

Clive Hudson Associates

Consulting Structural and Civil Engineers

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Our ref: 195536/10, Eldon Road, Reading/Structural Repair Strategy Statement - Rev O
Your ref:

5th November 2019

Dr. Narayan
10, Eldon Road
Reading
RG1 4DH

c/o Bernard Clark

Dear Dr Narayan,

By email only

Re: Structural Repair Strategy Statement – No. 10, Eldon Road, Reading

1. Introduction

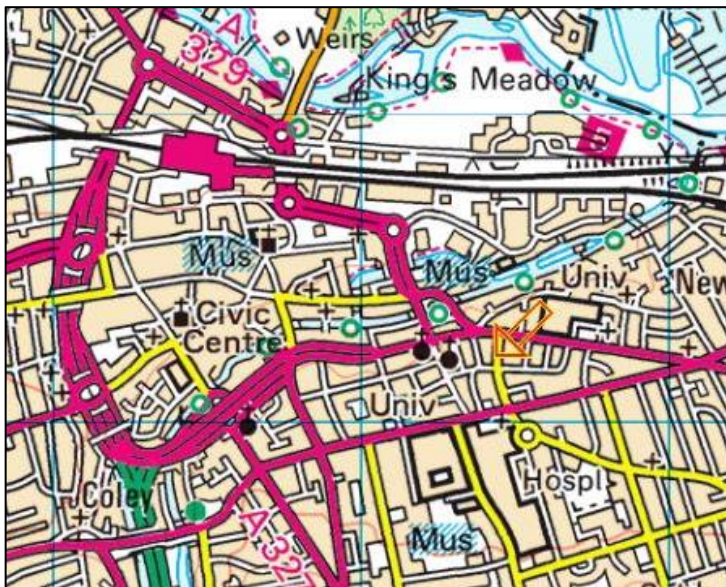
Clive Hudson Associates Ltd have been requested by Bernard Clark to provide a Structural Repair Strategy Statement for No. 10, Eldon Road, Reading. The statement proposes the strategy of the planned stone repairs and discusses options to strengthen the two timber beams over the bay window on the east elevation. The statement has been prepared to accompany the latest Listed Building Consent application, which is being prepared by Colin Dawson Associates.



Figure 1. Nos. 8 & 10, Eldon Road (No. 10 is on the left hand-side)

Image extracted from John Missenden's Reading Civic Society's presentation on 'Georgian Reading – Berkshire's Bath Spa' dated July 2017, amended April 2018

Clive Hudson Associates Ltd (CHA) disclaim any responsibility in relation to matters outside the scope of this statement.



North

Figure 2. Site location.
(extracted from www.streetmap.co.uk
accessed 1st November 2019).



Figure 3. Site location.
(www.google.com/maps
accessed 1st November 2019)

2. Description & Background

No. 10, Eldon Road forms the southern half of a Grade II-listed, detached property located at the junction of Eldon Road and St. John's Road, Reading (National Grid Reference SU 74243 73188).

The building is orientated on an approximate north-south orientation with the principal elevation facing east onto Eldon Road. No. 10 is on the left hand-side when viewed from Eldon Road, and is currently used as a General Practitioner's Surgery with access from St. John's Road.

No. 10 comprises 3 storeys and a basement and is understood to date to the 1840s. From the site visits undertaken, the property appears to comprise Bath stone facing onto a masonry rubble/mortar backing, with some limited evidence of a brickwork inner skin over the bay window on the east elevation.

From the initial phase of opening-up works, it appears the ashlar outer skin relies solely on cross-bonded stone blocks for restraint, which is unusual and, in our opinion, is a poor detail. This method of restraint partially explains the structural movement observed. (Historically, ashlar stone outer skins were either tied back to the inner skin using iron cramps, or, relied on the inner face of the ashlar skin being undressed and of varying depths which formed a bond with the core.)

Internally the walls are believed to be a combination of brickwork and timber-framed partitions.

Where accessed, the floor construction on the ground, first, and second floors consist of floorboards / boarding on timber joists. Access has not been gained to the basement.

It should be noted we have not undertaken a full structural inspection of the property and we have only viewed the elevations when scaffolded, with limited access from the scaffolding itself.



Figure 4. East elevation
(Photograph taken on 22nd
Aug 2019)

Internally, we have had access to the rooms on the east side of the property on the ground, first, and second floors with limited opening-up works undertaken on the east elevation, and to the rooms on the ground and first floors.

Nos. 8 and 10 are described in the listing description (L.E.N. 1321940) as:

Circa 1840. Probably by Henry or Nathaniel Briant. Bath ashlar pair. Rusticated ground floor and quoins. Band at 1st floor level. Hipped slate roof on deep-bracketed eaves, central chimney. 3 storeys and basement, 1st and 2nd floors have 2 windows each, glazing bar sashes, round-headed on 2nd floor, bracketed pediments on 1st floor. Each has a wide 3 light bay with casement windows. Entered from side in porches with Doric piers, cornice and blocking course.

Clive Hudson Associates Ltd were appointed in August 2019 following concerns raised by A F Jones Stonemasons regarding the unusual nature of the east elevation's wall construction and make-up. A F Jones had started a schedule of stone repairs in July 2019, but this was stopped shortly after their initial investigative works were undertaken.

We are in receipt of A F Jones' *Repair Strategy Report* dated 3rd September 2019.



Figure 5.
View of the rubble-stone /
mortar core at high-level on
the south-east corner.



Figure 6.
View of the stone /
mortar core at low-level
on the south-east corner.

3. Repair Strategy

The repair strategy is based on visits to the property on 9th and 22nd Aug, and 25th October 2019, and discussions with Ken Jones (Director of A F Jones) and a review of A F Jones' *Repair Strategy Report*, dated 3rd September 2019. As previously documented, we have not undertaken a full structural inspection of the property, and structural elements of the building that have been covered, unexposed, or inaccessible have not been inspected. Therefore, once the contractor starts on site and the structure reveals itself, further structural works may be required.

It should be documented that guidance is given in the Buildings Research Establishment (BRE) Digests 251, 359 and 361, as to the significance of different levels of cracking and the causes of cracks in buildings. This guidance is well-tryed but cannot be relied upon in isolation. It is, for instance, possible for masonry to be placed under stress by movement which does not cause immediate cracking but leaves it liable to sudden and unpredictable failure or instability. Similarly; successive crack repairs and re-plastering may conceal the true magnitude of overall movement. It must also be understood that there is no fixed point at which a line can be drawn separating damage because of 'normal' building movement and damage caused by ground movement alone.

It should also be understood that most historic buildings do move / distort to some degree during their life, but that this movement may not be a problem. It is only when the movement is on-going and progressive and threatens the structural integrity of the building that one should be concerned.

3.1 Stone repair

While we are broadly in agreement with A F Jones's method of pinning the outer ashlar leaf to the core; our preferred method would be to use 8 or 10mm diameter stainless steel threaded anchors with washers and stone plugs, such as 8mm diameter CINTEC DRB sock anchors, rather than 'straight' threaded bars which are resin-anchored into the core.

In addition, we would recommend stitching any vertical cracks with pairs of 2mm diameter stainless steel threaded bars resin-grouted into the horizontal mortar joints. We have used this successfully on other ashlar stone buildings, such as the Grade II listed, 17th-century, Old School Room in Uffington, West Oxfordshire.

Subject to further on-site inspections / opening-works, we would also recommend installing Helifix Bowties, or similar, to tie the stone façade(s) to the first and second floor structures.

3.2 Strengthening of timber beams over the bay window on the east elevation

It is clear some of the movement observed in the stone outer leaf on the east elevation is due to the deflection of the 2 timber beams that span over the bay window aperture.

Opening-up works revealed the two timbers are each approx. 13" ½' deep x 5" ½' wide and are bolted together at approx. 46" centres. While no opening-up works have been undertaken on the second floor to confirm the presence of a relieving structure (timber beams), it is clear the beams are undersized for the loads which they have to support and span (approx. 4m). This is not only reflected in the preliminary calculations but in:

- the general unevenness (sagging) in the floors on the first and second floors in this location,
- a significant diagonal crack in the wall above the timbers on the right hand-side of the bay window, and
- a horizontal tapered split on the inner face of the inner timber beam.

This movement appears to be related to inherent structural defects associated with the nature of the construction, as similar movement is evident in the stonework above the bay window in No. 8. While we assume

the majority of the movement is largely historic, without monitoring the movement for a period of time we cannot rule out the movement is progressive.



Figure 7.
View of the underside of the timber beams which span over the bay window aperture (Note: plaster repairs have been undertaken to the ceiling in this location in the past).



Figure 8.
Tapered diagonal crack in the wall above the right hand-end of the timber beam (on the 1st floor).

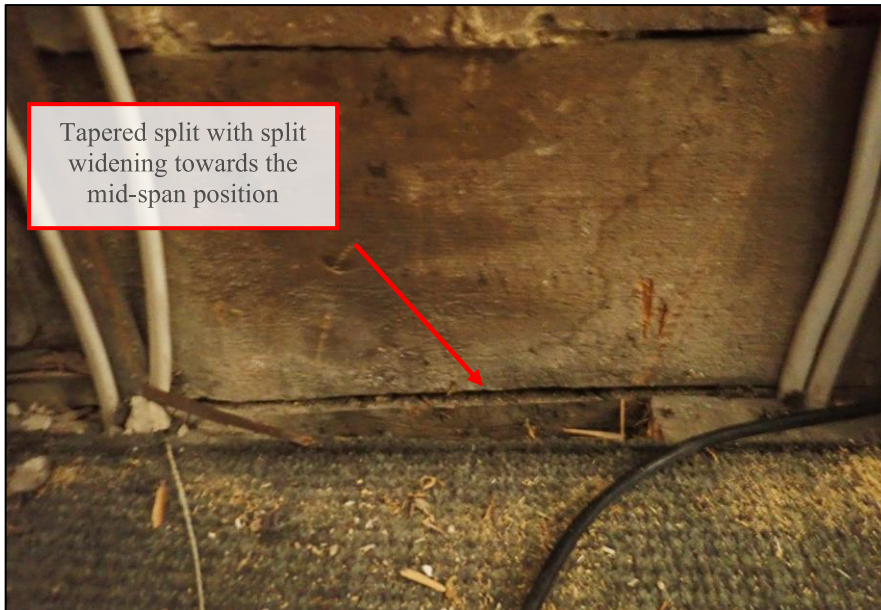


Figure 9.
Tapered, horizontal split in
inner face of inner timber
beam

Therefore, before undertaking the stone repairs to the east elevation, we would recommend the two timber beams are fully exposed / inspected, and an allowance is made for remedial works to strengthen / stiffen them.

Subject to the agreement with the Conservation Officer, one option could be to install a new steel beam below the existing timber beams, and, subject to calculations / inspection, to support this beam off the basement wall via steel posts.

If this is not considered acceptable, then another option could be, subject to calculations / inspection, to cut the ends of the existing floor joists / flat roof joists (where they are housed in the existing timbers) and to attach profiled steel plates / steel sections to the inner and outer faces of the two timber beams, before re-attaching the timber joists to the beam with site welded joist hangers.

We believe to replace the timber beams would be unwise due to the loss of historic fabric involved and the temporary works required to remove them and to install new beams safely.

If you have any questions, please do not hesitate to contact us.

David Evans

David Evans BEng (Hons) MSc (Historic Conservation) SPAB Lethaby Scholar 2008 IHBC

Reviewed by

C. N. W. Hudson

Clive N.W. Hudson BSc(Civ. Eng) C.Eng M.I.Struct.E
Director

On behalf of Clive Hudson Associates Limited.