storey domestic property with solid sandstone rubble masonry walls with a cement render. The roof has a slate covering with king post trusses and 2 no. purlins on each slope. There is a hipped roof to the rear of the building, with 3 no. purlins on each slope. There are 3 no. chimney stacks protruding from the gable elevations. The first floor structure consists of timber joists supported on intermediate hardwood timber beams, 190mm x 230mm deep. The main staircase has stone treads and is in a prominent position to the living room and dining room. There is a timber winder service staircase from the kitchen.

There is a two storey link building connecting the main house to the adjoining barn. The link building is of solid sandstone rubble masonry with a cement render. The roof has a slate covering with 2 no. purlins on each slope. The first floor structure consists of timber joists, 65mm x 180mm deep at 400mm centres spanning full length onto the internal cross walls.

The adjoining barn is a single storey double height space, with solid sandstone rubble masonry walls. The roof has a slate covering with 6 no. common trusses and 2 no. purlins on each slope. There is a mezzanine over the east and west ends the barn with timber joists supported on intermediate timber beams. There is a cart entrance to the south elevation with timber lintels over. There is a modern agricultural barn abutting the north elevation of the barn. The barn consists of blockwork walls with a metal sheet roof covering on steel beams.

The separate barn is a traditional two storey bank barn, with solid sandstone rubble masonry walls. The roof has a slate covering with modern timber trusses with 3 no. purlins on each slope. The first floor structure consists of timber joists supported on intermediate timber beams. The beams have additional support from timber posts and blockwork piers. The lintels over door and window openings are generally sandstone and hardwood timber.

There are 3 no. outbuildings in a ruinous state. The buildings are single storey solid sandstone rubble masonry. The roof coverings and timber structure are no longer remaining.

4. Structural Defects and Repair Recommendations

The following defects and repair recommendations should be read in conjunction with the accompanying drawings Y100-101 to Y100-104.

4.1 Main House

Structural Defects

No trial pits or foundation investigations were carried out at the time of inspection. There are 2 no. large trees in close proximity to the front elevation of the main house. There was no evidence that the tree roots are causing foundation movement.

Overall, the masonry walls are in reasonable condition. There are localised defects, including:

- The hard external cement render is non-breathable and can cause damp build up internally.
- The render has cracked on all elevations and has failed locally on the west elevation adjacent to the chimney flue.
- There is a high level vertical crack to the north gable elevation. The crack extends through the full width of the wall and is visible internally.
- The front elevation is covered in ivy and vegetation. The vegetation has penetrated through the masonry walling and has blocked the gutters.
- There is a sandstone arch over the fireplace in the dining room. 1 no. arch stone has a shear failure which has displaced the masonry above and caused a diagonal crack.
- There is a corroding iron band below an inner timber lintel within the service kitchen.
- The masonry to the ground floor store and bathroom is in poor condition. There is 1 no. rotten timber lintel over a door opening. There are also 2 no. rotten

embedded timber beams to the south and west walls. The masonry above has displaced and partially collapsed.

- There is a rotten timber beam over the stone staircase. The timber beam provides support to the masonry wall above.

Overall, the first floor structure is in reasonable condition with localised defects. The floor over the ground floor store and bathroom has partially collapsed caused by rot and loss of section to the main timber floor beam. The first floor joists over the store in the link building are undersized and have split at their mid-point.

The stone treads to the main staircase have worn away and are uneven. The timber winder staircase is in poor condition. The lower flight has collapsed and there are splits in the timber treads to the upper flight. The external stone staircase to the link building has uneven and moss growth on the treads. The balustrade is inadequately fixed and loose.

The roof is in good structural condition with 1 no. notable defect to the roof structure over the link building. There is 1 no. purlin with a rotten end.

The above ground rainwater goods are in poor condition across the site. There is significant vegetation growth at eaves level to the main house and adjoining barn blocking gutters. There are also missing downpipes and gutters.

There is scrub vegetation within the north west garden which is causing the ground to become soft and waterlogged.

Repair Recommendations

The main house requires localised masonry repairs, including:

- Removal all rotten embedded timber to store / bathroom and build up inner leaf of masonry.
- Stitch cracked arch voussoir stone and diagonal crack in masonry above, using stainless steel bar set in epoxy resin, or proprietary crack stitching system.
- Replace rotten timber lintel over door opening in hardwood timber.
- Remove corroding iron band and replace timber lintel in new hardwood timber over window opening.
- Remove rotten timber beams over stone staircase and replace in steel, with a 152 x 152 x 23 UC steel beam, Grade S355.
- Install a proprietary crack stitching system to the high level crack on the north gable.
- Patch repair any failed cement render in lime render.

The first floor structure over the store and bathroom, and the link building, will require full replacement. New joists to be 63mm x 190mm deep at 400mm centres spanning the full width, no requirement for intermediate support. The joists can be fixed to a new timber wall plate secured to the masonry wall using stainless steel threaded bar set in 2 part epoxy resin. Timber to be Grade C24 softwood.

The timber winder staircase will require full replacement. The external stone staircase should be cleaned down, removing all moss growth and all gaps between the treads should be packed and pointed in lime mortar. A new balustrade should be installed.

A traditional scarf end repair should be carried out to the rotten roof purlin over the link building.

We would advise installing a new above ground drainage system with additional downpipes to improve the system. Any new rainwater goods should be cast iron or aluminium.

The ivy to the east elevation should be cut back and all roots removed, or stumps left and poisoned. The scrub to the vegetation to the north west garden should be cleared and land drainage installed to improve the soil conditions.

4.2 Adjoining Barn

Structural Defects

No trial pits or foundation investigations were carried out at the time of inspection. There was no evidence of settlement or foundation failure.

Overall, the masonry walls are in good condition with only localised defects. There is a rotten embedded door frame to the east gable elevation. The vertical stone surrounds that form the ventilation openings at eaves level have displaced in 2 no. locations.

The first floor timber structure over the store is in poor condition. The joists are rotten, and the intermediate timber beam is rotten and has snapped.

The roof structure is in reasonable condition with localised areas of missing and slipped roofing tiles and isolated structural defects. There are 2 no. truss tie beams with rotten ends and loss of section. There is 1 no. rotten purlin with significant loss of section supporting a series of rotten common rafters.

Repair Recommendations

The adjoining barn requires localised masonry repairs, including:

- Remove all embedded timber to the east gable and piece in new stone or brick bedded in an appropriate lime mortar.
- Consolidate loose masonry stones above south door opening.

The first floor structure over the store will require full replacement, refer to Section 6 for details on converting the barn to domestic.

The roof structure requires localised timber repairs, including:

- Traditional scarf end repair to tie beam on 2 no. trusses.
- Full replacement of rotten purlin and common rafters, in hardwood timber.
- Refix any loose slates to prevent further water ingress.

The client should consider replacing the modern roofing tiles with Westmorland slate to match the main house.

We would advise installing a new above ground drainage system with additional downpipes to improve the system. Any new rainwater goods should be cast iron or aluminium.

4.3 Barn

Structural Defects

No trial pits or foundation investigations were carried out at the time of inspection. There was no evidence of settlement or foundation failure.

Overall, the masonry is in reasonable condition. The main concern is the bulging masonry to the south elevation. There is an outward bulge from ground floor level to first floor level and diagonal cracking in the stonework. In addition, there are 2 no. rotten timber lintels, 1 no. inner timber lintel over a ground floor window opening to the south elevation and 1 no. outer timber lintel over the cart shed opening on the north elevation. The masonry above the cart shed opening has displaced. There is minor vegetation growth to the south elevation.

The first floor joists are in poor condition. The joists to the first bay have collapsed and have split at their mid-point. The joists to the second and third bay have been strengthened with additional joists slotted between the existing. The joists to the fourth bay have collapsed adjacent to the front elevation. There are also voids and loose stones to the rear elevation, which is retaining the higher external ground levels, this is allowing water to ingress through the masonry and rot the joist ends. The first floor structure over the east end of the barn has collapsed.

The roof structure is a modern replacement, with no notable structural defects.

Repair Recommendations

The bulging masonry to the south elevation will require rebuilding, from ground floor to first floor, as indicated on the drawing. The masonry above will need to be adequately propped before the stonework is carefully taken down. The rebuilt stonework should be adequately tied into the existing stonework using proprietary wall ties.

The rotten lintel over the cart shed opening should be removed and replaced in hardwood timber. The masonry above requires consolidating and repointing in an appropriate lime mortar. A new timber lintel is required over the central ground floor window opening. This should be replaced in hardwood timber or precast concrete.

The defective and collapsed first floor joists require renewal, refer to Section 6 for details on converting the barn to domestic.

We would advise installing a new above ground drainage system with additional downpipes to improve the system. Any new rainwater goods should be cast iron or aluminium.

4.4 Outbuildings

Structural Defects

The remaining masonry walls to the outbuilding no. 1 and no. 2 are in reasonable structural condition.

Outbuilding no. 1's masonry walls are complete up to eaves level. There is significant vegetation growth, with well established trees growing within the west room and ivy growth to the west gable and internal cross wall. The wall heads are exposed, causing wash out of mortar and loose stonework.

Outbuilding no. 2 has missing masonry walls, including the front and rear elevation. There is vegetation growth to the north elevation and internal cross wall. The exposed wall heads have loose stonework caused by mortar wash out.

Outbuilding no. 3 is ruinous and has well established trees and significant vegetation growth. This restricted access to the building, so a structural survey was not completed.

Repair Recommendations

All vegetation should be removed from the 3 no. outbuildings. Any vegetation rooted into the masonry should be carefully taken out, any loose masonry to be consolidated and repointed in an appropriate lime mortar.

The wall heads should be consolidated using an appropriate lime mortar to protect from further deterioration.

5. Comments on Planning Proposals

The defective or collapsed first floor structures in the barns will require full replacement and be designed to comply with Building Regulations. We would advise the following:

Adjoining Barn

- Store – 1 no. steel beam 203 x 133 x 25 UB Grade S355 with 63mm x 190mm deep timber joists at 400mm centres, Grade C24 softwood.
- Byre – renew joists in line with modern regulations. 63mm x 190mm deep timber joists at 400mm centres, Grade C24 softwood.

Barn

- Renew first floor structure in its entirety to comply with Building Regulations, with timber joists supported on loadbearing partitions and steel beams.

The proposals involve the removal of an internal cross wall to the barn, which can impact on the structural stability of the building. A structural scheme will need to be developed to provide sufficient lateral restraint, this could be provided by the first floor structure, with timber joists supported on steel beams, steel columns and loadbearing partitions.

6. Conclusions

In conclusion, the buildings are in reasonable structural condition with localised repairs required, including, replacement of first floor structures, repairs to defective masonry, vegetation removal, and full renewal of above ground drainage.

The 2 no. barns are suitable for conversion to domestic following repairs. The remaining masonry walls to one of the outbuildings are in reasonable condition and with repair can be incorporated into the proposed development.

7. List of Photos

Photo 1 - East elevation of main house

Photo 2 - Vegetation growth to south elevation of main house

Photo 3 - North gable with vertical crack near window opening and failed cement render

Photo 4 - Stone arch with shear failure to voussoir stone

Photo 5 - Failed first floor timber beam over store

Photo 6 - Modern raised collar truss adjacent to original truss over service bedroom

Photo 7 - Roof over link building with rotten purlin end

Photo 8 - Timber treads to second floor staircase in poor condition

Photo 9 - South elevation of adjoining barn

Photo 10 - Roof structure over adjoining barn

Photo 11 - Rotten purlin and common rafters

Photo 12 – Truss tie beam with rotten end

Photo 13 - External staircase with vegetation growth on treads and loose balustrade

Photo 14 - South elevation of barn with outward bulging masonry

Photo 15 - North elevation of barn with rotten timber lintel over cart shed

Photo 16 - Collapsed first floor joists in barn

Photo 17 – Collapsed first floor joists and rotten wall plate

Photo 18 – Modern softwood roof trusses over barn

Photo 19 - Vegetation growth to Outbuilding No.1

Photo 20 - Vegetation growth and exposed masonry wall heads to Outbuilding No. 2



Photo 1 - East elevation of main house



Photo 2 - Vegetation growth to south elevation of main house



Photo 3 - North gable with vertical crack near window opening and failed cement render



Photo 4 - Stone arch with shear failure to voussoir stone



Photo 5 - Failed first floor timber beam over store



Photo 6 - Modern raised collar truss adjacent to original truss over service bedroom



Photo 7 - Roof over link building with rotten purlin end



Photo 8 - Timber treads to second floor staircase in poor condition



Photo 9 - South elevation of adjoining barn



Photo 10 - Roof structure over adjoining barn



Photo 11 - Rotten purlin and common rafters



Photo 12 – Truss tie beam with rotten end



Photo 13 - External staircase with vegetation growth on treads and loose balustrade



Photo 14 - South elevation of barn with outward bulging masonry



Photo 15 - North elevation of barn with rotten timber lintel over cart shed



Photo 16 - Collapsed first floor joists in barn



Photo 17 – Collapsed first floor joists and rotten wall plate



Photo 18 – Modern softwood roof trusses over barn



Photo 19 - Vegetation growth to Outbuilding No.1



Photo 20 - Vegetation growth and exposed masonry wall heads to Outbuilding No. 2

8. List of Drawings

- 101 House and Adjoining Barn - Ground Floor Plan
- 102 House and Adjoining Barn - First Floor Plan
- 103 House and Adjoining Barn - Elevations
- 104 Barn - Plans and Elevations



SCRUB VEGETATION
SOFT AND WATERLOGGED GROUND CONDITIONS
CLEAR SCRUB VEGETATION

MODERN LEAN-TO AGRICULTURAL BARN (NOT SURVEYED)

ADJOINING BARN

Byre

Byre

Ex JOISTS
65 x 180mm Dp @
400mm c/c

ROTTEN TIMBER DOOR
FRAME EMBEDDED
WITHIN MASONRY
REPLACE ROTTEN TIMBER
IN STONE / BRICK

ROTTEN TIMBER JOISTS
BREAK IN TIMBER BEAM 2
no. 90 x 250mm Dp
RENEW FLOOR STRUCTURE

SPLITS IN TIMBER JOISTS
65 x 180mm Dp @ 400mm c/c
RENEW FLOOR STRUCTURE

TIMBER STAIRCASE IN
POOR CONDITION
UNSAFE FOR ACCESS
PROVIDE NEW STAIRCASE

BALUSTRADE INADEQUATELY FIXED.
OPEN JOINTS TO STONE TREADS.
CLEAN DOWN AND REPOINT OPEN JOINTS
PROVIDE NEW BALUSTRADE

TIMBER LINTEL WITH
CORRODING IRON BAND
BELOW
TO BE REPLACED

SHEAR FAILURE IN ARCH
STONE
TO BE STITCHED

OPEN JOINTS TO STONE
TREADS

NO ROOF OVER
OUTBUILDING

LOOSE MASONRY TO
EXPOSED WALL HEADS
CONSOLIDATE WALL TOPS

NO ROOF OVER
OUTBUILDING.
LOOSE MASONRY TO
EXPOSED WALL HEADS.
CONSOLIDATE WALL TOPS

RESTRICTED ACCESS FOR INSPECTION.

WALLED GARDEN
(NOT SURVEYED)

OUTBUILDING NO. 3

STONE STEPS WITH WEAR
ON TREADS

COLLAPSED TIMBER
JOISTS OVER BATHROOM /
STORE

ROTTEN TIMBER LINTEL
TO BE REPLACED

2 no. ROTTEN / MISSING
TIMBER LINTELS. LOOSE
MASONRY ABOVE.
CONSOLIDATE / REBUILD
MASONRY

ROTTEN TIMBER BEAM
RENEW FLOOR STRUCTURE

BEAM 190 x 250mm Dp

Service Kitchen

BEAM

BEAM

BEAM

BEAM

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GROUND FLOOR PLAN w/ FIRST FLOOR STRUCTURE OVER
1:100

GENERAL NOTES

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- Check levels/dimensions quoted on drawing against those on site before finalising.
- Report any discrepancies before affected work commences.
- For setting out dimensions, see Architect's drawings.
- This drawing remains copyright of Blackett-Ord Conservation Ltd. Copy/distribute only with consent of the Author.

KEY

- SPAN OF TIMBER FLOOR JOISTS
- SPAN OF COMMON ROOF RAFTERS
- VEGETATION GROWTH
- LARGE TREE
- STRUCTURAL DEFECT (AS NOTED)
- CRACK IN MASONRY

GENERAL REPAIRS

- REMOVE VEGETATION FROM MASONRY WALLS
- RENEW ABOVE GROUND DRAINAGE SYSTEM, WITH NEW CAST IRON GUTTERS AND DOWNPIPES.

CONDITION SURVEY



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Scalegill Hall
for Thomsen Estates

House and Adjoining Barn - Ground Floor Plan

Drawing No: Y100/101 Rev: - Scale: 1:100 @ A1 Date: Oct, 2022

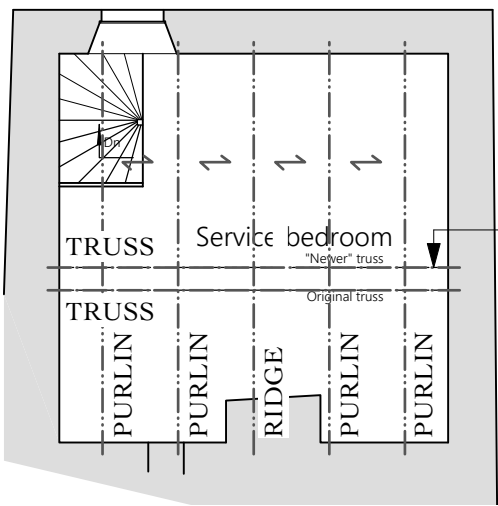
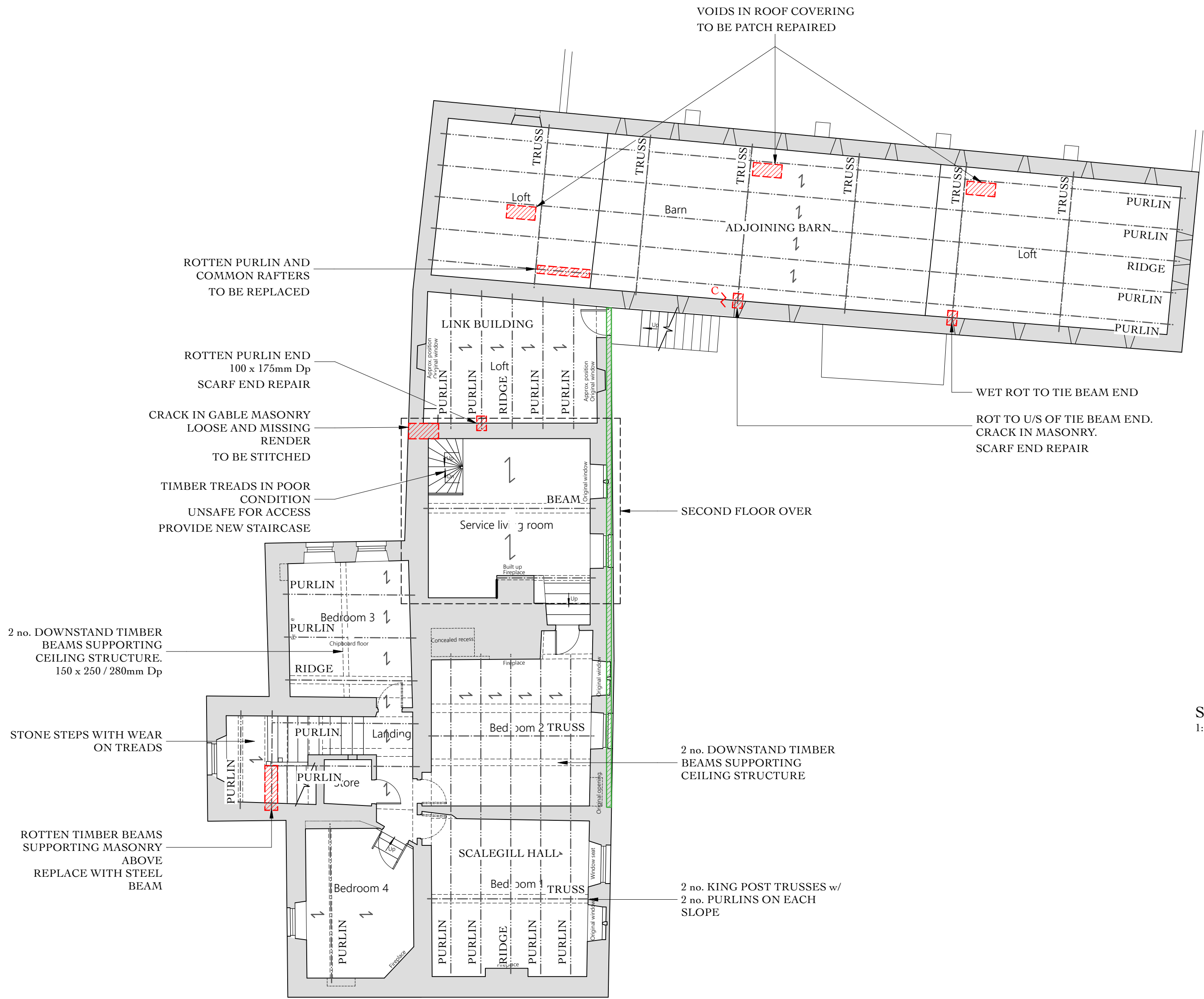




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MODERN RAISED COLLAR TRUSS
ADJACENT TO ORIGINAL w/ 2 no.
PURLINS ON EACH SLOPE

SECOND FLOOR PLAN w/ ROOF STRUCTURE OVER
1:100

FIRST FLOOR PLAN w/ ROOF STRUCTURE OVER
1:100

CONDITION SURVEY

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Scalegill Hall
for Thomsen Estates
House and Adjoining Barn - First Floor Plan

Drawing No: Y100/102 Rev: - Scale: 1:100 @ A1 Date: Oct, 2022

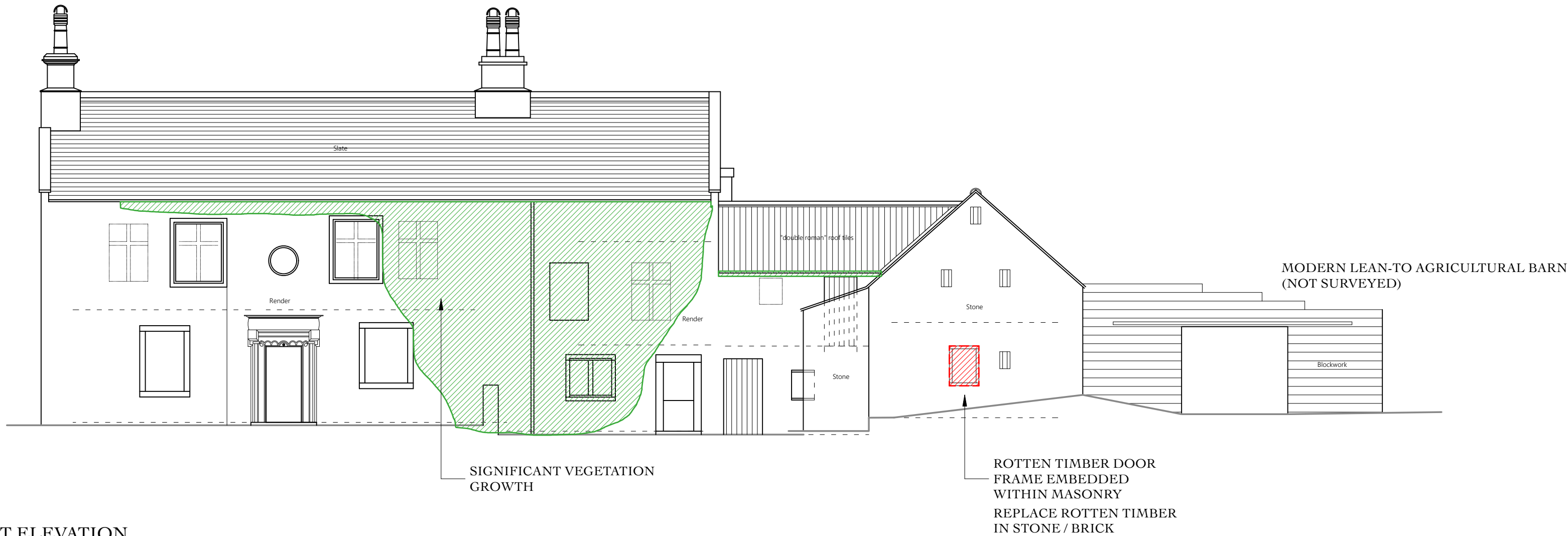


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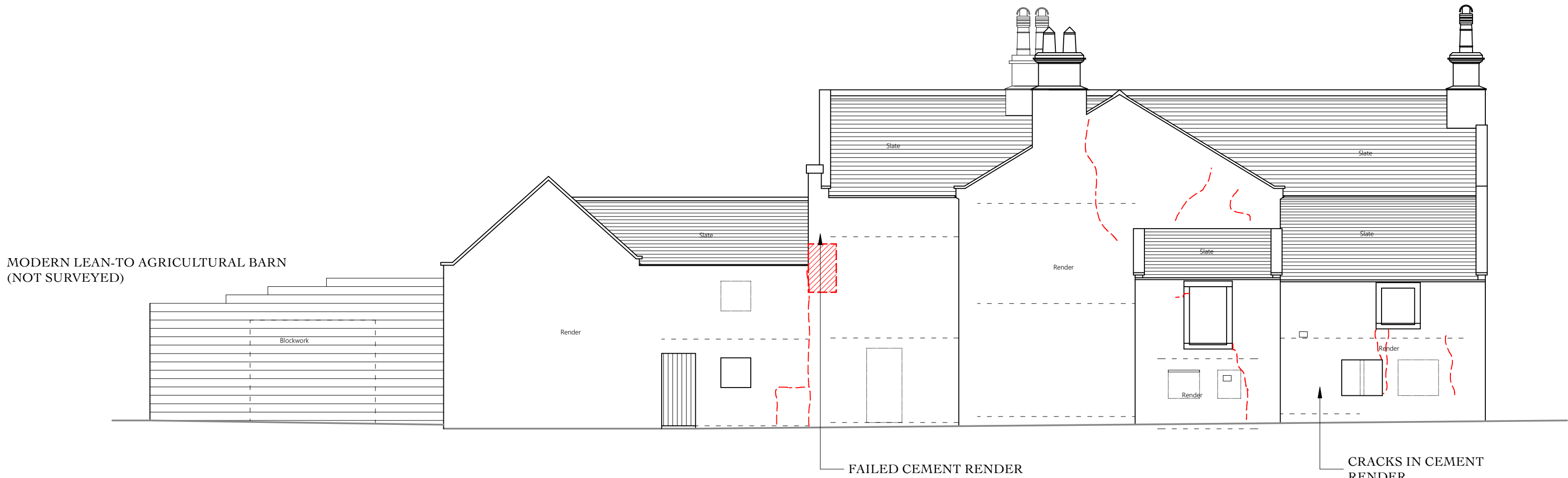
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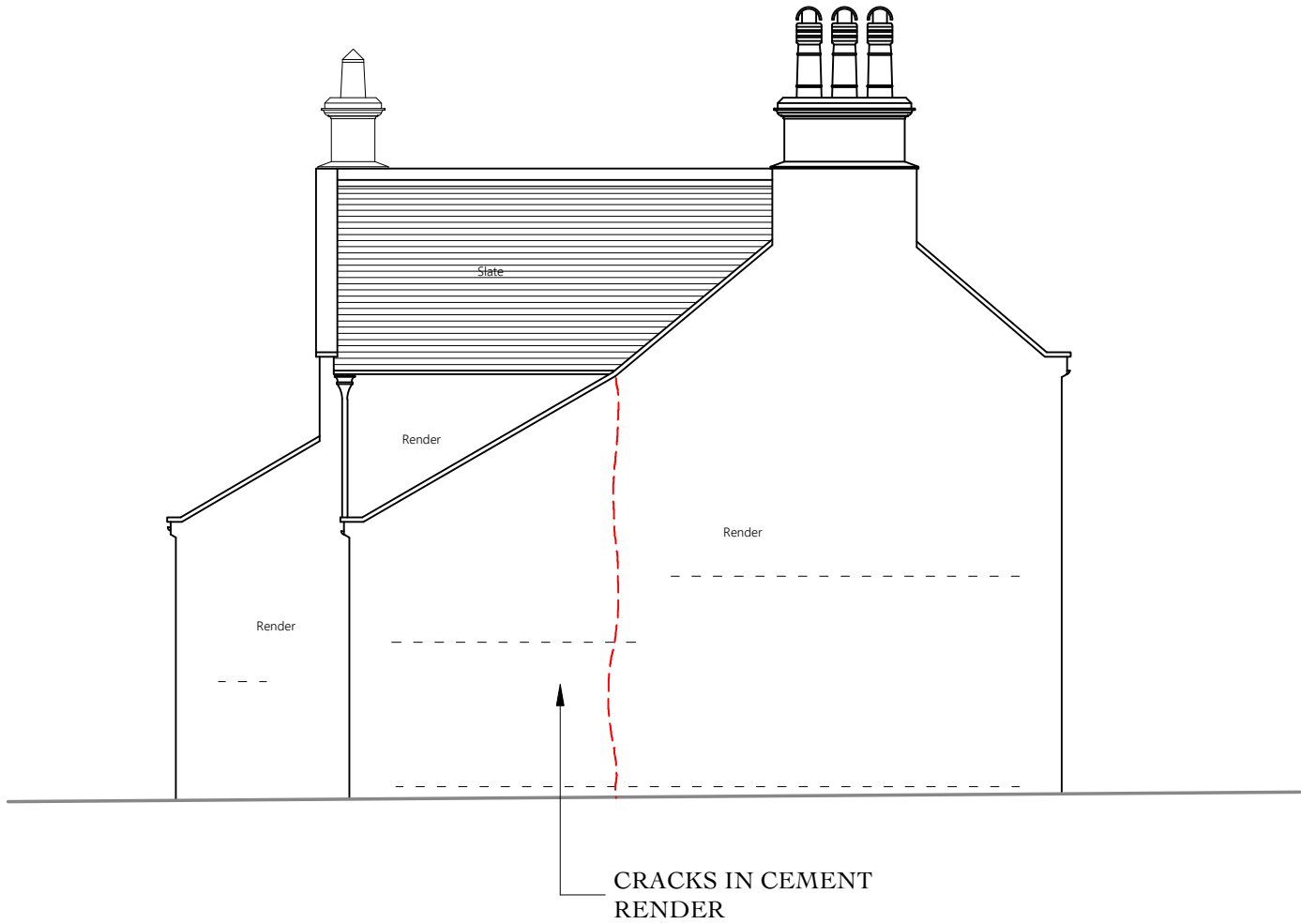
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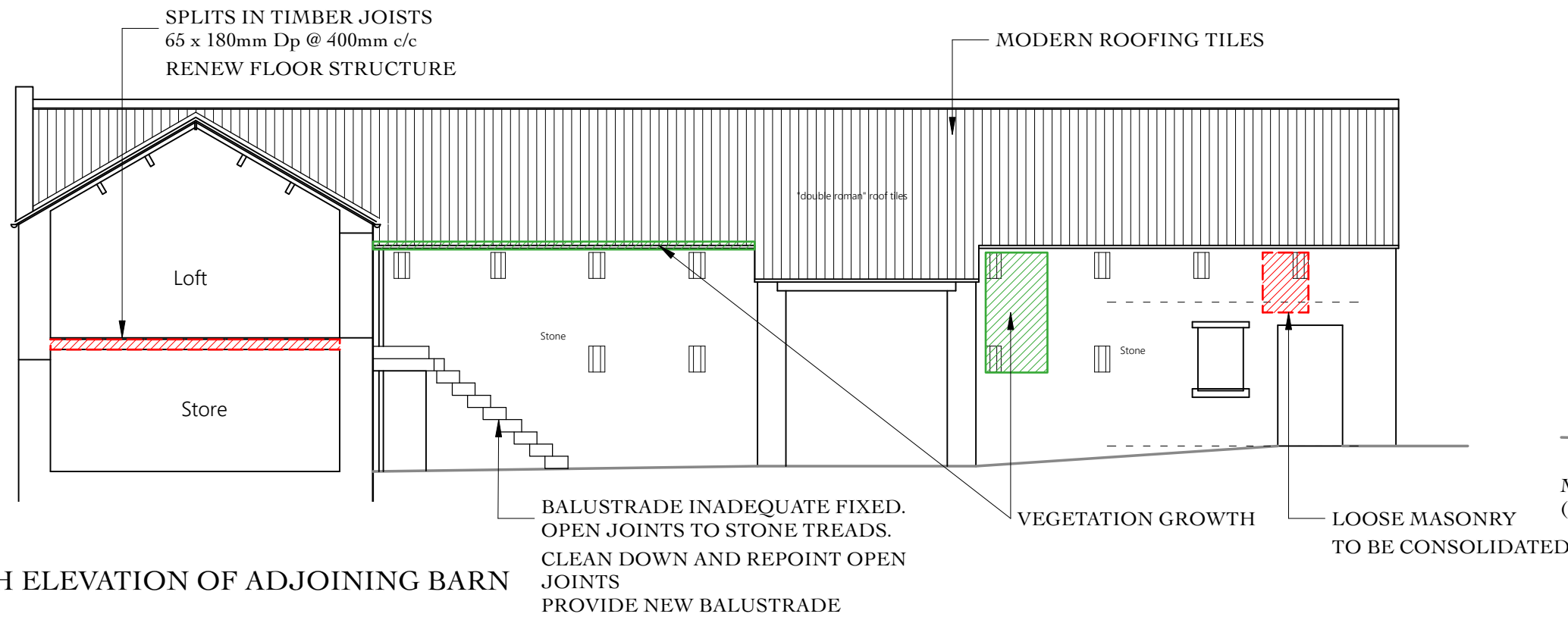
EAST ELEVATION
1:100



WEST ELEVATION
1:100



SOUTH GABLE ELEVATION
1:100



SOUTH ELEVATION OF ADJOINING BARN
1:100



NORTH ELEVATION OF ADJOINING BARN
1:100

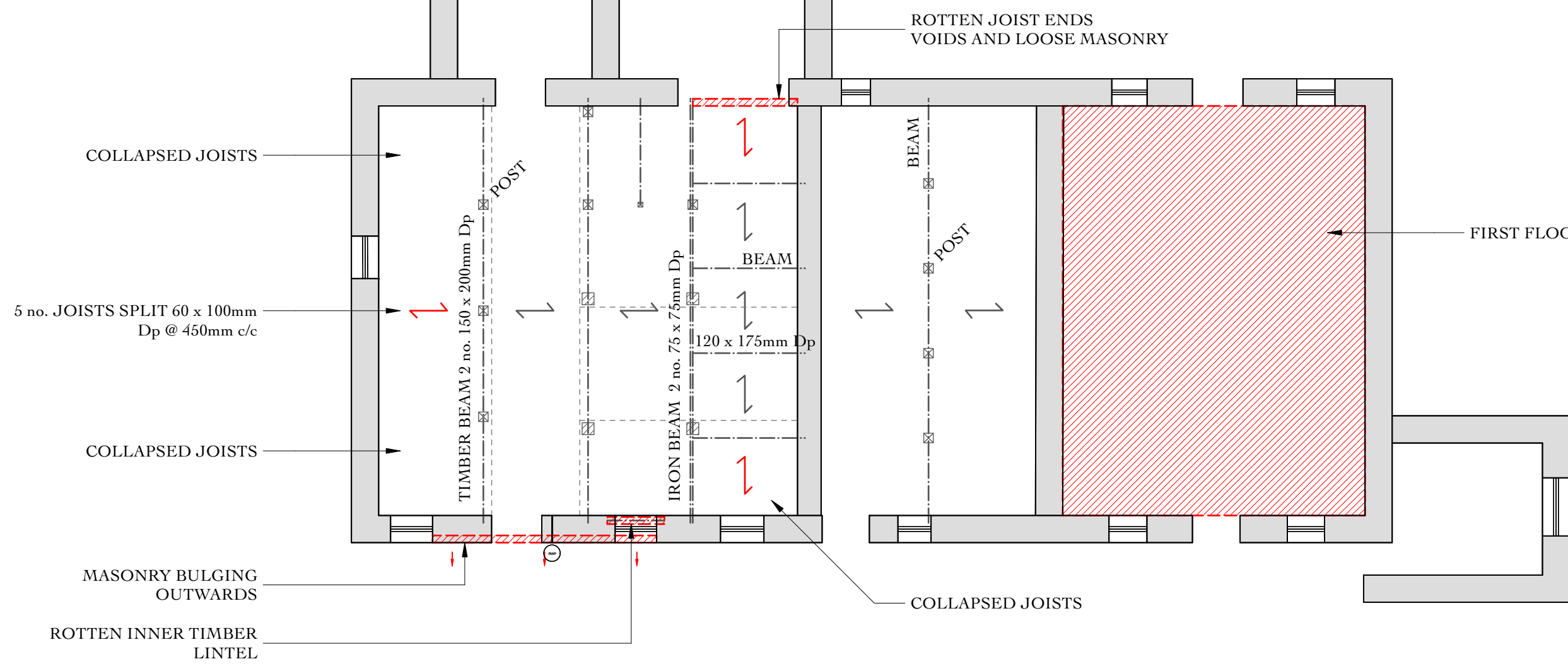
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Scalegill Hall
for Thomsen Estates
House and Adjoining Barn - Elevations

Drawing No: Y100/103 Rev: - Scale: 1:100 @ A1 Date: Oct, 2022





REPLACE DEFECTIVE AND COLLAPSED FLOOR STRUCTURE, SPECIFICATION SUBJECT TO FUTURE USE OF BUILDING

GROUND FLOOR PLAN w/ FIRST FLOOR STRUCTURE OVER
1:100



FIRST FLOOR PLAN w/ ROOF STRUCTURE OVER
1:100

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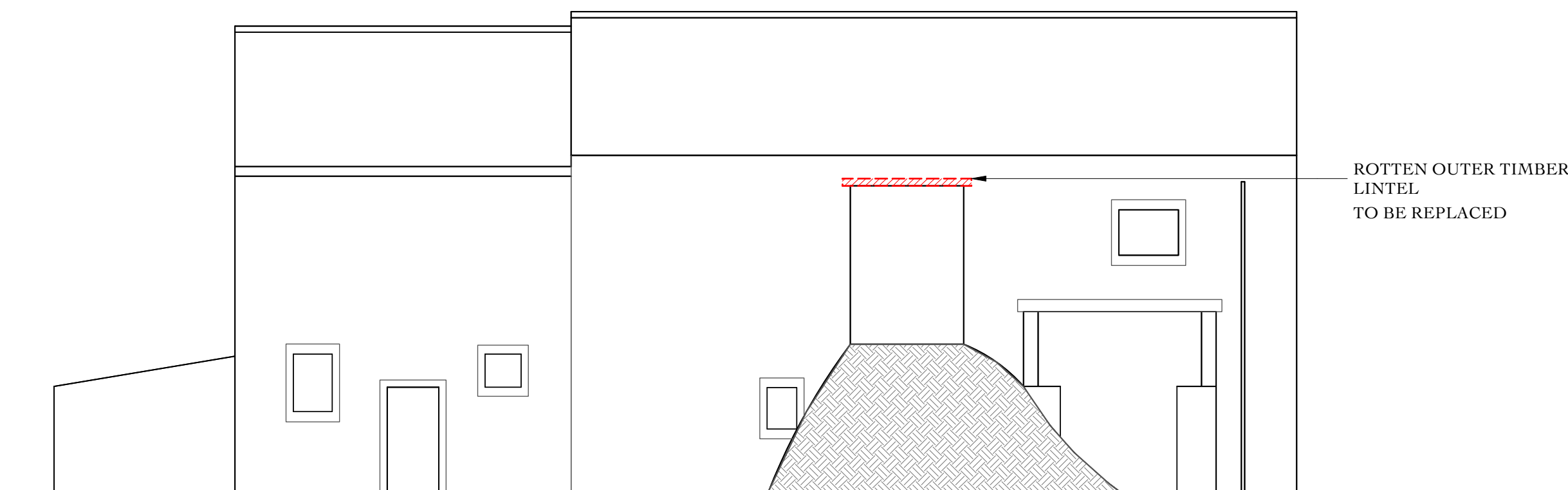
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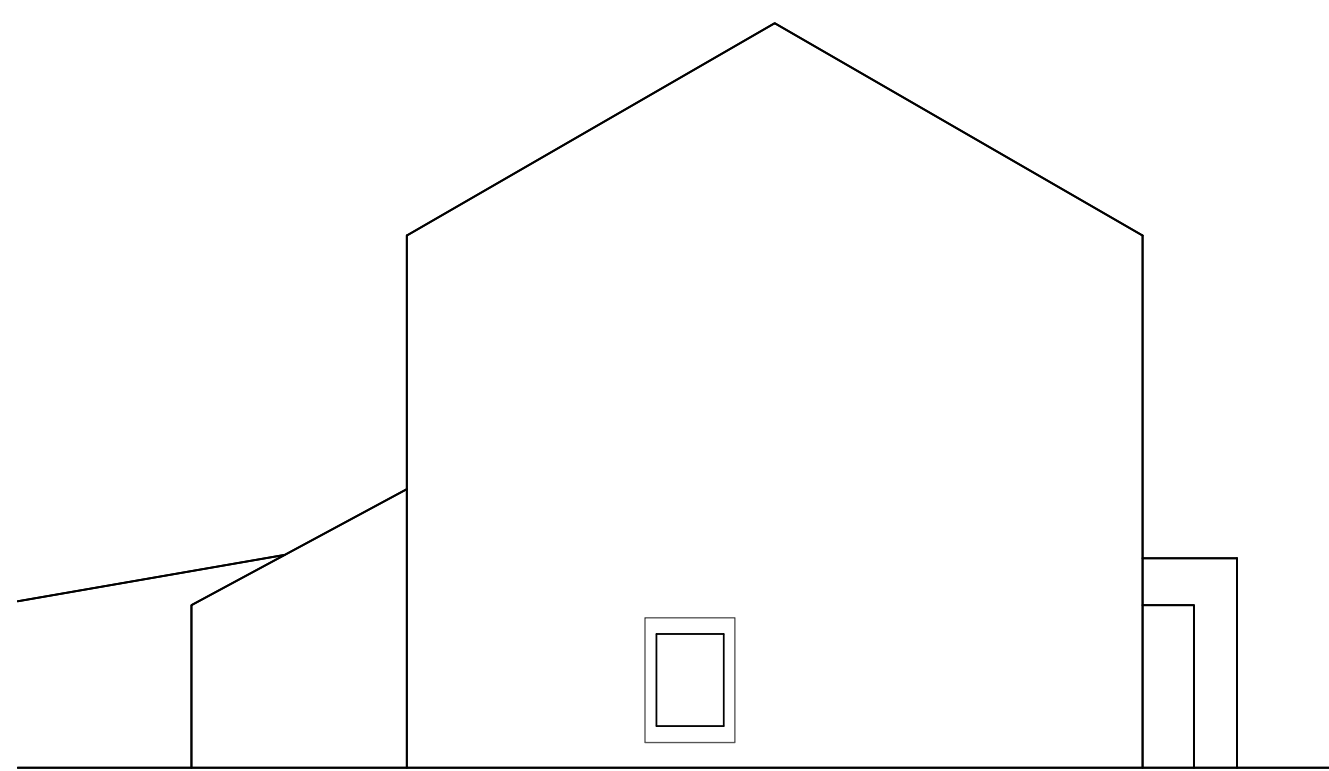
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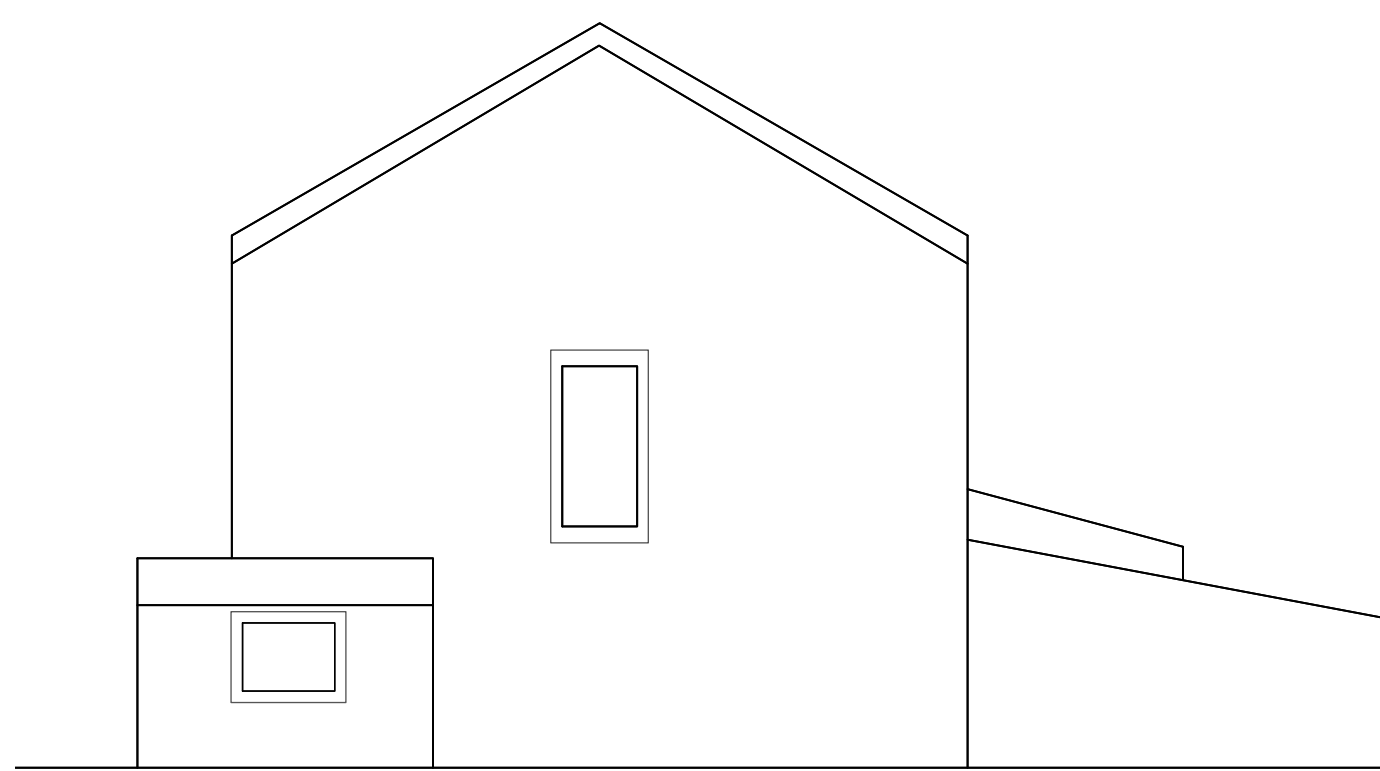
SOUTH ELEVATION
1:100



NORTH ELEVATION
1:100



WEST ELEVATION
1:100



EAST ELEVATION
1:100

CONDITION SURVEY



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Scalegill Hall
for Thomsen Estates
Barn - Plans and Elevations

Drawing No: Y100/104 Rev: - Scale: 1:100 @ A1 Date: Oct, 2022

