

# ADEPT

CIVIL AND STRUCTURAL CONSULTING ENGINEERS



## STRUCTURAL REPORT

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CIVIL AND STRUCTURAL CONSULTING ENGINEERS

Client: GMI Construction  
Project Name: The George Hotel, Huddersfield  
Report Title: Block A – Central Staircase Structural Condition Report A  
Inspection Dates: 4<sup>th</sup> August & 11<sup>th</sup> September 2023

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## 1. Executive Summary

- 1.1. The George Hotel is a Grade II listed building located adjacent to the railway station in the centre of Huddersfield.
- 1.2. The original part of the premises features a central accommodation staircase, parts of which are in poor condition, and temporary support has been installed to prevent the risk of collapse.
- 1.3. The stair structure comprises two different types of construction, some flights and landings being in stone and others in timber. The timber flights and landings have suffered serious decay in localised areas, with evidence of both wet and dry rot being visible.
- 1.4. This report provides a critical appraisal of the condition of the staircase as a whole and ascribes the main reason for the damage as being water ingress at high level, around the edges of the lantern light above the stairwell.
- 1.5. The report concludes with a section that provides details of the remedial measures that are needed.

## 2. Limitations of Report

- 2.1. A copy of the limitations of our structural inspection is attached at the end of this report.

## 3. Introduction

- 3.1. The George Hotel was originally built to accommodate commercial traders and other visitors to the Huddersfield area - a role which it performed successfully for many years - though gradual changes in the hotel / hospitality market offer brought about a decline in its fortunes, the hotel eventually being closed down in 2013, and subsequently bought by Kirklees Council in a near-derelect condition in 2020. The premises are currently undergoing extensive remodelling and refurbishment by the Radisson Hotel Group, with the intention of opening again for trade as a Radisson Red hotel in 2024.
- 3.2. The original part of the premises features a central accommodation staircase, which has currently been hoarded off to prevent access on account of its apparent poor condition. Temporary support scaffolding has been installed between the two top floor levels to prevent the risk of collapse of the decayed timber stair flights and landings. However, it was noted that the scaffold that has been installed appears to bear onto the stair structure itself and does not have full vertical continuity down to ground level.
- 3.3. The intention is to restore the staircase to full operational use. This will require structural repairs to be carried out, as well as modification of the ornate cast iron balustrade and handrailing, which has suffered from localised damage, but which would not comply with the current requirements of the Building Regulations in any case.

## 4. Observations

- 4.1. Reference should be made to the photographs provided in Appendix A1 of this report.
- 4.2. The stair structure comprises two different types of construction. The lower stair flights are formed of either simply spanning or cantilevering segmental stone tread elements, whereas the half-landings and flights above the second floor level are of conventional timber construction.
- 4.3. The stone stair flights appear generally to be in acceptable condition. However, the timber landings and flights have suffered serious decay in localised areas, with evidence of both wet and dry rot being visible.
- 4.4. The ground floor (Level 00) floor adjacent to the stair foot appears to be of terrazzo-covered stone slab construction.
- 4.5. The ground floor to first floor lower stair flight comprises a 14-riser run in timber, which appears to be in fair condition, though with some abrasion wear to the treads. The existing arrangement appears to be a modification of the original stair, which is thought to have been of stone construction. (See Photo A1.1).
- 4.6. The half-landing between ground floor and first floor levels is in timber and appears to be in fair condition with no visible signs of decay. (See Photo A1.2).
- 4.7. The ground floor to first floor upper stair flight comprises 10 cantilevering stone treads, which appear to be in fair condition. (See Photo A1.3).
- 4.8. **The first floor (Level 01) structure adjacent to the stair appears to be of stone slab construction.**
- 4.9. **The first floor to second floor lower stair flight comprises 14 cantilevering stone treads, which appear to be in fair condition. (See Photo A1.4).**
- 4.10. **The half-landing between first floor and second floor levels is of stone construction and appears to be in sound condition. The half-landing currently carries the scaffolding that supports the half-landing between second and third floor levels, and the stair flights above. (See Photo A1.5).**
- 4.11. **The first floor to second floor upper stair flight** comprises 11 cantilevering stone treads, which appear to be in fair condition. (See Photo A1.6).
- 4.12. The second floor (Level 02) structure is of timber construction.
- 4.13. The decorative lath and plaster ceiling to the underside of the second floor staircase entrance appears to have become de-bonded, with gaps and cracks being visible. Replacement of the plasterwork appears to be necessary. (See Photo A1.7).
- 4.14. The second floor to third floor lower flight is in timber and comprises 13 risers. (See Photo A1.8).
- 4.15. The lath and plaster ceiling to the underside of the second floor to third floor lower flight has cracked at approx. mid-span and appears to be separating from the stair above. Repairs to the plasterwork will be required. (See Photo A1.9).
- 4.16. The half-landing between second and third floor levels is of timber construction and appears to be badly decayed. The junction between the eastern end of the half-landing and the stair is in very poor condition, with signs of both wet and dry rot being visible. Major repairs will be needed, and it is suggested that the complete removal and replacement of the half-landing should be anticipated. (See Photo A1.10).
- 4.17. The second floor to third floor upper stair flight is in timber, comprising 5 risers. The flight comprises inner and outer string members, with two intermediate ceiling bearers, all of

which are very badly decayed. Removal and replacement of the complete flight will be required. (See Photo A1.11).

- 4.18. The third floor (Level 03) structure is of timber construction.
- 4.19. The third floor to fourth floor main flight is timber and comprises 17 risers. The flight feels firm to walk on, with very little perceptible deflection or vibration being noted. The flight appears to be in fair condition. (See Photo A1.12).
- 4.20. The half-landing at fourth floor level is of timber construction and is in very poor condition where it meets the external (north) wall. (See Photo A1.13).
- 4.21. The northern (external wall) ends of the floor joists have rotted away. A steel 203 x 133 UKB bearer beam has been installed, which spans across beneath the flank walls has been installed but the decayed ends of the joists stop short of the beam, which therefore currently does nothing to support the half-landing. The half-landing is currently being supported by scaffolding from below. (See Photo A1.14).
- 4.22. The fourth floor stair-side landing is of timber construction and appears to be in fair condition. (See Photo A1.15).
- 4.23. The fourth floor (Level 04) structure adjacent to the stairs is of timber construction and comprises a narrow landing that spans across the width of the stairwell.
- 4.24. The roof to the stairwell has a central, glazed lantern light, set upon a timber upstand. The gutters and roof finishes around the lantern light upstand appear to have failed, and the resulting water ingress overtime has resulted in serious damage to the decorative plasterwork, decay of the backing laths and wet rot in the roof joists. (See Photo A1.16).
- 4.25. Similar damage has occurred to the north-east, north-west and south-west corners of the stairwell roof as a whole. (See Photo A1.17).
- 4.26. The staircase features an ornate cast iron balustrade and hardwood handrail. (See Photo A1.18).
- 4.27. The cast iron balusters are set into sockets in the top surface of the cantilevering stone tread units. (See Photo A1.19).
- 4.28. The cast iron balusters are screwed into the vertical face of the timber inner string members and landing trimmers, using single countersunk headed screws. (See Photo A1.20).
- 4.29. The balusters have been broken and removed in several locations. In some instances, makeshift timber replacements have been fitted to fill the gaps. (See Photo A1.21).
- 4.30. Diagonal cracking was noted in the staircase flank walls in several locations. The majority of the cracks indicate slight movements at points of high stress concentration, particularly adjacent to the emergency access door openings off the half-landings. The cracking will require repair, using stitching bars to restore the structural integrity of the walls locally. (See Photo A1.22).

## 5. Discussion

- 5.1. Reference should be made to the level-by-level staircase plans provided in Appendix A2 of this report.
- 5.2. It would appear that the staircase has been modified in the past, as is evidenced by the atypical width and layout of the Level 00 to 01 lower flight, and the fact that it is formed in timber, whereas the adjacent flight is of cantilevering segmental stone tread construction. The half-landing appears to have been re-levelled in timber boarding, possibly to reconcile the main staircase levels with those of the more recent steel fire escape stairs externally. However, it is thought probable that the original stone stair flight may still be present beneath the more recent timberwork.
- 5.3. The need to provide fire escape access has resulted in additional door openings being formed through the stairwell flank walls. It is probable that the formation of these additional openings has led to stress concentrations in the flank walls, the result of which being the cracking that is evident.
- 5.4. Stitch repairs using proprietary embedded helical bar (HeliFix Helibar, bonded using HeliBond mortar, or similar products), or block-bonded replacement of the masonry across the cracks is proposed. This would help to restore the structural integrity of the flank walls locally.
- 5.5. The main damage to the timber stair areas is due to rainwater ingress, chiefly at roof level, though there may also have been some leakage through poorly sealed windows to the external (north) wall. This appears to have been ongoing for some considerable time, given the evident age and extent of some of the damage.
- 5.6. It is therefore essential that any further rainwater ingress should be prevented by removing the existing finishes to the stairwell roof, repairing any decayed timberwork to the roof deck, valleys and lantern light upstand, adjusting the roof profile as necessary to ensure effective falls to drainage points, and providing a new, high performance waterproofing system over the stairwell roof area.
- 5.7. The main damage to the timber stair structure includes the severe decay to the Level 02 to 03 half-landing, the Level 02 to 03 upper stair flight and the Level 04 half-landing, all of which appear to require full removal and replacement. Damage in the adjacent areas does not appear to be so severe, and is considered to be repairable, using conventional repair techniques such as cutting back decayed timber and splicing new replacement members alongside.
- 5.8. Some abrasion wear to the timber stair treads was noted, as well as other peripheral damage to decorative timber edgings and mouldings. To mitigate any trip hazard, it is suggested that all timber treads with wear to a depth of 5mm or greater should be removed and replaced with new.
- 5.9. Notwithstanding the removal and replacement of the worst-affected timber structure and the repair of less severely damaged areas, it is recommended that all timber in the stairwell should receive an anti-fungicidal timber treatment.
- 5.10. Water damage to the decorative plasterwork underdrawing to the stairs and landings is widespread. The worst affected areas appear to be the ceiling around the rooftop lantern light and the soffits below the Level 02 to 03 half-landing, the Level 02 to 03 upper stair flight and the Level 04 cross-landing and side landing.
- 5.11. The original ceilings appear to be of traditional split Chestnut lath and lime plaster construction, the lath being nailed in place using iron brads. A close-up inspection will be needed to determine to what extent it is the lath that is rotten or the iron brads that have rusted through (or both), in order to determine the full extent of the repair work that is

- needed. An area of approx. 30m<sup>2</sup> of repair work is anticipated at present, though closer inspection may reveal that a larger area is required.
- 5.12. It is recommended that the whole of the ceiling around the stairwell roof and lantern light upstand (approx. 20m<sup>2</sup>) should be stripped off and replaced. This would also enable a thorough inspection of the timber roof and upstand structure to be carried out to check for any damage that is currently concealed.
- 5.13. The balustrade to the main staircase is of ornate cast-iron, with a hardwood handrail. Several balusters (approx. 20) have been broken and lost and will need to be replaced. Some have already been replaced by makeshift timber balusters, roughly cut to reflect the overall profile of the cast-iron balusters.
- 5.14. Notwithstanding the replacement of the missing balusters, the existing arrangement would not meet current building regulations requirements from the points of view of height or lateral load resistance. An enhanced balustrading system will therefore need to be developed that meets the necessary structural performance criteria, while not significantly altering the aesthetics of the existing arrangement.
- 5.15. It is anticipated that this would involve the provision of an additional hardwood handrail set above the existing, supported by additional cantilevering newel posts that would need to be anchored at their base across the projecting width of the stair flights, in order to achieve sufficient lateral load capacity.
- 5.16. It is anticipated that the main removal and replacement elements of work would be carried out initially, from the top downwards.
- 5.17. This would involve the initial roof waterproofing / weathertightness works being completed first, followed by the stripping out of the roof level ceiling, the removal and replacement of the Level 04 half-landing, the repair of the Level 04 side landing and the removal of the supporting scaffold down to the underside of Level 03.
- 5.18. The removal and replacement of the Level 02 to 03 upper flight and the Level 02 to 03 half-landing would be next, with the supporting scaffold being removed incrementally as the work progressed.
- 5.19. Upon completion of this main body of heavy work, the remaining support scaffolding would be removed, and new full-height access scaffold installed to allow the remaining structural timberwork, masonry stitching and decorative plasterwork repairs to be carried out safely.
- 5.20. It is anticipated that because of the Grade II listed status of the original 'Block A' building, the materials to be used for the repair works should be matched as closely as reasonably possible to the original.
- 5.21. Further discussions about these issues will be needed in due course with Kirklees County Council's Conservation Officer.

## 6. Remedial Actions

- 6.1. The following remedial work is anticipated:
- 6.2. Remove all flashings and roof finishes to the stairwell roof area, and repair any decayed timberwork to the roof deck, valleys and lantern light upstand.
- 6.3. Adjust the roof profile as necessary to ensure effective falls to drainage points.
- 6.4. Provide new high-performance waterproofing system over the stairwell roof area.
- 6.5. Remove and replace the Level 04 half-landing in its entirety, ensuring full bearing onto the existing 203 x 133 x 25 UKB bearer beam.
- 6.6. Repair the Level 04 side landing as necessary, replacing the floor boards where damaged or missing.
- 6.7. Incrementally remove the existing support scaffold down to the underside of the Level 02 to 03 half-landing.
- 6.8. Remove and replace Level 02 to 03 upper stair flight and the Level 02 to 03 half-landing in their entirety.
- 6.9. Remove all remaining existing support scaffold and install new full-height access scaffold to give safe working access to all levels.
- 6.10. Repair any decayed timber found in the areas adjacent to the stair flights and half landings that have been replaced.
- 6.11. Apply fungicidal timber treatment to all exposed timberwork, including within ceiling voids wherever possible.
- 6.12. Remove and replace the plaster finishes to the underside of the stairwell roof and lantern light upstand area.
- 6.13. Repair cracking generally throughout the height of the stairwell flank walls and make good to the plasterwork that has been disturbed.
- 6.14. Replace timber floorboards and treads generally where in excess of 5mm of abrasive wear is present.
- 6.15. Remove all broken cast iron balusters and replace all missing or broken ornate balusters with new replicas.
- 6.16. Install new upper handrail, newel post and anchor bracket arrangement to all levels of the staircase.

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24<sup>th</sup> September 2023

## Limitations of Report

- a) Adept Consulting Engineers Ltd have prepared this report for the sole use and benefit of the client and/or his appointed agent only and no liability is accepted to any third party who may seek to rely on the whole or any part of this report. Should the client not act upon specific reasonable advice contained in the report, no responsibility is accepted for the consequences.
- b) Comments are restricted to those elements of the structure which are loadbearing and/or provide stability to the buildings, and to the external envelope. Non-structural items of interior or exterior fabric are excluded, except where deterioration or damage to such items may have caused or may in the future cause, damage to or loss of integrity of the structure.
- c) Comments are restricted to those elements of the structure which were readily available for visual inspection and exclude all items or elements which were covered in any way by, for example, fittings, fixtures, carpets, floor coverings, furniture, stored goods or plaster/finishes etc. or any items which are buried. No "opening up" of the structure or exposure of foundations took place and none of the above items were moved or disturbed.
- d) The external inspection of the roof, chimneys and rainwater goods, was made from ground floor level. It should be noted that the efficiency of rainwater goods, which may appear in good condition, can only be assessed if there is heavy rain falling during the inspection.
- e) Roof voids are only inspected from the access hatch unless there are fully boarded walkways and adequate light available. Should it be felt necessary to make a more detailed inspection and walkways or light are not available, suitable access arrangements may need to be made, the costs of which would be the responsibility of the client.
- f) Similarly, basements or under floor voids will only be inspected if adequate light and safe access are available.
- g) It is not practical to itemise every defect and minor defects which are obvious to the layman are not generally noted unless they are symptomatic of a more serious underlying structural fault.
- h) The inspection does not include any services in or to the building and the services of appropriate experts should be sought if deemed necessary.
- i) The detection and eradication of timber infestation and rising damp are specialist matters and as such are outside the scope of this report. We would, nevertheless, recommend that a firm of appropriate experts should be employed to carry out an independent survey and prepare a report.
- j) Although mention may be made in this report, we have not carried out an exhaustive survey as to whether hazardous or deleterious materials such as asbestos is used in the construction of the buildings, neither have we carried out any tests or other investigation to determine the presence or otherwise of methane gases or other noxious substances of any kind whatsoever on the site. Appropriate experts should be consulted if deemed necessary.
- k) It should be noted that further deterioration of existing defects, or the presence of any defects undetectable at the time of the inspection, cannot be ruled out.

# Appendix A1

## Photographs



Photo A1.1

Foot of the main staircase, as seen from the Level 00 (Ground Floor) entrance lobby. The stair locally is in formed in timber and is thought to be a modification from the original.



Photo A1.2

The Level 00 to 01 half-landing is boarded in timber and appears to be in fair condition.



Photo A1.3

View of the Level 00 to 01 upper stair flight, which is of cantilevering segmental stone tread construction and appears to be in fair condition.

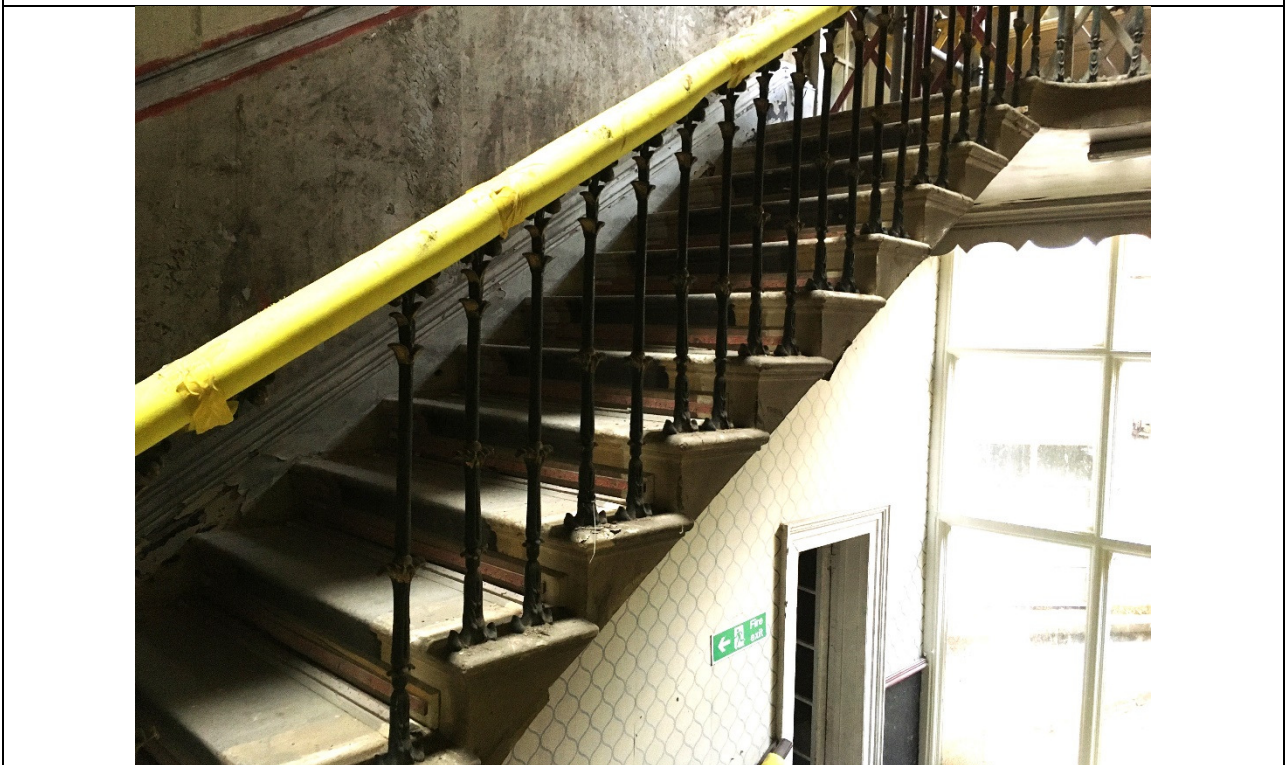


Photo A1.4

The Level 01 to 02 lower stair flight is of cantilevering segmental stone construction and appears to be in fair condition. NB – Broken ornate cast iron balusters locally.



Photo A1.5

Level 01 to 02 half-landing is of stone construction and appears to be in sound condition. NB lattice scaffold truss support to the Level 02 to 03 and 03 to 04 half-landings above.



Photo A1.6

The Level 01 to 02 upper stair flight is of cantilevering segmental stone tread construction and appears to be in sound condition. NB – Broken ornate cast iron balusters locally.



Photo A1.7

Underside of the stair at Level 02 has suffered from water ingress, resulting in the separation of the lath and plaster ceiling from the stair flight above. Repairs to the ceiling are needed.



Photo A1.8

Level 02 to 03 lower flight is of timber construction. The treads show signs of abrasion wear and will need local repairs. NB – Broken ornate cast iron balusters and makeshift timber replacement.



Photo A1.9

The ceiling to the underside of the Level 02 to 03 lower stair flight is showing signs of cracking and separation from the timber structure above. Local repairs needed.



Photo A1.10

Severely decayed timber structure of the Level 02 to 03 half-landing, as seen from below. Signs of dry rot and wet rot were noted. Removal and replacement of the half-landing is anticipated.



Photo A1.11

View of the underside of the Level 02 to 03 half-landing, showing extent of loss of the decorative plaster ceiling, and damage to the Level 02 to 03 upper flight, which will require replacement.



Photo A1.12

The Level 03 to 04 main stair flight (photo bottom RHS) is in timber and appears to be in fair condition, though the treads are showing signs of abrasion wear and will require repairs locally..



Photo A1.13

Level 04 half-landing, showing the joist ends completely rotted away. NB The joists do not reach as far as the grey-painted steel 203 x 133 x 25 UKB support beam, which has been installed recently.



Photo A1.14

The Level 04 half-landing and side landing are supported by scaffolding from below. The scaffolding bears onto the Level 02 to 03 half landing and upper stair flight, which is decayed.



Photo A1.15

The Level 04 side landing is generally in fair condition. The north-eastern end abuts the Level 04 half-landing, which is badly decayed. NB missing floor boards and 203x133x25 UKB support beam.



Photo A1.16

Ceiling to the south-west corner of the stairwell roof. Rainwater ingress over a prolonged period has led to decay of the backing laths and local collapse of the plasterwork. Local repairs are needed.



Photo A1.17

Damage to recently replaced ceiling plasterwork below roof level, caused by water ingress. General repairs are needed to the ceiling in this area.



Photo A1.18

The staircase features an ornate cast-iron balustrade, with a hardwood handrail (shown protected by yellow foam sheathing) NB - Variation in alignment of the stair flights and landings from level to level.



Photo A1.19

Baluster foot socket in the inner end of a cantilevering stone tread unit. The cast iron balusters have rectangular ends that fit into the sockets.



Photo A1.20

Rectangular bottom end of cast iron baluster, showing countersunk hole for wood screw to fasten the baluster to the timber stair string member behind. The screw is missing in this location.



Photo A1.21

The ornate cast iron balustrade has been broken in places and the balusters removed. NB - Makeshift wooden balusters have been fitted in places – e.g. fifth baluster from the right.

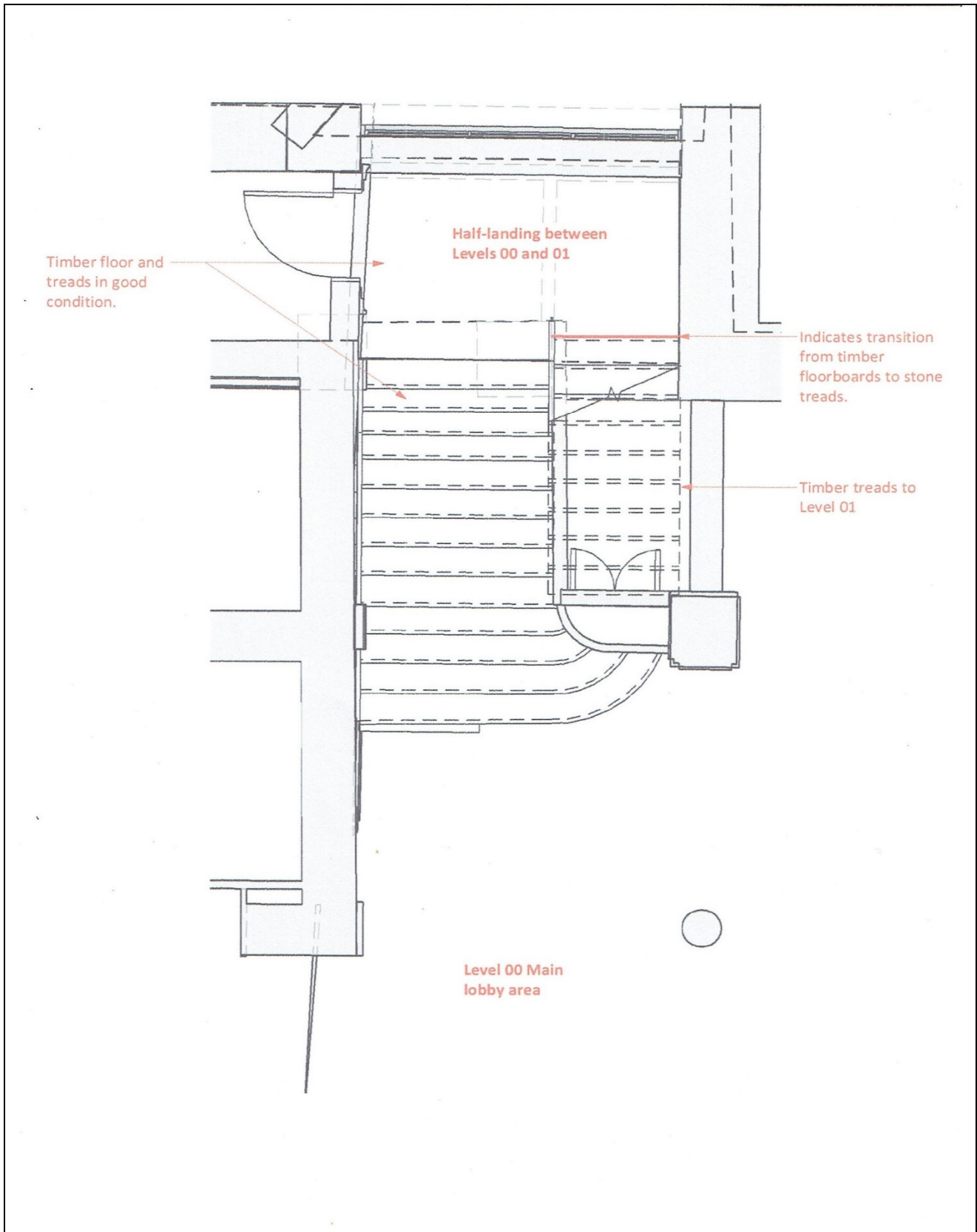


Photo A1.22

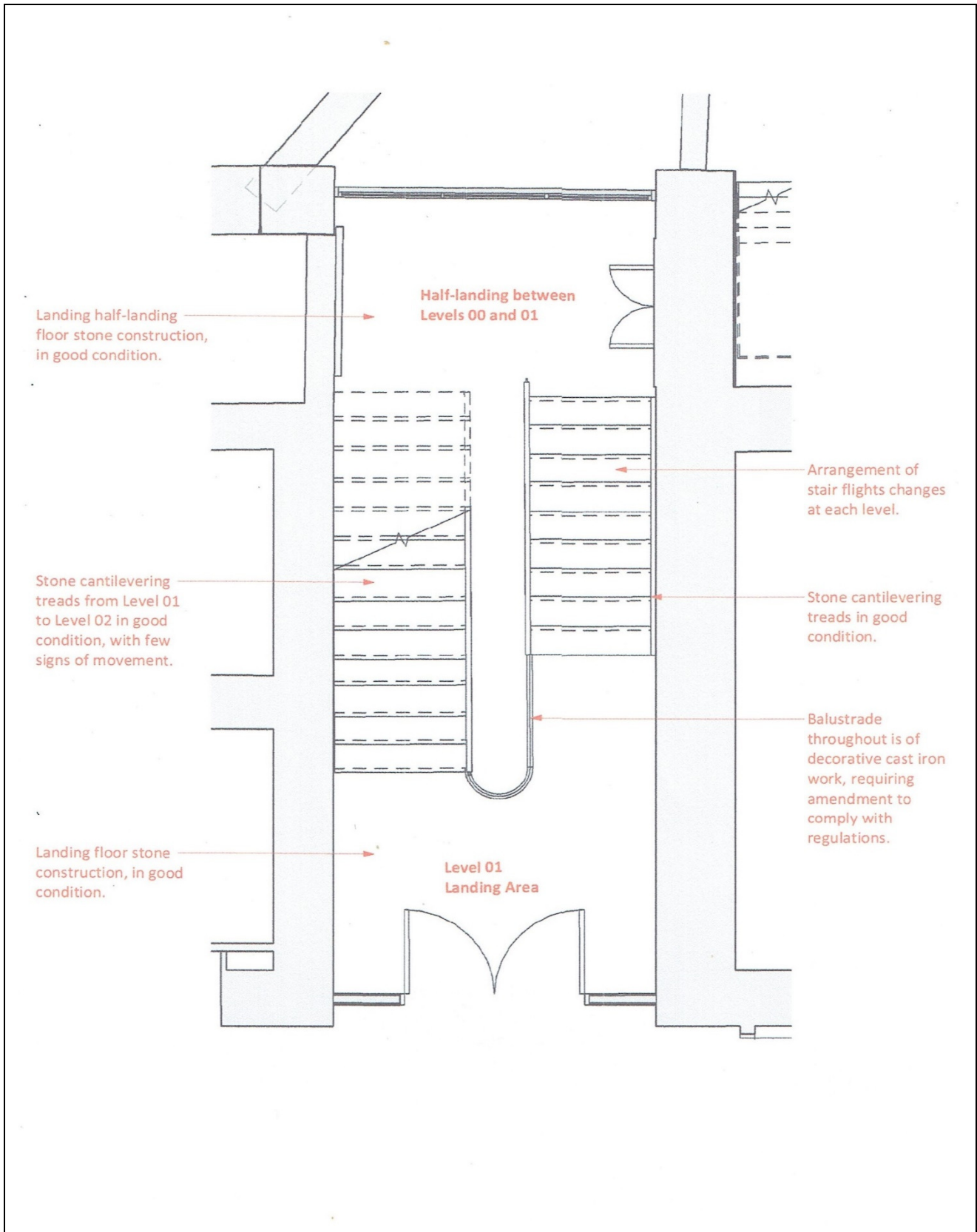
Diagonal cracking in the staircase east flank wall adjacent to the half-landing emergency access door. Local stitching / masonry repairs needed to restore structural integrity locally.

## Appendix A2

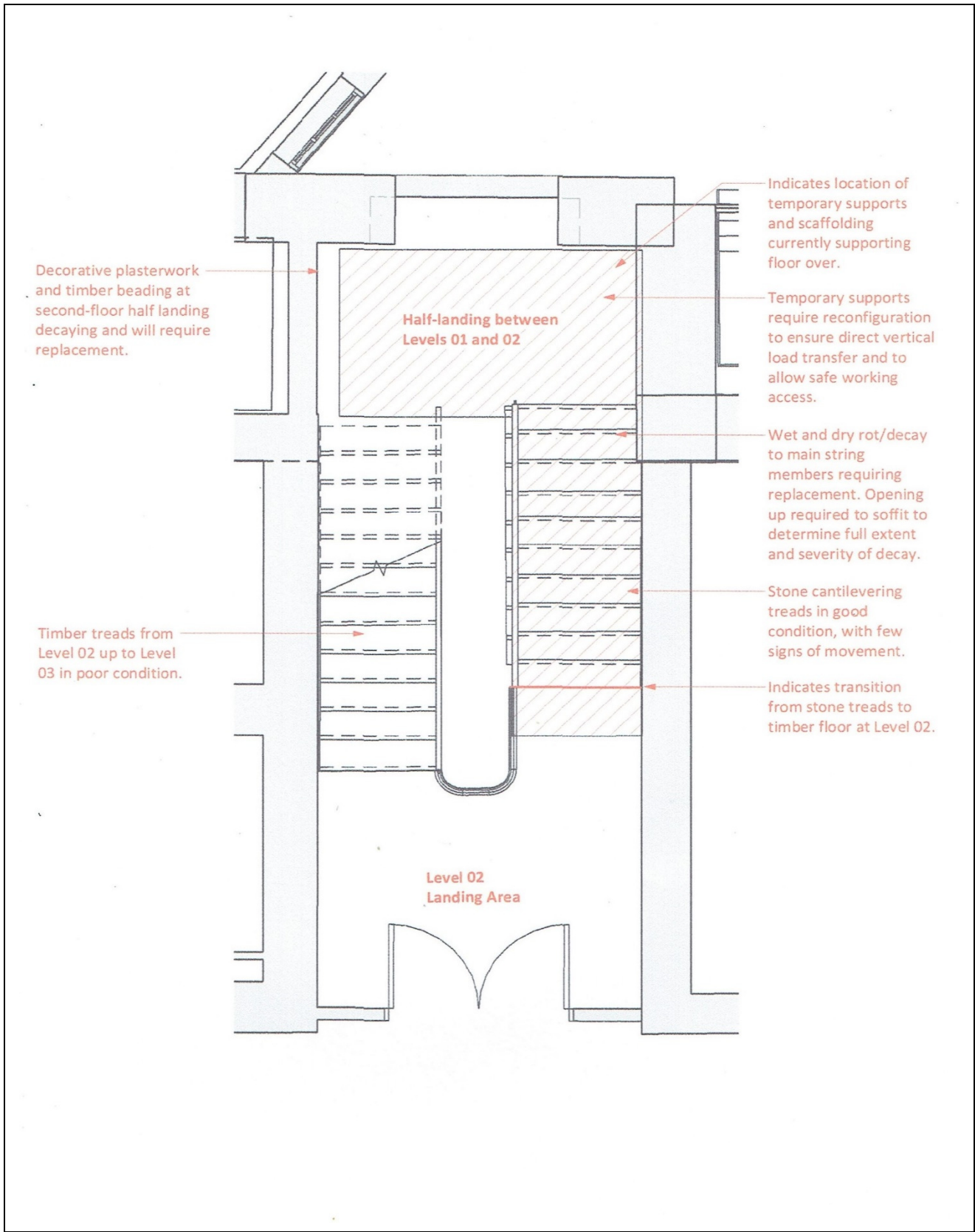
### Floor-by-floor staircase plans



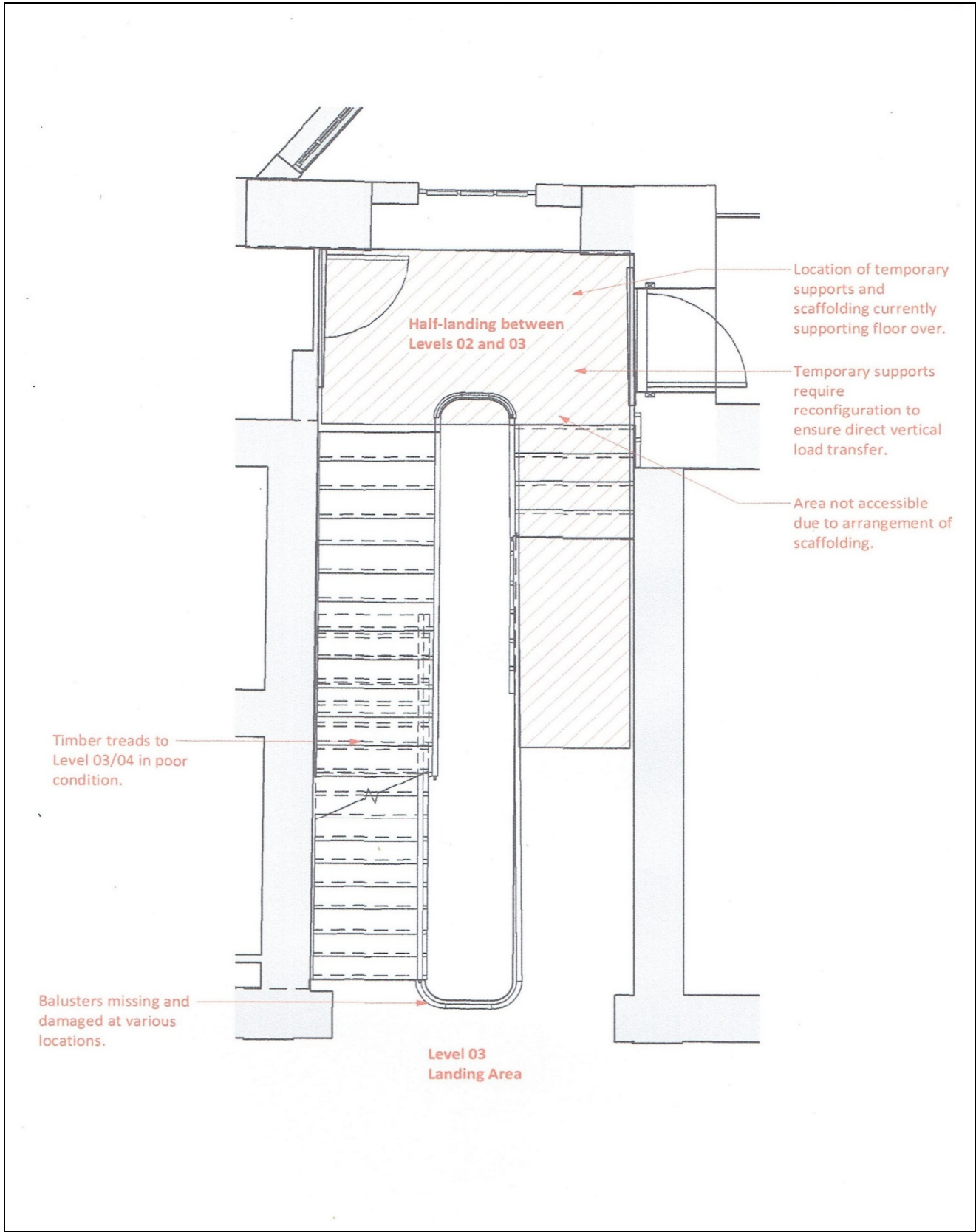
Drawing GHH-ACE-ZZ-00-DR-S-8034-P1 - Block A Stair Floorplan - Level 00



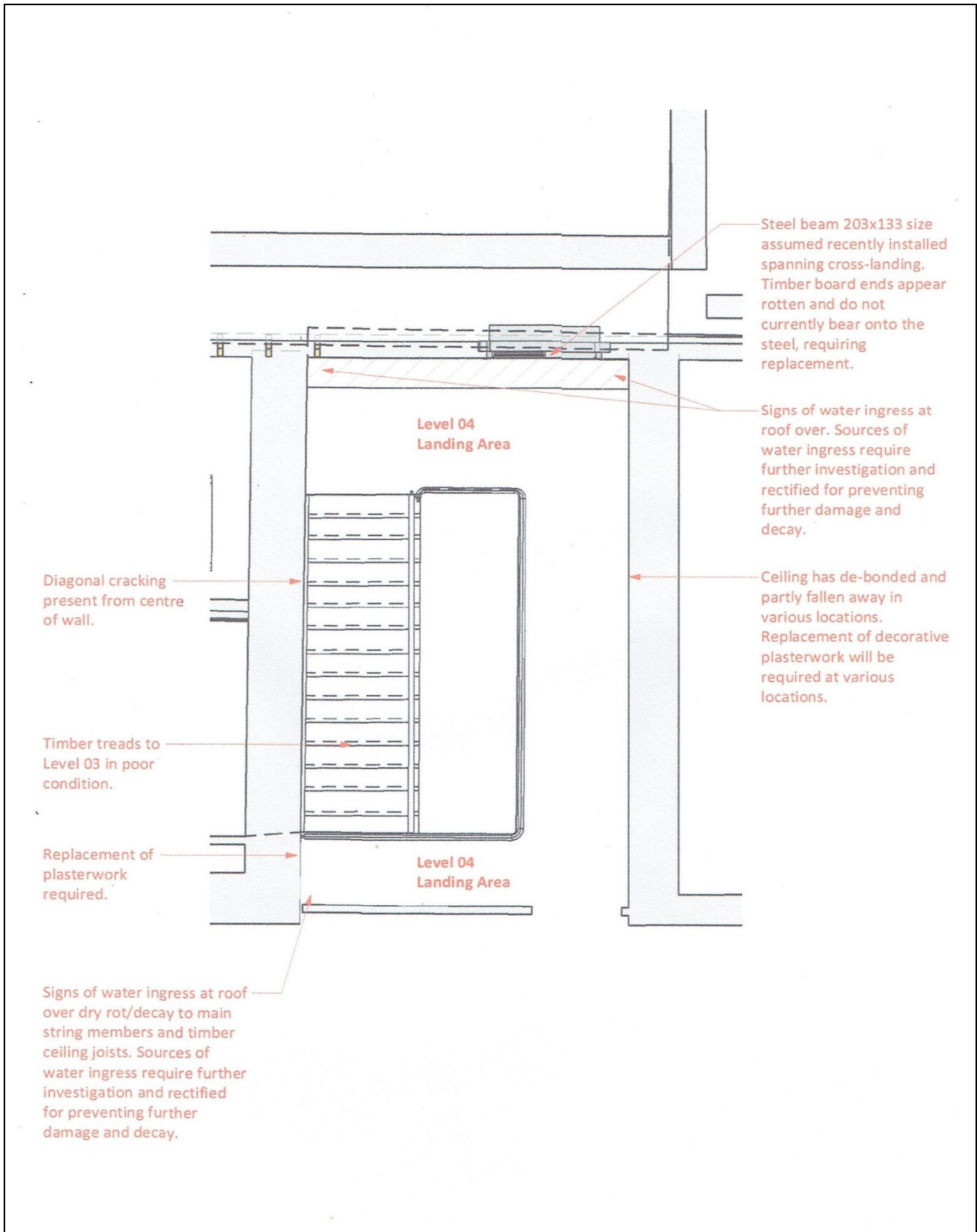
Drawing GHH-ACE-ZZ-01-DR-S-8035-P1 - Block A Stair Floorplan - Level 01



Drawing GHH-ACE-ZZ-02-DR-S-8036-P1 - Block A Stair Floorplan - Level 02



Drawing GHH-ACE-ZZ-03-DR-S-8037-P1 - Block A Stair Floorplan - Level 03



Drawing GHH-ACE-ZZ-04-DR-S-8038-P1 - Block A Stair Floorplan - Level 04