

The University of Sheffield

24a Endcliffe Crescent

Structural Condition Report

Reference: ECR-ARUP-XX-XX-RP-S-000001

P01 | 08 November 2023



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Job number 236617-121

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Executive Summary

24a Endcliffe Crescent is a coach house building dating back to the mid-19th Century. Historical maps suggest it was once part of a pair of adjoining structures, one of which has been demolished.

The building is in an exceptionally poor condition. Part of the roof has collapsed resulting in unstable walls and remaining roof members. It is evident that the roof and rainwater goods had been in a poor condition for some time before the collapse as many structural elements are suffering from deterioration resulting from water ingress. There is significant vegetation growth throughout the building.

The roof and parts of the walls are unstable at present and are at risk of further collapse, particularly during periods of extreme weather. Action must be taken to make the building safe.

The building should only be entered by competent personnel after an appropriate on-site risk assessment.

Given the unstable nature of the building, any repairs would need to be carefully planned and would likely require temporary propping or restraint of the retained structure during the work.

Repairs will require a significant proportion of the building to be carefully taken down and rebuilt and, as a result, complete demolition is likely to be more economical than repair and partial rebuilding. Demolition would mitigate the risk from unstable elements present during the repair work.

The following is a summary of work required to provide a dry and stable shell if the structure is to be retained.

- The main hipped roof and western lean-to roof are beyond repair and will require complete removal and replacement. The majority of the timbers on the western half of the roof have been damaged and need to be replaced. It is estimated that at least 50% of the roof slates have been damaged or lost and require replacement.
- The eastern lean-to roof requires vegetation to be removed and slates resetting. The existing slates appear to be suitable for re-use.
- The western wall is beyond repair. It will need to be taken down to foundation level and rebuilt with suitable tying details to the north and south elevation walls.
- The top section of the southern wall where the roof has collapsed (approximately the top 1.5m from roof level) will need to be carefully taken down and rebuilt.
- The render should be removed from the rest of the southern wall and the northern wall. It is likely that these walls will require repointing. An allowance should be made for remedial ties between these walls and the internal wall.
- The chimney will need to be taken down and rebuilt if retention is desirable.
- Internal walls are likely to require local repairs and brick replacement, with remedial tying details to adjoining walls.
- The lintel over the garage is likely to require replacement with a suitable steel or precast alternative.
- The first-floor structure should be completely removed and replaced, with suitable restraint details to the external walls. The masonry walls will need to be propped during floor replacement work.
- Gutters and rainwater goods should be replaced throughout.

1. Introduction

1.1 Appointment

The University of Sheffield (The University) appointed Ove Arup and Partners (Arup) to carry out a visual structural condition survey of 24a Endcliffe Crescent.

The aim of the investigation was to assess the general structural condition of the building and provide guidance on the extent of repairs or rebuilding required.

1.2 The Investigation

The investigation was undertaken on 11th October 2023. The weather was mild and cloudy. The structure was inspected externally and internally where safe access was possible. No finishes were removed as part of the survey.

1.3 Information provided

No information was provided by The University.

1.4 Location

24a Endcliffe Crescent is located to the rear of 24 Endcliffe Crescent to the west of Sheffield.



Figure 1 - Location of 24a Endcliffe Crescent

2. Building Description



Figure 2 - 1853 map showing Endcliffe Crescent

2.1 History and development

24a Endcliffe Crescent sits to the rear of 24 Endcliffe Crescent; one of three remaining villas on the western edge of Endcliffe Crescent. 24a appears to be of a similar age to the main villas and it is likely that it was originally used as a coach house to the main building. Figure 2 shows a map from 1853 where the main villa and outbuilding can be seen.

On the historical maps there appears to be a pair of adjoined outbuildings behind both 24 and 26 Endcliffe Crescent, whereas the part behind No. 26 now appears to have been demolished, leaving the spine wall exposed. The spine wall is rendered and covered in ivy, so any remains of the previous construction could not be seen. It is not known when this demolition may have taken place.

Endcliffe Crescent is now part of the University's Endcliffe campus. The main villas are used as student accommodation and some of the outbuildings are used as storage - 24a appears to have been used for this purpose before falling into disrepair.

2.2 Structure

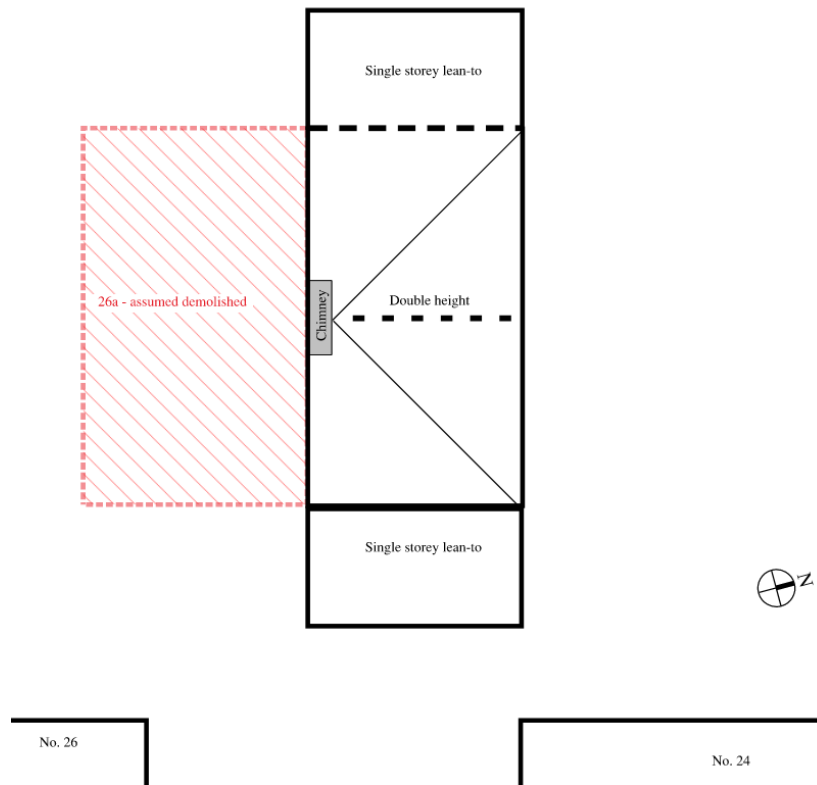


Figure 3 - Indicative plan view of the building

The building is of traditional load-bearing masonry and timber construction. The main part of the building is of two storeys with a hipped roof. At the western end of the building the roof line continues down to cover a single-storey mono-pitch lean-to structure. The western lean-to appears to be accessible from the main building.

Another single-storey mono-pitch lean-to structure is located at the east end and is separate from the main building. This may be a later addition to the original building.

The load-bearing masonry walls – where visible - could be seen to be one brick thick and have been rendered across much of their area. On the north elevation there is a large door opening which features a modern garage door. It is not clear whether the opening is a modern modification or whether the opening is from the building's original use as a coach house. The lintel over the doorway could not be inspected.

The majority of the roof structure appears to be the original construction and comprises slates laid on battens supported by timber roof joists and purlins.

A first-floor structure was present in the main part of the building but was not accessible. Some of the original joists remain but parts have been replaced with modern sections. The original floorboards appear to have been replaced with a modern chipboard floor.

The ground floor construction could not be determined, but appeared to be of ground bearing, as opposed to suspended, construction.

3. Condition

3.1 Overview

The building is in a very poor condition, with some areas unstable and unsafe to access. The lack of an effective roof means many elements of the building are exposed to the weather and will continue to deteriorate without intervention.

There is significant vegetation growth which may have and continue to be weakening the structure, though in parts the root systems may be providing local stability to some masonry elements.

3.2 Roof



Figure 4 – View from the west of the collapsed section of roof

The western lean-to roof and the western side of the hipped roof have completely collapsed. Damage is likely to have been caused as a result of a tree falling during a storm in early 2023, though it is likely that the roof was in a poor condition before then; the remaining damaged timber members could be seen to be rotten, as shown in Figure 5.

The remaining part of the hipped roof could not be inspected as access was not safe. From the west, the support of the north-west hip rafter at the peak of the roof near the chimney appears to have been destabilised by the collapse of the roof. There is significant vegetation growth around the chimney, and flashing details did not appear to be present, so it is likely that the timber members here are in a poor condition and suffering from rot.

Viewing the remaining portion of the roof from the north it was apparent that several slates and most of the ridge tiles along the hips have been displaced, leaving the roof vulnerable to water ingress. Gutters have fallen from most of the north elevation and were overgrown with vegetation where present. As a result of these defects, it is likely that the supporting timber structure has been subjected to water ingress and so may be suffering from rot.

Movement of the walls resulting from the roof collapse and rot of the timbers is likely to mean that some members no longer have an adequate bearing.



Figure 5 - Example of a rotten timber roof joist



Figure 6 - View of the roof from the north

The structure of the lean-to roof to the east was in a better condition, but still exhibited signs of water ingress and vegetation growth. The timber rafters could be inspected from the underside and appeared to be in a reasonable condition. Some rafters appear to have been replaced in the past.



Figure 7 - Underside of east lean-to roof

3.3 Floor

The first floor could not be inspected in detail due to the unsafe access conditions. From below, the first floor structure appeared to be in a relatively poor condition and was suffering from water ingress as a result of the damaged roof. Water staining was evident, and some joists showed signs of rot, as shown in Figure 8.

Movement of the walls resulting from the roof collapse and rot of the timbers is likely to mean that some members no longer have an adequate bearing.



Figure 8 - Apparently rotten first floor joist

3.4 Walls

3.4.1 North elevation

The north elevation is covered in render and so could not be inspected in detail. Cracks were noted in two locations: over the small single door and over the garage door. It could not be determined whether these

cracks were in the render only or whether they followed through into the masonry walls. The crack over the garage door may be a result of movement of the lintel associated with deterioration such as rot or creep.

The elevation did not appear to show any signs of settlement or other movement.

The section of wall forming the western lean-to had a significant amount of ivy growing over the wall. The roof to this section has collapsed and so there is no restraint to the top of the wall. Whilst it could not be inspected in detail due to the vegetation, it is likely that the top section of this wall has been destabilised by the vegetation growth and roof collapse.



Figure 9 - Overview of north elevation



Figure 10 - Cracking over doorway on north elevation

3.4.2 East elevation

The east elevation forming the end of the lean-to was difficult to inspect due to the vegetation growing in front of it but appeared to be in a reasonable condition.



Figure 11 – East elevation of lean-to

3.4.3 South elevation

The south elevation is thought to be a spine wall which previously sat between 24a and 26a, before 26a was demolished. The wall has been rendered and has a large growth of ivy covering the eastern half.

The wall appeared to be leaning out to the south, particularly where the eastern portion of the roof has collapsed, likely as a result of loss of restraint. The connectivity between the south elevation and the internal dividing wall could not be inspected due to the unsafe access – if there is any discontinuity between the two walls this may be contributing to the lean of the southern wall.

Viewed from the east where the roof has collapsed, the top of the wall was in an exceptionally poor condition; most of the masonry units at the top were loose, likely as a result of the roof collapse.

The chimney at in the centre of the elevation was almost completely obscured by ivy but appears to have sustained some damage from the roof collapse.

The eastern portion of the wall is likely to have been damaged by the growth of ivy, particularly at ridge level where it would be easier for growth to penetrate.



Figure 12 – South elevation



Figure 13 - Damaged section of south elevation

3.4.4 West elevation

The west elevation is in a very poor condition following the collapse of the lean-to roof. Many masonry units along the top are loose, and there is a significant gap between the west and south wall – see Figure 15.



Figure 14 – West elevation

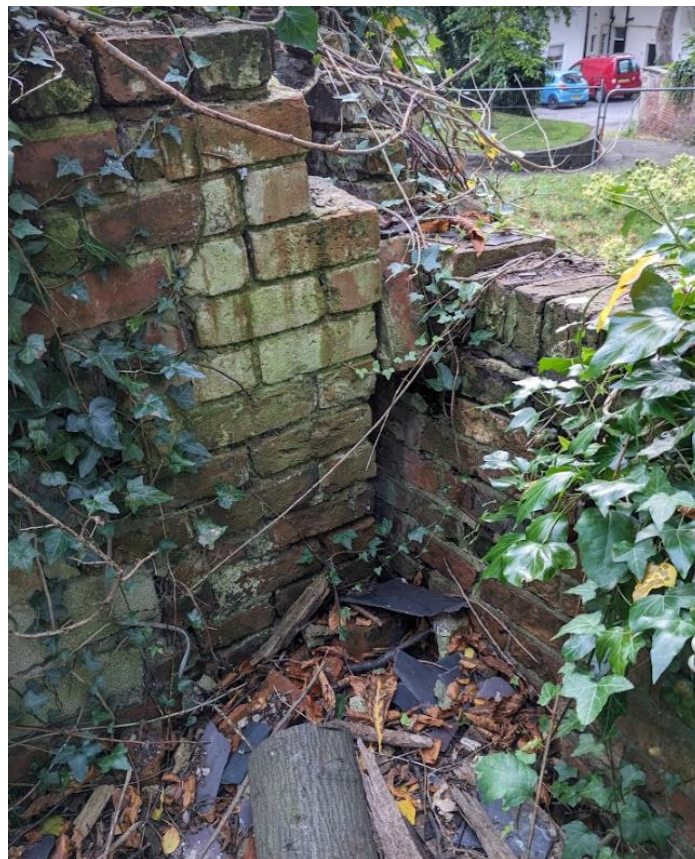


Figure 15 - Junction between west and south elevation walls

3.4.5 Internal walls

The internal walls could not be inspected in detail due to the debris from the roof collapse, but it is likely they are in a poor condition having been exposed to the elements and may have been damaged by falling debris from the collapsed roof.

4. Structural Repairs

4.1 Overview

The structure is in a very poor condition overall, with many elements having been damaged or lost after the roof collapse.

The roof and parts of the walls are unstable at present and are at risk of further collapse, particularly during periods of extreme weather. Action must be taken to make the building safe.

The building should only be entered by competent personnel after an appropriate on-site risk assessment.

It is clear that elements of the structure have been exposed to the elements for a significant period of time causing damage, which has been exacerbated by vegetation growth.

4.2 Repairs required

This section provides a summary of the minimum repairs required to bring the building back to a stable condition.

Given the unstable nature of the building, any repairs would need to be carefully planned and would likely require temporary propping or restraint of the retained structure during the work.

Repairs will require a significant proportion of the building to be carefully taken down and rebuilt and, as a result, complete demolition is likely to be more economical than repair and partial rebuilding. Demolition would mitigate the risk from unstable elements present during the repair work.

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