Structural Appraisal and Feasibility Report

J2437 22 Ladbroke Grove

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GENERAL NOTES

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REVISION HISTORY

Revisions indicated with line in margin.

Revision status: P = Preliminary, T = Tender, C = Construction, X = For Information

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1 INTRODUCTION

This document provides a summary of the existing structure at 22 Ladbroke Grove, W11 3BQ and considers the implications of the proposed alterations. Drawings indicating the existing structure can be found within Appendix A. The proposed works (Planning consent Ref:PP/14/08863) are indicated within Rodic Davidson Architectural (planning) drawings included in Appendix B. This document explores the potential construction methods/processes in order to deliver this scheme given substantial amount of repair/replacement involved.
2 SCOPE

WYE have carried out a non intrusive visual structural survey only.

The following exclusions apply:

- Temporary works design, and construction management is to be carried out by the Contractor although potential solutions have been considered within this report.
- Fire protection requirements by the Architect

3 THE SITE

The property is located within the London borough of Kensington and Chelsea. The site is orientated NE – SW and is positioned on a generally N to S slope.

The underlying ground conditions are known to be London Clay from historical borehole records and geological maps. The depth to this clay is not known although the landscaping works carried out in the garden would indicate the clay is likely to be shallow, overlain with topsoil only.

4 EXISTING STRUCTURE

4.1 GENERAL DESCRIPTION

The existing structure is a 4 storey terraced house approximately 11m x 6m in plan and with the lower storey being partially below external ground level. The building is of traditional construction with load bearing masonry (London stock brick) walls, timber floors and slate roof. Drawings of the existing building can be found within Appendix A.

A non-intrusive visual inspection of the property was carried out on 12th March 2015. Opening up works and trial holes have not been carried out. The depth and type of foundations is not known at this stage although they are assumed to be traditional brick corbels onto the clay sub-strata.
4.2 STRUCTURAL CONDITION

4.2.1 Loft Level Defects
- Leaking Rooflights
- Slipped/damaged slates
- Cracks within chimney stack. Width 3-4mm.
- Deformation of purlin sections. (Proposed to be removed in new scheme)
- Partially rotten purlins with loss of material

4.2.2 Second Floor Defects
- Cracks between the mansard roof and party wall. Width 0.5-2mm.
- Cracks within ceiling finishes. Width 0.5-2mm.
- Diagonal cracks within spine wall (low level). Width 3-4mm.
- Damp patch in ceiling (beneath rooflights above)

4.2.3 First Floor Defects
- Significant deformation of floors. Floors appear to be sagging between supports and inclined towards spine wall.
- Masonry cracks at all levels with front and rear facades, internal walls and spine wall. Width 0.5-4mm
- Damp to front façade.

4.2.4 Ground Floor Defects
- Significant deformation of floors. Floors appear to be sagging between supports and inclined towards spine wall.
- Masonry cracks at all levels with front and rear facades, internal walls and spine wall. Width 0.5-4mm

4.2.5 Lower Ground Floor Defects
- Damp to front and rear facades
- Cracking to front and rear facades, internal walls and spine wall. Width 0.5-4mm
- Cracks within ceiling finishes

4.2.6 Front Façade Defects
- Extensive cracks at all levels. See Crack survey sketch in Appendix C. Max crack width 4-5mm

4.2.7 Rear Façade Defects
- Cracking throughout, particularly within closet wing. Width 0.5-3mm.
- Failed lintel at ground floor level.
4.2.8 Structural cracking and movements

The structure is exhibiting extensive signs of movement and water damage. Cracking is observed at all levels within the external, party and internal walls. Additional photographs of the observed cracking are contained within Appendix B.
4.2.9 Deformation of floors and staircases

The floors and stairs within the property have bowed over time and are showing relatively significant levels of permanent displacement/deformation, presumably due to creep. It is also believed this may also be related to the settlement of the internal spine wall which has resulted in up to 30mm deviation of the floors from the horizontal.
4.2.10 Water ingress

Water ingress through the front external wall has resulted in degradation of the brickwork and discolouration due to damp/mildew is visible within the bedroom at 1st floor level. This may also be due to a poorly detailed parapet gutter.

Water ingress through the existing roof lights has resulted in damage to structures at a lower level. Primary roof purlins have suffered some rot/decay. Although this appears to be only superficial (circa 4-5mm penetration) there has been loss of material and the members’ capacity will have been reduced. This is evident in the degree of deformation of these members. Further assessment of these members and a schedule of repair will be required, particularly in light of the proposed modifications to the roof structure. See section 5. Further staining and material decay is visible at lower levels.
5 PROPOSED SCHEME

5.1 PROPOSED MODIFICATIONS TO EXISTING STRUCTURE

The proposed works incorporate changes to the existing building at all levels. These include:

• Removal of existing rear closet wing extension
• Removal of existing internal loadbearing walls at all levels, but most extensively at lower ground floor.
• Construction of lowered floor slab at lower ground floor level, with associated underpinning of existing load bearing walls.
• New foundations to support new load bearing structures.
• Replacement and reconfiguration of existing staircases and the associated floor voids/trimming.
• New floor structures to replace existing half-storey landings.
• Insertion of new steelwork structure to re-support the existing floors, walls and roof.
• Removal of existing loft floor structure and replacement with new mezzanine.
• Construction of a new single storey, highly glazed extension.

5.2 CONSTRUCTION SEQUENCE/PROCESS OPTIONS

The proposed works could be carried out in a variety of ways however there are principally three potential options:

Option A - Retention repair and modification of all existing structures. This process would involve extensive crack stitching and masonry repairs to all walls, insertion of new steelwork within existing floor structures, and modifications/repairs to the existing timber floor and roof structures. Formation of new floors and staircases would require retention and modification of the existing, perhaps involving firrings etc to achieve level structures. This scheme has been consented Ref: PP/14/08863.

Option B – Demolition behind retained façade. The front façade of the building would be retained and repaired with all other structural elements removed. A new structure would then be erected behind the existing façade.

Option C – Full demolition and reconstruction. Demolition of all structures including the front façade followed by construction of a new house, with the front façade constructed to replicate the original.

• All options will require temporary works to varying degrees. The propping and demolition sequences will need to be given careful consideration in order to maintain support of any retained structures, and to safeguard existing adjacent structures.
• All options will have practical implications on the ease of buildability, site accessibility, construction programme and construction cost.
• All factors should be considered in the section of construction process and are discussed more fully in the following sections of this report.
• Demolition works must be carried out using methods which cause minimum disruption i.e. noise and vibration to adjoining properties and their occupants.

• Detailed method statements to include working methods, sequence of works, temporary works designs, risk assessments and working hours are to be prepared by the contractor and submitted to the design team.

• All options will likely require the removal and replacement of the existing roof and loft floor structures to allow repair/modification.

5.3 SAFEGUARDING EXISTING STRUCTURES

5.3.1 Option A - Retention repair and modification of all existing structures

The retention of the existing façade and floor structures will ensure that the risk of damage to neighbouring properties is minimised. Lateral support to the Party walls is maintained and the front façade will act to stiffen the terrace as a whole. The works can be sequenced in a way that ensures existing damaged masonry is repaired, improving the general robustness of the building, prior to demolition.

5.3.2 Option B – Façade retention

A series of temporary horizontal props would be required to ensure lateral support to the party walls is maintained. The works can be sequenced in a way that ensures existing damaged masonry (within the front façade) is repaired, improving the general robustness of the building, prior to demolition. This will act to ensure the terrace as a whole maintains its current level of stiffness and minimises the risk of damage to adjacent structures.

5.3.3 Option C – Full demolition and reconstruction

A series of temporary horizontal props would be required to ensure lateral support to the party walls is maintained. Additional temporary works located close to the front façade would be required to ensure the terrace as a whole maintains its current level of stiffness and minimises the risk of damage to adjacent structures. In practice this is a potentially difficult proposal and the risk of damage to the adjacent structures is increased. The extent of this damage is not easily quantified/predicted. A process of monitoring, to include the adjacent structures should be adopted, to allow pre planned mitigation measures to be implemented if required. Again, this a difficult proposal to implement in practice.

5.4 TEMPORARY WORKS

The contractor is responsible for determining all temporary loads during construction and providing temporary stability to suit their proposed method/sequence of erection. The contractor is to submit proposals to the S.E. for review prior to commencement of demolition works. However, the extent and type of temporary works will be driven by the selected method and sequence of construction. The likely TW requirements are outlined below for discussion.

5.4.1 Option A - Retention repair and modification of all existing structures

This proposal will require local needling and propping of existing load bearing masonry walls, and further propping of the existing floor and roof structures. The extent of demolition and modification planned in this case, will necessitate a large number of props. Careful sequencing of demolition, repairs and new works will be required with an incremental approach being adopted.
5.4.2 Option B – Façade retention
A series of temporary horizontal props would be required to ensure lateral support to the party walls is maintained. A series of steel beams (horizontal) spanning between the party walls and acting to support the front façade would be required.

5.4.3 Option C – Full demolition and reconstruction
A series of temporary horizontal props would be required to ensure lateral support to the party walls is maintained. A series of steel beams (horizontal and diagonal) spanning between the party walls and acting to replicate the diaphragm action of the front façade would be required.

5.5 ACCESSIBILITY
5.5.1 Option A - Retention repair and modification of all existing structures
This option offers the least flexibility with regard to access to the site. The presence of the front façade, floor plates, and retained walls, along with the required temporary vertical propping will make access, particular for larger structural elements, extremely difficult.

5.5.2 Option B – façade retention
Access to the site may be hindered by the presence of the existing façade and the temporary works installed to support it. This access may be further reduced by the temporary works crossing existing windows/doors. A significant reduction in the number of vertical props would improve access within the site, although this would be partially constrained by additional horizontal props, installed to replicate the existing floor plates (removed).

5.5.3 Option C – full demolition and reconstruction
A significant reduction in the number of vertical props would improve access within the site, although this would be partially constrained by additional horizontal props, installed to replicate the existing floor plates (removed).

5.6 SAFETY
All options must be considered against the backdrop of ensuring safety of site operatives and the general public at all stages. A crucial aspect of ensuring safe working practices is the temporary works design/implementation and coordination with a fully considered construction sequence. The complexity of temporary works and sequence will be driven by the choice of construction method. The contractor is to submit Risk Assessments and Method Statements to the design team for review prior to commencement of demolition works.

5.7 PROGRAMME
Programme considerations are beyond the scope of this report, however the choice of construction method/sequence could have a significant impact on construction programme. Specialist advice should be sought to advise of likely programme implications

5.8 COST
Cost considerations are beyond the scope of this report, however the choice of construction method/sequence could have a significant impact on project costs. A specialist cost consultant should advise the likely implications of the chosen construction method/sequence.
6 CONCLUSION

• The existing structure is in need of extensive repair and/or replacement due to its current condition.

• The existing internal spine wall appears to have displaced vertically as a result of ground settlements or clay shrinkage. This displacement appears to have caused a significant amount of the internal cracking observed.

• The previously consented works involve significant levels of demolition and modification and therefore Options B and C should be given serious consideration due to the potential benefits to the project buildability, energy efficiency, programme, cost etc.

• All three construction options have their merits from a practicality and buildability perspective. The chosen method of construction must ensure adjacent structures are safeguarding whilst also providing a safe working environment.

• Option A, involving extensive repair of the existing structure, is likely to have significant programme and sequencing implications, however the temporary works required for both options B and C would also have sequencing issues which must be considered.

• The current condition and proposed modification to the loft floor and roof structures would indicate that these structures should be removed and replaced in any case.
APPENDIX A

Existing building drawings
APPENDIX B

Additional existing building photographs

Water damage within Loft space

Cracked chimneystack
Front Façade cracks

Spine walls cracks
Spine wall cracks

Party wall/Mansard junction cracks
2nd floor (Mansard) cracks to party wall

Spine wall cracks
Rear façade cracks

Spine wall cracks
Rear façade cracks

Spine wall cracks
Spine wall cracks

Spine wall/Party wall cracks
Rear façade cracks

Spine wall cracks
Cracking to front entrance steps

Front façade cracking
Cracking to front retaining wall
APPENDIX C

Front Façade Crack Survey
22 LADBroKE Grove - FRONT FACADE. CRACK SURVEY.
APPENDIX D

Current demolition proposals (Consented scheme)
EXISTING CHIMNEY TO BE REPAIRED. FLASHINGS TO BE REINSTATED/REPAIRED.

EXISTING ROOFLIGHTS TO BE INSTALLED. EXISTING STRUCTURE TO BE MODIFIED TO SUIT.

EXISTING REAR ENTRANCE TO BE REMOVED.

EXISTING CLOSET WING TO BE REMOVED. FLOORS 1 & 2 TO BE REMOVED & REPLACED TO MATCH EXISTING LEVELS.

EXISTING LINTER TO BE REPAIRED/MODIFIED.

EXISTING LEAN-TO/ROOF TO BE REMOVED.

EXISTING STAIRS IF BET. WALLS TO BE REMOVED.

22 LADROKE GROVE, REAR FACADE J2437.
EXISTING: INTERNAL WALLS) REMOVED (PARTIALLY REMOVED.
EXISTING STAIRCASES TO BE REMOVED/REPLACED.
EXISTING LOFT FLOOR TO BE REMOVED/REPLACED.