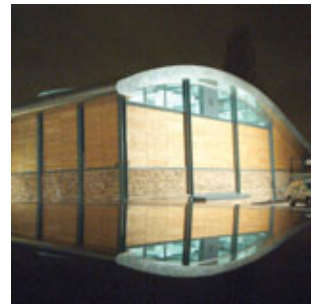


SINCLAIRJOHNSTON

CONSULTING CIVIL AND STRUCTURAL ENGINEERS



STRUCTURAL ENGINEERS APPRAISAL

OF

41/42 CHESTER TERRACE

LONDON

W1

**IN SUPPORT OF AN APPLICATION FOR LISTED BUILDING CONSENT
FOR STRUCTURAL ALTERATIONS**



**Derek Glenister, BSc, CEng, MICE, MISTructE
Sinclair Johnston & Partners Limited
93 Great Suffolk Street
London
SE1 0BX**

**Tel: 020 7593 1900
Fax: 020 7593 1910
E-mail: dglenister@sinclairjohnston.co.uk**

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INDEX

- 1.0 AIM OF REPORT**
- 2.0 BRIEF STRUCURAL DESCRIPTION**
- 3.0 BRIEF DESCRIPTION OF SITE**
- 4.0 STRUCTURAL OBSERVATIONS AND INVESTIGATIONS**
- 5.0 PROPOSALS**
 - 5.1 Overview**
 - 5.2 External Walls and Party Wall**
 - 5.3 Floors**
 - 5.4 Roofs**
 - 5.5 Basement**
 - 5.6 Stairs**
 - 5.7 Lift**
 - 5.8 Existing Brick Arch Vaults**
 - 5.9 Rear Subterranean Room to No. 42 and Chiller Compound 41**
- 6.0 PROTECTION OF HISTORIC FABRIC**
- 7.0 SYNOPSIS**

APPENDICES

- A. PHOTOGRAPHS**
- B. RECORD DRAWINGS OF INVESTIGATION WORK**
- C. DRAWINGS OF PROPOSED ALTERATIONS**
- D. SEQUENCE OF CONSTRUCTION AND TEMPORARY WORKS
 PROPOSALS**
- E. METHOD OF CONSTRUCTION OF NEW CANTILEVER STONE
 STAIR.**

41/42 CHESTER TERRACE, LONDON, W1**1.0 AIM OF REPORT**

- 1.1 The purpose of this report is to present initial findings related to the structural integrity and significance of the properties at 41 and 42 Chester Terrace, London, W1 and to provide an opinion as to the viability for the proposed alterations to the houses.
- 1.2 The report is based on:-
- Stephen Levrant, Heritage Architecture Limited's Historic and Conservation Report dated March, 2012.
 - Survey drawings of the existing building.
 - Christian Liaigre drawings of the architectural proposals.
 - A visual inspection of the building. See photographs Appendix A.
 - Limited selected exploratory works undertaken on 12th June, 2012 to assess the presence or otherwise of original historic fabric. See record drawings Appendix B.
 - Experience of working on other houses in the Terrace notably numbers 1 and 22 Chester Terrace.
- 1.3 The historic background is given in Heritage Architecture's report, and is, therefore, not repeated here. However, a synopsis of the main findings is as follows.
- 1.4 No. 41 and 42. Chester Terrace are grade I listed buildings built in 1825 as part of a ten year long development of the Regent's Park Terraces designed by John Nash, a highly significant and innovative Architect.
- 1.5 The Regent's Park Terraces were developed by, and indeed are still owned by The Crown Estate.

- 1.6 The houses in Chester Terrace were substantially redeveloped in the 1960's with the main terrace Nos. 3, to 39 having new floors, new roofs and the installation of lifts and the rear elevation re-built.
- 1.7 Nos. 41 and 42 are also shown to be redeveloped retaining the existing facades with a new roof and new internal lift shafts.
- 1.8 The current proposals comprise internal alterations to the two houses and significantly to link the floors at each level to form a single residential property. The proposals are more fully described in Heritage Architecture's Design and Access Statement.

2.0 BRIEF STRUCTURAL DESCRIPTION

- 2.1 When viewed from the park Nos. 41 and 42 combine as do Nos. 1 and 2 Chester Terrace to form what appears to be a substantial single individual house.
- 2.2 The property is four storeys plus basement of traditional construction comprising external load bearing masonry walls, a masonry party wall and internal masonry or studwork walls and timber roof.
- 2.3 All of the internal walls are thought to generally date from the 1960's or indeed later, and generally comprise fletton brickwork or blockwork or studwork.
- 2.4 The floors, ground floor and above in each of the houses are of timber construction. Limited exploratory works at first, second and third floor levels within No. 42 Chester Terrace verifies that the existing joists are generally 10" x 2" joists at about 16" centres spanning side to side between the side flank wall and the central party wall or the brick enclosure wall to the staircase.
- 2.5 The staircases within both Nos. 41 and 42 are of new construction and are thought to date from the 1960's redevelopment. The balustrade and handrail within both properties appears to be a later alteration.
- 2.6 The structural floor joists themselves date from the 1960's and it is noted that these are supported on metal hangers rather than bearing into the wall itself. The original floor joists would have been expected to have been embedded into the brickwork wall, and supported on a timber plate. It is noted that in areas there is fletton brickwork repairs which are presumed to be where original floor joists and the timber plate have been cut out and the wall made good.
- 2.7 From investigations to date nothing remains of the original floor construction which we would have expected to comprise main timber bressumers supporting floor joists with an independent separate timber ceiling structure.

- 2.8 It appears that the floor levels have been adjusted from the original Nash levels, this was probably done in the 1960's in order to provide the requisite floor to floor heights for the lift installation. This would, therefore, account for the floors having been replaced and also the staircases.
- 2.9 This change in floor level resulted in a substantial floor to cill height at the second floor and hence in both houses the floor has been locally built up in order to improve the floor to cill height.
- 2.10 The changes in floor level is evidenced by the band of fletton brickwork which can be seen within the floor void at second floor, where the original floor would have been cut out and the wall made good.
- 2.11 The lift shaft is a 1960's addition and from experience on other properties within the terrace the lift shaft is expected to a half brick wall of fletton brickwork.
- 2.12 The floor slab within the basement is expected to be a concrete ground bearing floor slab dating from the 1960's.
- 2.13 The main roof is a new roof comprising carpentered timber trusses supporting timber rafters and timber ceiling joists. Drawings are available of this alteration dating from 1961.
- 2.14 The roof within 42 contains a rooflight over the stairwell as shown on the 1961 drawings for the roof. No. 41 has had the rooflight altered and enlarged with the introduction of an additional rooflight within the side elevation of the roof. Again the original plans show the 1960's roof incorporating a rooflight on this elevation for both 41 and 42.
- 2.15 The roof within 42 is different from 41 and whereas the record drawing from 1961 indicates the roofs were handed the roof within 42 is of similar construction, but different orientation. See roof drawing within Appendix B.

3.0 BRIEF DESCRIPTION OF SITE

- 3.1 Chester Terrace is located to the east side of Regents Park, and 41 and 42 Chester Terrace are located to the north end on the west side of the road, and enjoy views out across Regents Park.
- 3.2 Chester Terrace itself is raised above the general level of Regents Park.
- 3.3 The two existing semi-detached houses comprise basement, ground, first, second and third floors. The roof is a pitched roof to the two end gables, and front and rear elevations with a flat area to the centre.
- 3.4 The houses front on to Chester Terrace and have gardens to the sides and rear. There is an existing lightwell which runs around the houses, but which is part covered over.
- 3.5 Pavement vaults exist to the front extending out to the centre of Chester Terrace.
- 3.6 In addition to the rear of No. 41 there is an open compound which has been formed in more recent times the 1960's or possibly later which is used to house a chiller for cooling. Also No. 42 in a similar juxtaposition has a subterranean room which again is a modern intervention.
- 3.7 The local geological map indicates that the underlying sub-soil comprises river terrace gravels overlying London clay.

4.0 STRUCTURAL OBSERVATIONS AND INVESTIGATIONS

- 4.1 Limited structural investigation works were undertaken on the 12th June, 2012 in order to assess if any historic fabric remains other than the perimeter masonry elevations and masonry party wall.
- 4.2 Record drawings of the investigation works are included within Appendix B, and have been used to inform this report.
- 4.3 In summary it is evident from the investigation works that the current existing floors and roof are of modern construction dating from the 1960's as are the internal walls.
- 4.4 The enclosure walls to the stairs and lift are of fletton brickwork dating from the 1960's.
- 4.5 The brick walls forming the enclosure to the open chiller compound have bowed inwards and cracked. See record Appendix B. This movement is not recent, but the wall is considered to have been structurally compromised and will need replacing.

5.0 **PROPOSALS**

5.1 **Overview**

5.1.1 The main retained element of historic fabric is the external elevation walls and these are to be retained. The principle alterations comprise:-

- The linking of the semi-detached houses to form a single residential property.
- The removal of the 1960's staircases and lift shafts and replacement with a new traditional cantilever stone stair and single lift shaft.
- The removal of the 1960's floor construction and replacement with new floors.
- The lowering of the front basement vaults to provide improved headroom.
- The reconstruction of the 1960's subterranean room extension at No. 42 and the chiller compound at No. 41 to suit the new landscape design and as a consequence of the defective brickwork.

5.2 **External Walls and Party Wall**

5.2.1 These elements are the only elements of retained historic fabric. Works to these walls are to be of minimal intrusion. Therefore, new door openings through the party wall will be carefully formed and provided with appropriate concrete lintels. With the exception of one opening in the basement which will have a steel picture frame. New floors will be supported on the existing walls utilising metal joist hangers carefully cut into bed joints. Where new beams are required to support floors these will be supported on local padstones carefully cut into existing walls in a limited number of places.

5.3 **Floors**

- 5.3.1. The new floors will generally comprise timber joists spanning between masonry walls and new steel beams. The main floor joists will be 225mm x 50mm joists at 400mm centres with a sub-grid of 75mm x 50mm ceiling joists on a perpendicular grid in order to allow lateral service distribution in both directions.
- 5.3.2. It is proposed that there will be a new traditional cantilever stone stair, and therefore, the stone floor finish will continue at landings and outside the lift. Therefore it is proposed to provide a localised area of concrete slab to provide a suitable floor structure for the stonework in these areas. This concrete slab will be supported on steel beams and utilising a profile metal decking to act as a permanent shutter. The concrete slab itself will not be cut into either the elevation walls or the party wall.

5.4 **Roof**

- 5.4.1. The existing roof construction will be retained; however, the existing rooflights over the staircases will be infilled as will the rooflights to the side elevations.
- 5.4.2. The main roof trusses are of fabricated construction comprising timber cords and bolted plywood connections. The detail of this particularly within No. 41 is less than satisfactory, and further investigation and design studies will be undertaken on the existing roofs and roof trusses to assess and determine what additional strengthening and remedial works are required to put the roof structure into good order.

5.5 **Basement**

- 5.5.1. The existing concrete ground bearing slab will be broken out, new localised mass concrete foundations provided to the new masonry walls and lift shaft, and a new ground bearing concrete slab reinstated.

5.6 **Stairs**

5.6.1. The new stairs are to be of traditional cantilever stone construction. These will be supported in part by the new masonry walls to the stair enclosure, and in part will need to be cut into the existing masonry party wall. A Method Statement for the construction of this stone cantilever stair is included in Appendix E.

5.7 **Lift**

5.7.1. The new lift will be incorporated within a new masonry enclosure rising through the building. The lift will require a new lift pit which will be excavated and formed in reinforced concrete. It is anticipated that this may be lower than existing corbel foundations to the party wall, and, therefore, localised underpinning of the party wall will be required together with local cutting back of the existing corbels. This will only be undertaken over the extent of the proposed new lift.

5.8 **Existing Brick Arch Vaults**

5.8.1. The existing brick arch vaults have an internal headroom of only approximately 1.3m and the proposal is, therefore, to lower the internal floor level to provide improved headroom. In order to do this it will be necessary to underpin the existing vault walls. This is commonly done and indeed we would note that this has been done elsewhere within Chester Terrace.

5.9 **Rear Subterranean Room to No. 42 and Chiller Compound to No. 41**

5.9.1. It is noted that the existing brick walls to the 1960's compound at the back of 41 are failing. The walls having bowed with major cracks, and it will, therefore be necessary to re-build these walls, and it would be proposed to undertake this in reinforced concrete construction.

- 5.9.2. With respect to the subterranean room to the rear of No. 42 the roof of this room is to be lowered in order to provide planting space over for landscaping, and also, therefore, to lower the floor level to achieve necessary headroom. Therefore in view of the scope and scale of alterations to this room which is not of historic construction it is proposed that the existing modern brickwork will be removed and replaced with a new reinforced concrete enclosure.

6.0 PROTECTION OF HISTORIC FABRIC

- 6.1 Consideration has been given to the need to protect the historic fabric, namely the elevation walls and party wall during the structural works. It is, therefore, proposed that the structural works should be phased in such a manner as to ensure the stability of these elements throughout the works. The proposed method and sequence of working together with temporary works proposed are included and set out within Appendix D.
- 6.2 A further Method Statement for the construction of the new cantilever stone stair is included in Appendix E which sets out the method of cutting into the existing part wall of the new cantilever stone stair in order to provide the appropriate support to the new cantilever stone stair and maintain the structural integrity of the existing party wall.

7.0 SYNOPSIS

- 7.1 From historical records and on-site inspection and investigations to date it is evident that no historic fabric remains except the main elevation walls and the existing party wall.
- 7.2 The proposals, therefore, to replace the existing 1960's timber floors with new timber floors supported by new steel beams will not have a significant intrusion into the historic fabric.
- 7.3 The existing timber stairs will be removed and a new stone cantilever stair provided and the stonework from the stair will be continued through into the landings and lift lobby. To accommodate this it is proposed to provide a localised concrete slab at each floor, and this will be supported by a local arrangement of steel beams so that there is no requirement to cut the concrete slab into the existing masonry walls.
- 7.4 The existing 1960's reinforced concrete basement slab will be broken out and replaced with a new concrete slab as the extent of below ground drainage works will impair the integrity of the existing slab.
- 7.5 The existing vaults are to be underpinned to allow a lowering of the vault floors to provide a more useable headroom. This has been undertaken elsewhere on the terrace, and it will be undertaken in a traditional underpinning manner which is tried and tested and, therefore will not affect the structural integrity or stability of the existing vaults.
- 7.6 The existing roof will be retained but further investigations will be undertaken to assess its structural integrity and appropriate remedial and strengthening works undertaken.
- 7.7 The new lift shaft will require a new lift pit and localised underpinning of the party wall will be required to accommodate this.

- 7.8 The existing chiller compound to the rear of No. 41 is in a poor structural state and requires to be rebuilt, and also the subterranean room to the rear of No. 42 requires to have the roof slab level lowered for landscaping, and likewise the existing floor lowered to accommodate this and, therefore, it is proposed to replace these enclosures with new reinforced concrete enclosures. It is noted that these are not historic in themselves and this work, will not impact on the historic fabric of the building. The elements will be replaced to the same footprint as existing.
- 7.9 Consideration has been given to the need to ensure the structural stability and integrity of the historic fabric and therefore the proposed Method Statements and sequence of working with appropriate temporary works are outlined in the Appendices to demonstrate that the proposed works can be undertaken satisfactorily without impairing the stability or integrity of the existing historic fabric.

DEREK GLENISTER, BSc, CEng, MICE, MStrucE