Project Ref: 4601

Garage Building

7 Crown Street

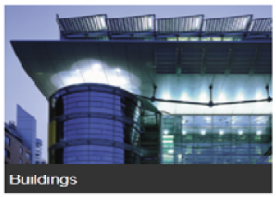
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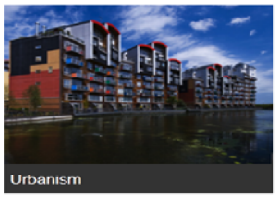
PE27 5EB



Structural Inspection Report

Rev v2









CAR is an independent consultancy providing specialist advice for policy-makers, design professions and the construction industry. Founded in 1987, CAR's interdisciplinary team is at the forefront of new thinking in all aspects of the built environment.

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Revisions

Rev	Date	Description
v1	June 2025	First Issue
v2	September 2026	Minor reference updates

Introduction

This report has been prepared following a non-intrusive site inspection of the garage building to the rear of 7 Crown Street, St Ives, carried out in May 2025 on behalf of the client, Graham Handley. CAR Ltd were asked to visit the property and provide commentary on the general condition of the property and prospects for conversion to habitable space.

1 Existing Site and Building

The site is located in St Ives town centre, on the north side of Crown Street, to the west end, and is surrounded by a mixture of commercial and residential properties. The Great River Ouse is located approximately 130m to the southwest.



Figure 1.1 Site location

The main building on the site, currently unoccupied, faces onto Crown Street and the garage building sits to the rear, on the east boundary. It is accessed via a shared driveway finished with areas of block paving, tarmac and gravel. There are no trees on the site. Manholes are present within the shared access driveway. There is no obvious foul connection from the garage and rainwater from the roof currently discharges directly to ground.

The surrounding area is generally flat, as is the site itself. There is a level change of approximately 200mm down across the site, in line with the south elevation of the garage building.

From the available British Geological Survey information, the ground is anticipated to be Oxford Clay Formation (mudstone) overlain by River Terrace Deposits (sand and gravel). The nearest historic borehole record is on Harrison Way, some 550m to the southwest, which shows the ground to be topsoil over sand and gravel. Silty clay turning to clay is noted at approximately 5.2m below ground level.

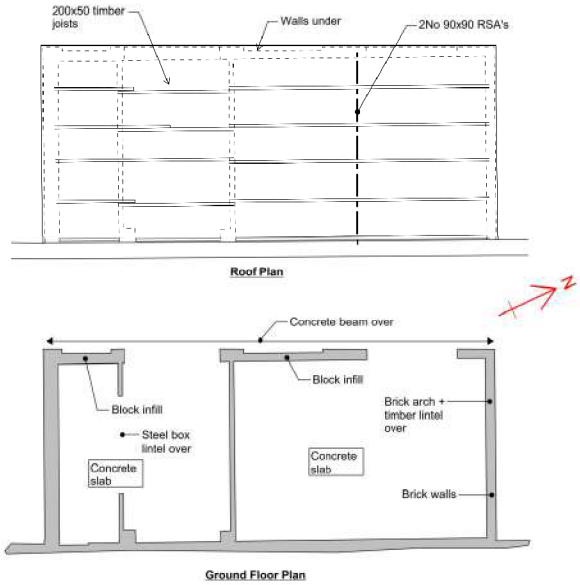


Figure 1.2 Existing ground floor and roof plans

The Existing building is constructed of solid brick internal and external walls. The building looks to have been built abutting an original boundary wall to the rear, on the other side of which there are car parking spaces for the adjacent properties where the ground level is approximately 500mm lower than the garage slab level. The mono pitch roof slopes from east to west and is formed from timber joists, spanning side to side across the slope, supported on the brick walls and back-to-back steel angles. The ground floor is a concrete slab. It is unclear whether the external walls are built off the slab or if they have their own strip foundations.

2 Observations and Discussion

The following observations were made during the site visit.

2.1 External Walls

The north elevation is constructed in brick, assumed 215mm thick, and provides vertical support to the roof joists and lateral support to the building, it appears to be bonded into the rear boundary wall. There is a previous opening which has been infilled with brick. No major cracks were noted externally. Small cracks were identified internally, close to the rear wall and above the original lintel. Repointing will be required to areas of the wall and possibly some relaying of brickwork to the rear section.



Figure 2.1 North elevation, external



Figure 2.2 North elevation, internal

The south elevation is constructed in brick, assumed 215mm thick, and provides vertical support to the roof joists and lateral support to the building. It appears to be bonded into the

rear boundary wall. There has obviously been some movement in this wall, which appears to be historic and possibly from vehicular impact. Large areas are in need of repointing internally and externally. Part of this wall should be rebuilt to realign the brickwork and improve the stability of the wall.



Figure 2.3 South elevation, external

The front, west, elevation is formed from brick piers of varying widths and thicknesses with a continuous full length 225mm high x 215mm wide concrete beam positioned directly below eaves level. The concrete beam generally looks in a good state of repair, with no obvious signs of movement or corrosion.



Figure 2.4 West elevation, external



Figure 2.5 West elevation pier, external

The block infill to the central bay has experienced some shrinkage movement, with horizontal cracking present along the top joint. This is cosmetic and can be repointed.



Figure 2.6 West elevation infill, internal

The rear wall to the east forms the boundary to the car parking spaces on Crown Yard. There are no obvious signs of movement to the wall, but it does not appear to be plumb either horizontally or vertically. This will need to be considered when constructing the new internal lining walls. There are also various recesses and projections which may require levelling out by infilling or demolishing. Areas of the wall will require repointing both internally and externally to mitigate further degradation.



Figure 2.7 East elevation, external



Figure 2.8 East elevation, internal south end

There are embedded timbers within the brick walls throughout. These should be inspected more closely for rot. It is likely that they will need to be carefully cut out and replaced with brick to mitigate movement from timber decay.

2.2 Internal Walls

The two internal walls are constructed in brick, assumed 102mm thick, and provide vertical support to the roof joists. They also may contribute to the lateral stability of the building, although they do not appear to be bonded to the external walls in their current state. There are areas which require repointing, but the walls appear to be generally in a good state of repair.

There are embedded timbers within the brick walls. These should be inspected more closely for rot. It is likely that they will need to be carefully cut out and replaced with brick to mitigate movement from timber decay.



Figure 2.9 North internal wall



Figure 2.10 South internal wall

2.3 Roof

The timber roof joists are 200mm high by 50mm wide at approximately 750mm centres, supporting what looks to be light insulated panels. The timbers span a maximum of 3.3m, supported within brick walls. In the north bay they are also supported on a pair of 90 x 90 steel angles.



Figure 2.11 Roof construction, north end

The timbers look in a reasonable state of repair and could be reused to support a new roof finish. Additional joists may be required to provide adequate support and timber blocking or ply sheathing should be installed to provide additional rigidity to the building.

2.4 Foundations and Ground Floor Slab

The ground floor slab is concrete, assumed to be ground bearing, and appears to be in a good state of repair, albeit requires some levelling. The foundations to the external walls are unknown. Although any increase in load on the foundations is anticipated to be negligible, and there are no obvious signs of settlement or differential movement, it is recommended for due diligence that the foundations are checked in various places during the conversion works.

3 Outline Proposals

The plan in Figure 3.1 shows the proposed floor layout. The removal of the internal wall will require a new steel or timber beam within the roof to support the roof joists. Proposed openings within the internal wall to remain will require new precast concrete lintels above. There are existing brick nibs which may need to be removed and the make-up of these should be assessed prior to demolition. New internal walls should be lightweight, non-loadbearing and built off the slab.

Works to improve the energy performance of the building fabric will be implemented. The walls will be insulated internally, within a timber lining wall structure. The roof will be insulated above or between the joists, and presumably a ceiling added. The additional weight of this build up will need to be assessed.

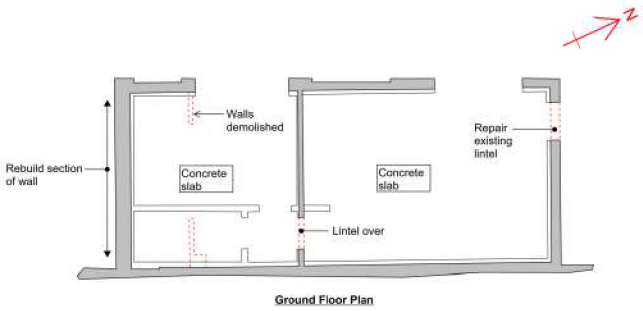


Figure 3.1 Proposed floor plan

The original opening within the north elevation could be reinstated, with the brick infill being removed. The lintel over this opening is currently a brick arch to the outer leaf and timber to the inner leaf. There is clear movement above the lintel on the internal face, likely due to degradation of the timber, as seen in Figure 3.2. The timber should be cut out and replaced with a precast concrete lintel.



Figure 3.2 Movement above lintel to north elevation

The outer leaf is likely to require remedial works once the brick infill is removed and this could be achieved either by rebuilding the brick arch, or by repairing the existing arch using a remedial detail such as that suggested by Helifix for such situations. This utilises Helibars within the brick courses directly above the arch and CemTies up through the arch to secure it to the masonry above. Figure 3.3 shows this typical arrangement.

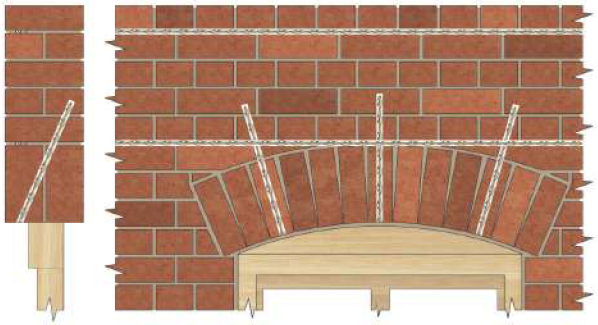


Figure 3.3 Typical Helifix arch lintel repair (Helifix.com)

Overall stability of the building is currently provided by the external and internal walls. As a result of the proposed works, the stability will be enhanced by improved support from the roof structure by adding noggins, restraint straps and sheathing board. The timber lining walls will also help to provide additional restraint to the masonry external walls.

4 Next Steps

Prior to, or during, the conversion works some investigation works are suggested to understand further the construction of the building and impact of this on the structural and civil design. These are outlined below.

4.1 Trial Pits

A series of trial pits could be excavated to provide information on the existing foundations to external walls and to confirm local ground conditions. Figure 4.1 indicates where these would be best located. Following assessment of the trial pits it may be suggested that underpinning of some of the existing foundations is undertaken.

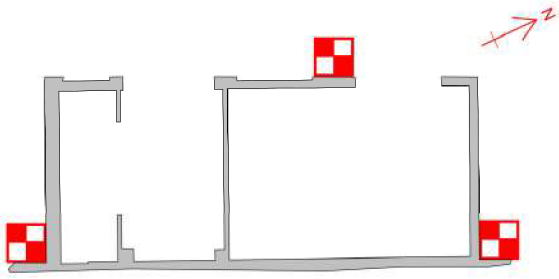


Figure 4.1 Suggested trial pit locations

4.2 Repairs to Walls

Repointing will be required to some areas of the walls; the extent will be determined within the next design stage. Rebuilding of a section of the south elevation is also suggested.

Cracking to the masonry walls was not generally noted and so crack stitching is anticipated to be minimal. The walls should be assessed in more detail in the next design stage to confirm any specific locations where crack stitching may be required.

4.3 Brick Pier Investigations

There are a number of brick nibs which would ideally be removed and these should be investigated prior to demolition. Bricks should be locally removed to understand the construction and possible structural purpose.



Figure 4.2 Brick pier to be investigated

4.4 Roof Strengthening

It is likely that the loading to the roof will be increased and so the existing timber joists and steel beams will need to be assessed for this increased load. We anticipate that the timber joists can remain, and additional joists may be inserted to support the roof finishes. The steel back to back angles are likely to require strengthening or replacement. Figure 4.3 shows a possible roof structure upgrade arrangement.

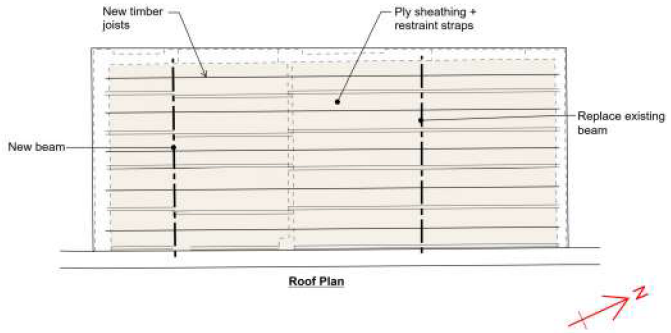


Figure 4.3 Suggested roof structure

4.5 CCTV Drainage Survey

A CCTV survey of the below ground drainage system on site would identify potential defects with the drains. These often get ignored but drains leaking into the ground surrounding foundations can cause significant movement to structures. The results of the survey should include a diagram to show drain locations, levels and flow direction as well as clearly identifying any defects and suggested remedial works required. It should identify existing foul and surface water discharge strategies.

It is anticipated that proposed foul water would discharge to the main sewer via gravity. Note that due to the proximity to existing structures, soakaways would not be suitable for the proposed building and so discharge of surface water would need to be to the main surface water or foul water sewer, with possible attenuation being provided to restrict the flow rates.

5 Conclusions

The garage building appears to be suitable for conversion to residential use, following minor repair and general maintenance works being carried out. The most notable repair being the south elevation, which will require partly rebuilding.

Roof members will need to be assessed for additional loads and strengthened where required. New structural members will be required where internal walls are to be demolished to support the roof structure.

Foundations should be checked to assess the suitability for the proposed use, however there are no obvious signs of settlement or other foundation issues.