Appendix J – Structural stability report

Basic description, planning approval and brief

Proposals

The current proposals submitted for planning indicate minor alterations to an existing semi-detached Grade I-listed building formally known as Gloucester Lodge (address: No. 12 Gloucester Gate), and the demolition of its ancillary building, No. 12 Gloucester Gate Mews, at the rear of the site. Following a recent acquisition, the property boundary has been enlarged to include the currently uninhabitable No. 13 Gloucester Gate Mews, which will be rebuilt to consolidate the floor space of the two mews. The proposal seeks to add a new basement level for plant and services directly below the mews and the courtyard. The walled garden will be retained with a direct link from the ground floor of the main building to the mews added. Within it includes a new basement amenity space and a family room at ground level as a part of the linked access.

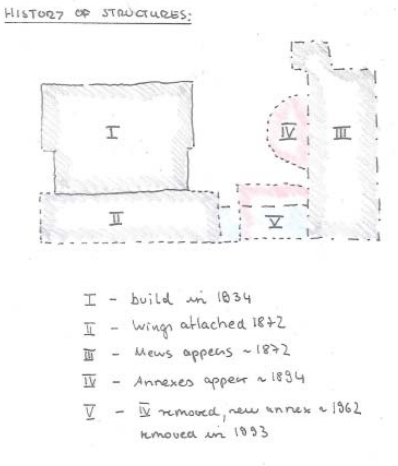
Existing structures

The existing Gloucester Lodge is a traditional three-storey building with a lower ground floor, which provides access to its subservient two-storey mews through a walled garden leading on to the street level of Gloucester Gate Mews.

Party Wall issues

The site is bounded to the north by No. 14 Gloucester Gate, which forms the second half of Gloucester Lodge. The property is connected to No. 15 Gloucester Gate, which is the current address of Bright Horizon Daycare and Nursery and which also shares a party wall with No. 13 Gloucester Gate Mews. Bounded to the south is No. 11 Gloucester Gate, a residential property and the final building on the north end of John Nash's Grade I-listed Gloucester Gate Terrace. Opposite the two mews on the east are Nos. 217 and 219 Albany Street. The space between these two end terraces forms the entrance into Gloucester Gate Mews from Albany Street.

Basic description, planning approval and brief



Planning Application

A planning application is to be submitted. The following points are substantial for further design statements.

- Application C is followed
- The site falls within the Regent's Park Conservation Area.
- The site has undergone numerous alterations in the past, as illustrated in (refer picture to the left). A recent 1993 consented planning application details the extensive changes to the interior of the building and the demolition of an annex which physically connected the main house to the mews. The design recognises the extent of this recent alteration and proposes the new additions to be in line with this precedent to preserve original heritage features.
- The scheme will require a basement excavation for the new level beneath the mews and the courtyard area.
- The application is accompanied by an Outline Construction Management Plan by Techniker. The plan attached states potential site constraints and commits to a minimal impact approach to the proposal's construction and demolition of its surrounding in particular.

Information required for further design development (scheme design)

Soil Conditions (required)

A soil investigation has not yet been carried out. Prior to further design a SI is paramount. It should cover

- the extent, materials and conditions of the existing footings
- exact level determination of existing footings within the plot and along the party wall areas
- the final ground conditions beneath the site, water issues
- expected settlement characteristics
- basement heave analysis
- foundation recommendations

Specification will be prepared by Techniker for the geotechnical site investigation works.

Borehole logs along 198 Albany Street indicate an continuous layer of clay (from soft to firm) down to 15m beneath the surface layer (finishes, made ground, fill) of 1m thicknesses. Due to a high variability in the ground conditions those remarks are just indicative.

Below ground drainage

No information is currently available for the existing drainage layout. To proceed with the foundation and future service design the drainage and sewage lines beneath the plot must be surveyed.

Information required for further design development (scheme design)

Fabric Conditions

No information is available for the quality of the existing floors, the properties of the masonry panels as well as the facades. Prior to further design those information should be obtained covering at least the following points.

- Condition, size and strength parameters of structural walls
- Condition, Size and strength parameters of existing floor joist
- Support conditions of existing floors (Pockets)
- Size of existing staircases

Fire place, chimney survey

To provide sufficient information for the future slab layout (support conditions) the chimney and fire places along the party walls needs a proper monitoring.

Structural design input (Performance criteria)

Additionally to the points above it would be prudent to have the following information available.

- Intended finishes
- Fire requirements
- Deflection and vibration limits
- Protected structural parts due to heritage obligations
- Preferred procurement method
- Special Live load and dead load requirements
- Water protection performance (basements)

Stair design

The design intent for the proposed stairs between the dining room and the garden room to the primary residence should be communicated.

Structural design (study)

It is paramount to state, that all given information are subject to a scheme and detailed design. The final foundation solution can only be developed after receiving a concise set of the investigations stated above.

Foundation and Underpinning general

The general structural methodology for the design and construction of the proposed subterranean portions of the proposed redevelopment will address potential hazards associated with the unknown elements of the adjoining structures and their foundations. Generally, one of the following conditions is expected to be encountered:

- Shallow foundations to the neighbouring properties / Party Walls: Conventional methods will be used to underpin the wall footings to suitable depth prior to commencement of excavation to incorporate the proposed basement.
- Excavation adjacent to an existing subterranean structure not shallower than the proposed basement. Existing structures (Party Walls) will be propped throughout the construction process to prevent lateral displacements

Early stage coordination with the party wall surveyor and the neighbour´s engineer would mitigate potential risk at later design stages.

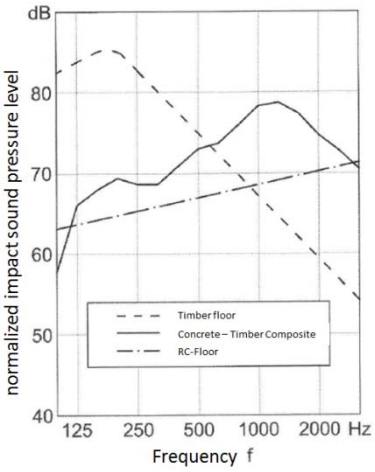
Monitoring of the adjacent building during demolition and construction phase will be mandatory.

Main House

Option 1 – Main House

- Demolish existing internal load bearing wall and floor plates as well as the dining room rear appendix
- Leave the front façade, parts of the rear façade and the party walls
- New 160mm RC-Floor panels cast into the space sitting on pockets within the existing wall elements and new build masonry walls.
- Underpinning of the Southwestern lower ground floor prior to extent the floor area.
- Underpinning of the courtyard façade walls to create sufficient safety for the required excavation of the link footings.
- Temporary works will be required

Option 2 – Main House



- Demolish parts of the existing internal load bearing wall and floor plates as well as the dining room rear appendix
- leaving the front façade, parts of the rear façade, northern spine internal wall and the party walls
- New Timber Concrete Composite floors (80mm) are installed using the existing timber (assumed 220mm) joist where possible to reduce the amount of shuttering as well as penetrating the existing walls
- Underpinning of the Southwestern lower ground floor prior to extent the floor area.
- Underpinning of the courtyard façade walls to create sufficient safety for the required excavation of the link footings.
- Price premium to pure RC-Wall approximately 35%
- Temporary works will be required

Garden room / Courtyard elements

The available courtyard space will be used to facilitate a new Gymnasium/Spa area at Lower Ground Floor Plan and a light glass box linking the main house with the Mews.

Planted roof above Gymnasium

- 200mm RC-Walls and/or 200mm RC blade columns to support a 250-300mm thick RC roof slab which is to support circa 600mm of planting in the courtyard
- Connect roof deck via shear connectors for movement joints along the edges of the mews and main building

Option 1 – Garden room

- Foundations as above
- Reinforced concrete walls approximately 160mm
- Reinforced concrete deck 160mm above lower ground floor
- Steel grillage above ground floor level (structural depth 200mm) carrying glazing at northern edge in grillage fins

Option 2 – Garden room

- Foundations as above
- Engineering brick walls approximately 315mm
- Reinforced concrete deck 160mm above lower ground floor
- Steel Beam / timber / plywood deck above ground floor level (structural depth 300mm)
- Glazing spanning between edge and centre beam

New Mews building

Mews underpinning

Whereas for the majority of the existing building traditional underpinning methods are applied, the temporary stability for the erection of the Mews building requires detailed attention.

Again - early stage coordination with the party wall surveyor and the neighbour´s engineer would mitigate potential risk at later design stages.

Two options are proposed.

Option 1 – traditional underpinning

- Underpin the neighbour foundation and the longitudinal edges traditionally (6 steps horizontally, 2 steps vertically) and brace the walls laterally until the basement has been finished
- The proposals required a careful consideration of the applied sequence
- Settlements are not avoidable, the final level depend on the stress/settlement relation of the ground
- Structural zone approx. 650mm
- Penetration of neighbour properties (approval required)

Option 2 – cased bored mini piles around the basement

- Introduction of an approx. 350mm cased bored mini pile ring around the perimeter
- Excavation in 2 steps vertically with a set of lateral bracings to reduced settlements
- Minor settlements are expected depending on detailed design and ground conditions
- Structural zone approx. 900mm
- No penetration of neighbour properties.

Structural design (study)

Mews - Basement /GF-construction

- 300mm RC-Raft with high reinforcement content
- The necessity of an internal drainage skin depends on the finally specified performance requirements

Table 11.2 Provisions for Performance Grades

From Table 1 of BS 8102: 1990[11.11]				Abbreviated commentary given by CIRIA Report 39[11.10]
Grade	Basement usage	Performance level*	Form of protection	
Grade 1 Basic utility	Car-parking; plant rooms (excluding. electrical equipment); workshops	Some seepage and damp patches tolerable	Type B with RC design to BS 8110[11.1].	Visible water and BS 8110 crack width may not be acceptable. May not meet Building Regulations for workshops. Beware chemicals in groundwater.
Grade 2 Better utility	Workshops and plant rooms requiring drier environment; retail storage	No water penetration but moisture vapour tolerable	Type A or Type B with RC design to BS 8007[11.3].	Membranes in multiple layers with well lapped joints. Requires no serious defects and higher grade of supervision. Beware chemicals in groundwater.
Grade 3 Habitable	Ventilated residential and working, incl. offices, restaurants, leisure centres	Dry environment	Type A or Type B with RC design to BS 8007, plus Type C with wall and floor cavities and DPM.	As Grade 2. In highly permeable ground, multi-element systems (possibly including active precautions, and/or permanent and maintainable under-drainage) probably necessary.
Grade 4 Special	Archives and stores requiring controlled environment	Totally dry environment	Type A or Type B with RC design to BS 8007 and a vapour-proof membrane, plus Type C with ventilated wall cavity and vapour barrier to inner skin and floor cavity with DPM.	As Grade 3.
* See CIRIA Report 139[11.9] for limits on environmental parameters				

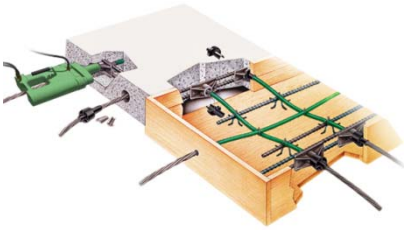
- 250mm/160mm RC-Walls at basement/ground floor level
- 160mm RC-Slabs above basement and lower ground floor

Structural design (study)

Mews - Upper Floor options

Option 1 – Link

- Structural Steel Portal frame at approximately 2000mm centre
- Cross-bracing at roof level at no glazed face and timber plywood decking
- Four side supported insulated safety glass (12/8/10)
- Timber stud or masonry infill wall panels longitudinal to provide longitudinal stiffness
- Wall opening to be coordinated



Option 2 – Link

- RC-concrete shell 140mm RC-Walls
- Min 180mm to 200mm post-tensioned roof deck at non glazed face to reduce deflections
- Two side supported insulated safety glass (18/9/12)
- Wall opening to be coordinated

Other comments

The following comments are just indicative and required further investigation at later design stages.

General stability

- The lateral stability of the Main house is provided by the internal and perimeter structural masonry walls in combination with slab diaphragm action. The slabs will need to properly tie into the walls. The use of Helifix needles between new slabs and existing walls is recommended.
- The Mews structure is stable due to the box-characteristics and the infill panels at the upper floor
- The link will be stabilised via floor diaphragms which are linked to the mews and the main building via shear studs running through movement joints (where required)
- The ground water level used for the basement buoyancy check was taken at 1.0m below the existing ground level. The water uplift force is less than the downward force arising from the weight of the structure therefore the building is stable during the event of high ground water level.

Joints

- Within the main house and the mews no movement's joints are required. Due to the basement characteristics of the mews movement joints are suggested as the stresses will vary and the extent of the new elements without joints are slightly onerous.
- For glazing works secondary movement's in-between the panels are compensated by the flexibility of the silicone joints. A minimum joint of 5mm is required.

Structural design (study)

Material grades

- The assumed concrete grade to be C28/35 and the steelwork to be grade S355.

Design life

- The usual design life should be 60 years. However the design expectation for waterproof basements may be less than required.

Robustness

- The main house is classified as a type 2B construction in accordance with the Building Regulation 2000 (edition 2004).
- The Mews and the link are classified as a type 1 construction. The same precautions as for the main house are maintained.
- Any further tying requirement will be identified during the next design stages

Contractors design work (proposals)

- RC-detailing
- Temporary works design
- Pile and underpinning design