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Structural report

on

outbuildings to the side of

10 South End

Osmotherley

North Yorkshire

DL6 3BL

Client:
K. Livingston
10 South End
Osmotherley
North Yorkshire
DL6 3BL

Report Prepared by:
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BSc CEng MIStructE

29th September 2017

STRUCTURAL REPORT ON OUTBUILDINGS TO THE SIDE OF
10 SOUTH END, OSMOTHERLEY, NORTH YORKSHIRE DL6 3BL

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INTRODUCTION

At the request of K. Livingston, we were asked to carry out a structural inspection of the outbuildings attached to the west side of the above property to accompany a planning application.

The report is confirmed to be in respect of the structural integrity of the existing outbuildings.

The reader is assumed to be standing on the driveway facing the north elevation and all locations are described from that position.

The outbuildings are all duo pitch pantile covered roofs with loose rafters, purlins and trusses as indicated on the existing plan Drawing No. 1 in Appendix A.

The property was visited on the 27th September 2017 and the weather was sunny and dry.

SITE INSPECTION

Cart House-North Elevation

Inspection of the north elevation of the cart house, which is the outbuilding adjoining the main house wall, revealed significant structural cracking over the double garage door lintel which is a timber lintel and shows signs of rot at the left hand side. We recommend that the lintel is replaced with a new steel lintel and dummy timber covering.

The stonework above the lintel should be locally repaired. The straight joint between the house wall and the front cart house wall shows signs of significant previous movement with substantial previous repointing which has opened up further since the previous repointing has been carried out. This has also affected the mortar haunching at the bottom of the roof slope where it abuts the existing house wall.

The first floor door hatch opening has rotted on the cill and has been replaced by a makeshift concrete cill and the frame should be carefully cut out and repaired or replaced.

The cast iron gutters and downpipe across this front elevation are in poor condition and appear blocked. Water runs down the right hand face of the wall to discharge locally into the ground which we believe has caused movement of this front right hand pier leading to extensive cracking in the right hand wall of the cart house.

Inspection of the pantile roof, which is hip ended, shows a significant dip in the ridge line indicating lateral movement of the roof which is causing further rotation and bowing of the eaves on this front elevation leading to distortion of the stonework.

It could also be contributing to the movement of the wall and vertical crack at the side of the main house.

Front Outbuilding-North elevation

Inspection of the front of the right hand side outbuilding, which is a single storey with cast iron gutters which are in a poor condition. These again discharge into the hopper of the downpipe between the cart house and the front outbuilding. The pantile roof appears to have been recovered in the last 25-30 years with an insertion of new roof timbers and felt.

The timber doorway to the front outbuilding is distorted due to movement of the left hand pier together with rot of the door frame and has therefore lost its structural integrity and needs to be completely replaced.

The mortar pointing on the front elevation is a hard sand cement mortar which is cracked with water ingress into the stone joints and we recommend that the full elevation is removed of all this mortar and repointed in a lime based mortar.

Cart House-South Elevation

External inspection of the south elevation of the cart house revealed a significant bow at first floor level in the outer stone leaf which appears to be current with signs of fresh cracks in the hard sand cement mortar pointing. At eaves level, the wall again shows signs of bowing due to the lateral spread and we recommend this wall is carefully taken down and rebuilt using existing or matching stone with lime mortar.

Again the cast iron gutters and downpipes appear to be in a poor condition and should be taken down and refurbished or replaced.

Inspection of the pantile roof again revealed the dip in the ridge line which is causing lateral spread of the roof structure and pushing the eaves walls out.

The roof appears to have been flashed against the house wall which extends above the cart house roof with mortar pointing instead of lead flashing and this mortar pointing has cracked which would allow water ingress behind and into the roof structure leading to rot of the timber structure.

We recommend that this mortar pointing on both the south and north elevations is replaced with lead flashing.

Rear Outbuilding – South elevation

The south elevation of the rear outbuilding shows signs of significant frost damage to the stonework which needs to be cut out and replaced locally.

There is a tree growing out of the wall at the west side of this elevation which has again caused local damage to the stonework leading to a substantial crack running up this wall again we recommend that the tree and its roots are removed fully and the stonework is locally stripped back and fully repaired with lime mortar which then should be used to repoint this full elevation *if it is to be retained.*

Despite the recovering of the roofs in the last 25 to 30 years, all the pantile roofs of both the front and rear outbuildings are in a poor condition and we recommend that the roofs should be stripped back and the timbers locally repaired or replaced with new timbers.

Again where the lower roofs abut the existing walls, there is no formal lead flashing and again it has been simply done with mortar pointing which has cracked. Again it is allowing water ingress into the buildings which is affecting the timber roof structures. Again we recommend that new proprietary lead flashings are used throughout.

Where lead flashings have been used these have been poorly maintained and vegetation is growing out of the gutters which will be affecting the lead flashing.

Existing Kitchen Extension to the Main House – South and West Elevations

There is a single storey lean to at the rear of the house and the inspection of the south elevation revealed significant frost damage to the stonework and again the cast iron gutters are in a poor condition. The pantile roof again appears to be reasonably new, however again no formal lead flashing has been used at either side where it abuts high level parapet walls. There is a significant dip in the roof pitch indicating that the supporting structure is over stressed and we recommend that the roof is completely stripped and the roof structure replaced with new timbers designed by a structural engineer.

Inspection of the west elevation of this single storey lean to, again revealed significant frost damage to the stonework which again will need to be carefully dismantled and the majority of the stone will need to be replaced with matching stone. This west wall abuts the house wall and there is significant movement cracks between the house wall and the extension's west wall and we recommend that when the wall is repaired and rebuilt that the wall is fully tied to the existing house wall with wall ties at 450mm vertical centres.

Cart House- West Elevation

The exposed west wall of the cart house shows significant signs of frost damage. There is a significant crack at the rear first floor corner indicating severe movement caused by the lateral spread of the roof structure.

Large sections of the pointing have been affected by frost damage and significant localised repairs to the wall are required in order to reinstate its structural integrity.

Front and Rear Outbuildings – West Elevation

The pantile roof of the rear outbuilding on this west elevation is in an extremely poor condition with a number of the tiles having slipped. These appear to be the original pantiles which shows signs of significant frost damage and should be completely stripped and replaced.

The lower west wall of the rear outbuilding acts as a retaining wall and unfortunately is showing significant signs of lateral movement local to the front outbuilding and again this wall, for both the front and rear outbuildings, shows significant frost damage requiring localised repairs and full repointing with lime mortar.

Where cracking has occurred then we recommend that stitch repairing be undertaken to the bed joints in accordance with the details in ***Appendix B***.

Internal inspection of the rear outbuilding revealed the roof structure to be in a poor condition with wet rot to the ends of the purlins and rafters where they have been affected by water ingress.

We therefore recommend that this roof is completely stripped and a new engineered roof designed by a structural engineer.

The flagged floor which is partly covered with earth, appears to show a significant dip to the west side and we recommend that the floor should be carefully removed and a new reinforced concrete floor slab laid.

The south west corner of this outbuilding has suffered structural damage with a loss of substantial amounts of stonework leaving the outer stone skin exposed.

The crack in the south gable elevation above and to the west of the tree, which can also be seen internally which indicates the instability of this wall and we once again confirm that this wall will need to be completely rebuilt once the tree has been removed.

Existing Kitchen Extension to the Main House – Internal

Internal inspection of the lean to at the rear of the house revealed the ceiling to be in a poor condition which has been reboarded with hardboard to retain its integrity on a temporary basis. There is a central purlin spanning east to west which appears to be supported on a timber beam which is arched at the east side of the existing adjacent property. There appears to be significant signs of water ingress in and around this beam which will be leading to wet rot and ultimate failure of the beam. This is due to the mortar pointing between the roof and the adjacent property which is cracked and allowing water ingress.

Similar water ingress is clear on the west side internal wall with signs of blistering plaster and corrosion on metal shelf brackets. The crack between the gable wall and the existing house wall can be seen internally which was noted externally before.

The timber door and window frames show signs of decay and need to be fully repaired or replaced.

Cart House – Internal West, South and North Elevations

Internal inspection of the cart house reveals the first floor timber beams which show signs of significant woodworm infestation and rot and the original floor joists have been removed from the majority of this floor. There are a few joist left in the rear left corner, but these are in a poor condition.

The west wall of the cart house has significant structural cracks throughout, from ground level up to eaves and this is partly due to the spread of the roof structure and also due to the poor quality of the wall. Previous substantial attempts at repointing have been carried out but further cracks through this repointing have occurred and we recommend that this is dismantled and rebuilt. The timber lintel over the doorway on the south elevation supporting the inner leaf shows signs of significant woodworm infestation and has rotted significantly causing cracking and needs replacement. The south wall does not appear to be tied to the main house wall and there is a large gap between the wall and the existing house wall.

Internal inspection of the north wall revealed a similar gap between the wall and the existing house wall with no formal ties and we recommend that this is repaired and strapped or stitched to ensure the wall is fully tied to the existing house wall.

On the lower level the original mortar has perished and significant gaps in the stonework can be seen and again localised repairs are required. On the left hand side, where the wall abuts the main house wall at ground level, there is an old door opening which has been infilled with stone. The original timber lintel is still in place we recommend that this lintel is carefully chopped out and infilled with new stone fully slate packed in position.

Inspection of the existing roof structure which has been strengthened with the introduction of acrow props which support timber beam at just below eaves level which in turn have timber props supporting the hip rafters. However, the existing roof structure is still in a poor condition from poor original design, showing signs of significant lateral movement as noted earlier. We recommend that the roof is completely stripped and a new roof structure designed by a structural engineer.

The part brick and earth floor should be removed and a new insulated RC slab installed.

The new slab can be thickened at the edges to allow support of a new internal load bearing block liner wall. This new block liner wall should be fully tied to the stone outer walls to provide additional stability.

Front Outbuilding- Internal

The internal inspection of the front right hand outbuilding revealed the roof structure to be in a poor condition. The common rafters appear to be undersized and showing signs of excessive deflection and the main purlins and roof truss appear to be leaning over to the west side.

We recommend that the roof is completely stripped of the roof tiles and roof rafters and a more detailed inspection of the purlins and roof truss is then carried out to see if the roof can be realigned. Alternatively, the roof should be replaced with a new roof structure designed by a structural engineer.

The internal wall between the front outbuilding and the cart house shows some corresponding significant cracks moving from ground level up to roof level noted earlier. Together with partial collapse in the rear left hand corner and missing stones at eaves level at the left hand side of the rear wall.

We recommend again that this left hand internal wall is dismantled and rebuilt as required for structural roof support and the rear south wall is locally repaired or rebuilt. The west gable

wall also shows signs of localised cracking and requires localised repairs. The timbers built into the gable wall at eaves level requires replacement. New stonework should be slate packed and repointed into position.

The north external wall also shows signs of significant cracking and localised stitch repairs will be required. The timber lintels over the window and doorway require replacement with new proprietary steel and concrete lintels.

The existing concrete floor slab should be broken out and replaced with a new insulated reinforced concrete slab and the internal central post should be removed.

CONCLUSIONS AND RECOMMENDATIONS

We have generally concluded that the cart house and front and rear outbuildings and the rear lean to extension have been of poor design and construction coupled with neglect over many previous decades which have led to significant structural defects. We recommend that all the roofs are completely stripped off and new roof structures designed by a structural engineer to reinstate the structural integrity of the roof covering.

Due to the poor design and neglect of the outbuildings structures and especially the roof structures, this has led to lateral movement of the south and west walls of the cart house to deflect significantly at eaves level and bow out at floor level and these walls should be dismantled and rebuilt as required for structural roof support. The west wall of the cart house has also been affected by ground movement on the north side due to lateral movement of the roof distorting the stonework and defective rainwater pipe on the front north elevation. This has led to significant cracks in this west wall from ground floor level to eaves level and the wall cannot be repaired. The timber lintel over the front garage door has failed and is causing movement of the stonework above and this lintel would need to be replaced and the stonework repaired accordingly. The north and south wall do not appear to have been tied into the existing house wall.

The south and west wall of the single storey lean to extension at the rear of the house and the south and east walls of the rear outbuilding have suffered significant frost damage which

has eroded the stones and we recommend that these walls are dismantled and rebuilt as required for structural support with new matching stone.

On the south elevation of the rear outbuilding the tree growing out of the wall has caused significant damage and this should be fully removed including its root system before the wall is rebuilt.

The rear outbuilding also shows signs of movement of the west lower retaining wall and this lower section should be fully repaired to ensure that it is stable to act as a retaining wall for the higher level internal ground floor.

The wall between the front and rear outbuildings also show signs of significant structural damage with sections of the wall showing signs of collapse and we again recommend that this wall is dismantled and rebuilt. If a new first floor is to be inserted in the Cart house area to replace the existing first floor then we recommend that these joists are supported on new block liner walls which are in turn supported on new reinforced thickened concrete floor slab designed by a structural engineer.

The new block liner walls should be fully tied to the existing walls and rebuilt sections to ensure the additional stability provided by the reinstatement of the first floor and roof diaphragms.

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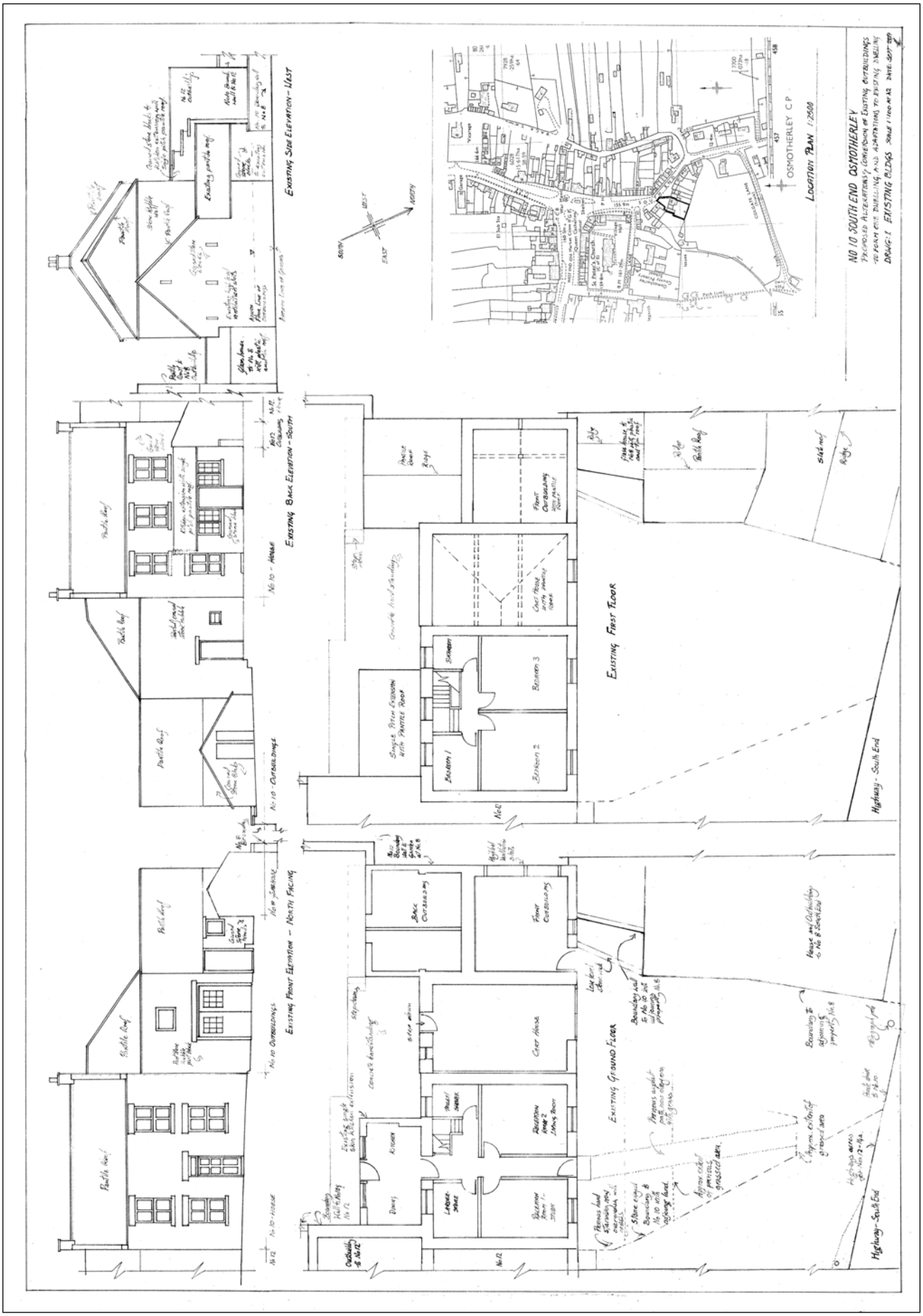
This report is confined to the points adverted to above. We have not examined any other parts of the structure which were uncovered, unexposed or inaccessible and, therefore, we cannot confirm that any such part of the property is free from defect.

D F Rawcliffe

APPENDIX A

STRUCTURAL REPORT ON OUTBUILDINGS TO THE SIDE OF 10 SOUTH END, OSMOTHERLEY, NORTH YORKSHIRE DL6 3BL



APPENDIX B

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