QODA

Pre-Redevelopment Options Review

39a Fitzjohn's Avenue

20727-QODA-FJA-XX-RP-YS-3003

QODA

Contents

QODA

1 Executive Summary

This report has been produced to document the exploration of different options for redeveloping the existing building at 39a Fitzjohn's Avenue, in line with Planning guidance from Camden's Planning Guidance on Energy Efficiency and Adaptation, and in the context of other Camden, London, and National Planning Policies.

The report starts with a review of relevant policies, and an explanation of the site and contest. It then goes through a review of the existing building condition and feasibility, with fundings summarised as follows:

- The existing building is constrained in terms of its structural layout, orientation, and location in a conservation area. It is currently most suitable for use as bedsits
- The Mechanical Electrical and Plumbing (MEP) services in the existing building are in poor condition, and generally unsuitable for retention
- The existing fabric has been estimated to perform far more poorly than current standards for thermal performance
- Upgrades would be required to the building fabric and MEP in order to bring it in line with current legislation, with structural upgrades required to make it more accessible
- In order to subdivide the building into multiple dwellings, structural replacement would be required
- The development proposals for this site should focus on residential use to complement the scale and general townscape character of the Conservation Area

Three development options were created for review. Their selection was based on feasible options as identified in the existing condition and feasibility survey, as well as analysis of options that could potentially meet Camden's Policies on local housing needs.

- Option 1 involves limited alterations, with a view to maximising reuse and minimising embodied carbon. It consists of a single dwelling. The maximized retention limits the ability for other areas of the scheme to be improved.
- Option 2 introduces sensitive refurbishment and extensions to the existing building to maximise the size of the of accommodation, while retaining the structure and making acoustic, thermal, and fire performance improvements. Due to the retention of existing structure in this option, it consists of a single dwelling.
- Option 3 involves structural interventions to allow layout reconfiguration to deliver 2 new townhouses and 2 new maisonettes. This option is not able to retain as much of the existing development, but allows it to be split into more dwellings. It requires structural replacement, with only elements of the facade able to be retained.

A Whole Life Carbon (WLC) assessment was carried out for these options. Regulated operational carbon emissions (B6) were modelled in SAP 10.2; Unregulated operational carbon emissions were calculated using SAP 10.2 methodology on the basis of an all-electric development (eg no gas for unregulated uses such as cooking); and Upfront Embodied Carbon (A1-A5) was modelled using OneClick Carbon Designer - a high-level modelling software, suitable for estimating carbon emissions at this early design stage. Some of the key results of the WLC assessment are shown in Figure 1.

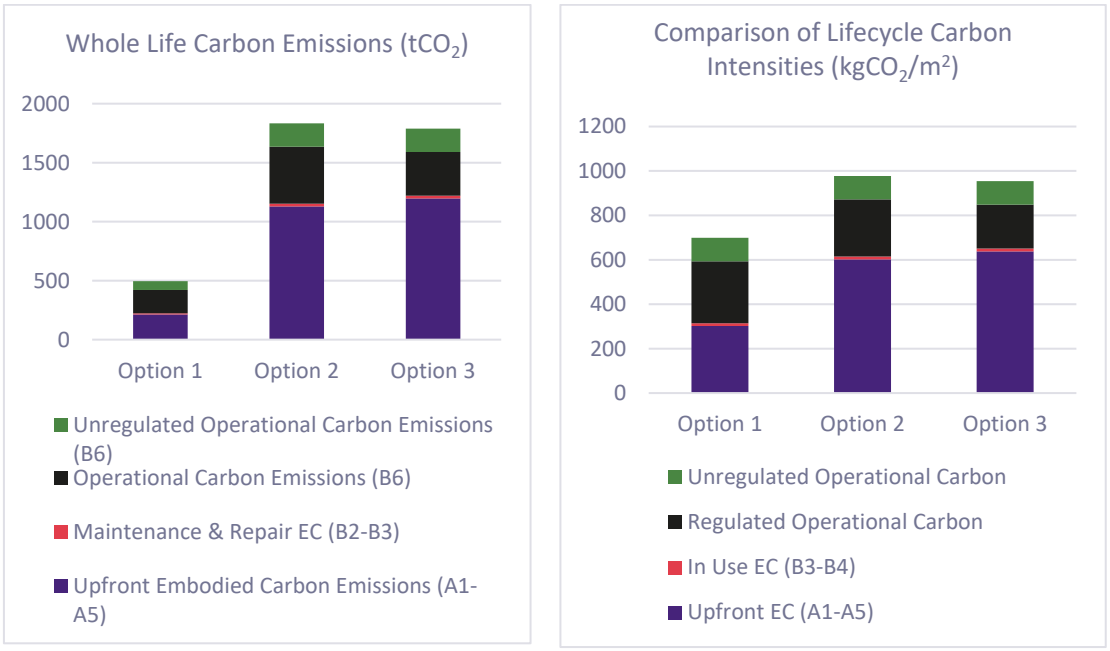


Figure 1 Summary of Whole Life Carbon Results

Following this assessment, the report found that although Option 1 had lower Whole Life Carbon and carbon intensity, it would not allow the site to be improved to meet local housing demand. Option 2, while improving the size and quality of the building, was also less favourable in terms of housing mix, and emitted more Whole Life carbon than option 3 due to the cumulative effect of a higher operational carbon intensity.

The report concludes that Option 3 should be pursued to increase the number of dwellings on the site, and to allow these to be designed to a high level of energy efficiency, futureproofing them against the need to retrofit as the UK approaches its net zero carbon commitments.

2 Introduction

2.1 Purpose of this report

The land at 39a Fitzjohn's Avenue is being redeveloped to improve its ability to meet the needs of the local area and community within its context in the London borough of Camden. There is an existing building on the site. Camden's Planning Guidance includes an emphasis on reusing and refurbishing existing buildings where possible, as an alternative to demolishing and rebuilding. This report explores several options to determine what level of intervention for this building would lead to the best outcome in the context of carbon emissions, material use, occupant experience, and impact on the local area.

2.2 Carbon and Climate emergency context

The Proposed Development is being considered at a time when there is international consensus on the effects of human-made carbon emissions on the global climate. The International Panel for Climate Change (IPCC) in their 2018 and 2022 reports have identified the effects on the planet of various climate change scenarios.

It is now widely accepted that a 1.5^{o}C rise in global average temperatures is a 'least bad' limit to global warming, although this will still result in significant impacts to humans and the natural environment. To avoid exceeding the 1.5^{o}C temperature rise, global climate emissions must stop increasing by around 2030, and become zero by 2050.

Currently, around 40% of the UK's carbon emissions come from the built environment, and there is a responsibility on designers to develop buildings with drastically lower carbon emissions.

In 2019, Camden Council declared a climate and ecological emergency. This recognised the threat of climate change and the irreversible damage to our planet it may cause.

Constructing new buildings releases significant embodied carbon into the atmosphere, while retrofitting existing buildings can lead to a much lower carbon impact. The carbon impact of any new development should be carefully assessed against its benefits to ensure the negative impact of the associated embodied carbon is justified. This is not always a simple comparison, as refurbishing existing buildings to meet present day standards can have associated emissions, or may result in buildings that are less fit-for purpose than an equivalent new build.

2.3 Planning Policy Context

The Statutory Development Plan comprises the following:

- London Borough of Camden Local Plan (Adopted July 2017);
- London Borough of Camden Policies Map (Adopted 2019); and
- London Plan 2021 (Adopted March 2021).

Camden Planning Guidance (CPG) provides advice and information on planning policies will be applied. The Greater London Authority (GLA) have also adopted a series of London Plan Guidance (LPG). Also of note is the Fitzjohn's Netherhall Conservation Area Appraisal & Management Strategy (Adopted March 2001). These documents are 'material considerations' in planning decisions.

The National Planning Policy Framework (2023) and the National Planning Practice Guidance are also material considerations in the determination of any planning application.

The following Planning Policies define requirements for projects in terms of energy and carbon:

London Plan (2021)

- **Policy SI2 Minimising greenhouse gas emissions**
- **Policy SI3 Energy Infrastructure**
- **Policy SI4 Managing heat risk**

Figure 2: GLA Energy Hierarchy (Source – The London Plan)

Camden Local Plan

- Policy H6 (Housing Choice & Mix)
- Policy H7 (Large & Small Homes)
- Policy CC1 (Climate change mitigation)
- Camden Planning Guidance - Energy Efficiency & Adaptation
- Camden Planning Guidance – Housing (January 2021)

This report addresses the requirements set out in the above Planning policies, particularly the Camden Supplementary Planning Guidance on Energy Efficiency and Adaptation, by reviewing the implications of different levels of intervention for the 39a Fitzjohn's Avenue Site.

3 Site and Context

3.1 Site location

The subject site is in the Hampstead area of the London Borough of Camden; specifically, it lies adjacent to Fitzjohn's Avenue at the north-west corner of the road's junction with Nutley Terrace. The neighbouring area is predominantly residential in nature, although Hampstead Village is located 600 metres to the north. The site benefits from close proximity to major roads such as the A41 and A505, as well as a number of rail and underground stations including Finchley Road and Frognal Station.

Fitzjohn's Avenue is a significant connecting road which runs from Swiss Cottage to the heart of Hampstead Village. Both Finchley Road and Hampstead Village provide a full range of local services and shops. Fitzjohn's Avenue itself has several local schools.

Figure 3 Location plan showing the Wider Site in the context of the six blocks of 19th century development (Source – Sergison Bates Architects – refer to DAS)

The property itself lies on a roughly rectangular plot, which is unusual in the area due to its relative largeness. The plot provides a frontage of 48 metres to Fitzjohn's Avenue and 69 metres along its return frontage to Nutley Terrace. Mature trees and substantial planting ensure that the context provides a high standard of privacy and separation between individual properties. This is particularly true along the Nutley

Terrace side of the property where the later extension is screened by tree cover and the rear garden is all but invisible.

The site is located within the Fitzjohn's and Netherhall Conservation Area, which was first designated in 1984. The most recent Conservation Area Statement (CAS) produced for this area was published in 2001.

3.2 Existing Building

The plot accommodates an original house built in 1885, then sold in 1937 to the Trustees for the Roman Catholic Purposes Registered and entered a period of residential institution use. The house was rechristened Southwell House by the Jesuit order who occupied it in honour of an Elizabethan Jesuit martyr. Two significant extensions were carried out during this period of occupation although these would both appear to predate the public planning records. The earlier extension is a 3 storey red brick wing to the North of the original dwelling which fills the gap between it and No. 43-45 Fitzjohn's Avenue. This North wing contains a mixture of bedrooms and communal rooms.

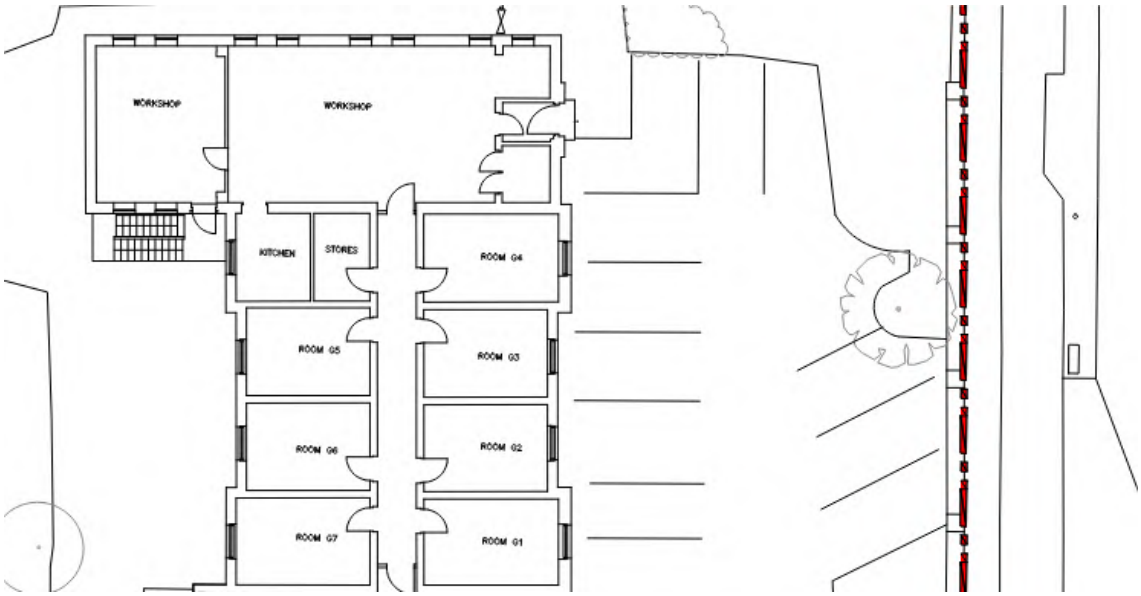


Figure 4 Ground Floor plan of the existing building

A 1960's 3 storey wing with an angular stair tower built up to the boundary was subsequently added to the southwestern corner of the original building extending its frontage along Nutley Terrace. Both of these wings are notable for their more institutional architectural character, flat roofs, and relatively awkward integration with the original dwelling house.

Mature trees and substantial planting ensure that the context provides a high standard of privacy and separation between individual properties.

This private rear garden provides ample area for a generously proportioned lawn with planted boundaries.

The public boundaries of the property are defined by low brick walls which retain the higher land level on the property. The deep front setback to Fitzjohn's Avenue enables provision of off-street parking accessed by a carriage drive.

3.3 Development Goals

39 Fitzjohn's Avenue Ltd are developing the land encompassed within the proposed development with the following aims:

- Making better use of the available areas to serve the housing needs of Camden
- Retaining the site's aesthetic character in line with the Conservation Area requirements
- Improving the appearance of the facades, where appropriate, to better reflect the style of neighboring buildings
- Improving energy performance to reduce the site's carbon emissions, and resident fuel bills
- Enhancing green infrastructure and local biodiversity, with the added benefit of improving access to nature for residents
- Improving quality of life for residents and the community

3.4 Existing Building Condition

3.4.1 Existing site constraints

The existing building at 39a Fitzjohn's Avenue dates back to the early twentieth century and appears to have been built as a later extension to the original house at 39 Fitzjohn's Avenue built in 1885 to fill the gap between it and no. 43-45 Fitzjohn's Avenue. The extension, comparatively modest in footprint, fails to meet the architectural quality of the original house and does not include any balcony, juliette or protruding, to provide external amenities for the rooms behind.

Whilst the original house at 39 Fitzjohn's Avenue offers lateral living with positive aspect on the west, east and south elevations, 39a Fitzjohn's Avenue features two main elevations only to the east and the west. The northern elevations includes smaller windows with poor aspect facing directly onto the neighbourly building at no. 43-45 Fitzjohn's Avenue.

Also, refurbishment and re-use potentials for the existing building at 39a Fitzjohn's Avenue are limited by the load-bearing capacity of the existing structure, the uneven floor-to-ceiling heights across the elevation and the poor fire performance of the existing building fabric.

Upgrading the existing building structure and fabric to modern standards would have associated upfront embodied carbon emissions associated with construction activities and materials.

Refer to the Existing Building Condition Drawings relating to 39a, which are submitted as part of this application.

3.4.2 Condition and feasibility study (as noted in Camden's Planning requirements)

3.4.2.1 Review of current building functionality

The existing building interiors are arranged around simple layouts across three floors. The entrance from the forecourt fronting Fitzjohn's Avenue leads, via a small lobby, into the biggest room in the building on the ground floor, used as a workshop with north facing windows. A central north-south corridor connects the workshop with a series of small rooms, all under 20sqm in area, facing either east or west with a single window.

Two staircases, one external to the northern corner of the building and one internal located within the link wing between 39 and 39a Fitzjohn's Avenue, provide access to the upper floors, both with a similar layout. A central corridor serves rows of small rooms, all under 20sqm in area, facing either east or west with a single window. The first floor plan features additional rooms above the workshop on the ground floor, again served by a central corridor, facing north or east or west.

The existing layout appears to suit bedsit accommodation, as wall mounted wash-hand basins have been installed in most of the rooms in the building as well as one shared bathroom accessed via the central corridors.

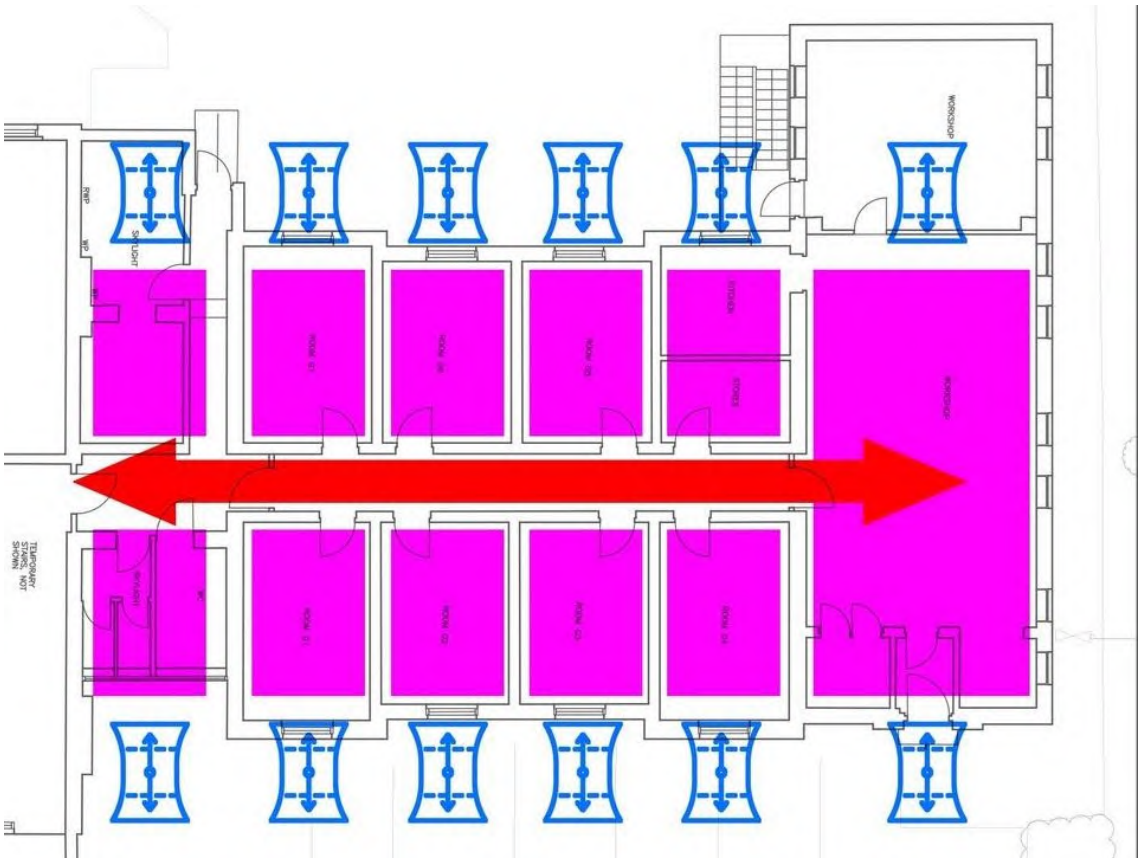


Figure 5 Markup showing the central spine, the rooms either side and the views out east and west

3.4.2.2 MEP Survey

An MEP Survey was carried out by BSG of the existing services at 39A Fitzjohn's Avenue. The full Survey is appended to this report.

The survey determined that most of the mechanical services are either beyond economic life expectancy, or had been installed in an unsystematic manner; therefore, retention was not recommended. The only exception might be main heating plant items, including the boiler, the HWSR pump, the calorifier and relative control equipment and the booster pump.

It identified that the electrical services installation is in a poor condition generally, and recommended that it be fully stripped out and replaced as part of any future project work.

The survey flagged multiple discrepancies with Building Regulations that would need to be addressed in any future design. It noted that Fire and life safety should be studied by a specialist as part of any future plans.

3.4.2.3 Existing building technical review

Drawings and sections of the existing building

Drawings and sections are included in the CHMRP drawing package submitted as part of this Planning Application.

Loading capacity of structural frame, materials strength, pile testing

Pile testing has not been carried out on the existing building as there are no existing piles.

An assessment of the loading capacity of the structural frame and the strength of its materials has not been carried out. This is because the existing building's current structure provides a layout that is only suitable for use as a single, large dwelling. To assess the frame capacity would imply an extension to the existing structure. However, extending the current structure would only result in making the large dwelling even bigger. Increasing the size of the dwelling would not improve the site's ability to meet the housing needs of the local area, and is not deemed a worthwhile exercise.

In order to improve this building's contribution to the area and optimise land use, the building must be subdivided into multiple dwellings, which necessitates structural replacement. As a result, we have not assessed the current structure's capacity, as it will need to be replaced in order to improve this site's ability to meet the needs of the local area.

Three options for the redevelopment are explored in Section 4 of this report, where the required structural interventions for these options have been detailed and calculated.

Energy performance of the façade

The fabric performance values in Table 1 have been estimated based on material information from the pre-demolition audit, using SAP10's methodology and augmented where necessary by precedent information for other buildings of a similar age.

In support of enhancing the existing fabric of the building (where proposed and pursued), details of air tightness, thermal bridge modelling and condensation analysis will be produced at later stages.

Table 1 Estimated Existing Building Fabric Values

Construction	Description	Estimated Existing Building U-value W/m2K	Building Regs Part L Limiting U-values for Improved elements in existing buildings
Wall	Brick cavity wall (brick)	1.56	0.55
Roof	Concrete slab flat roof	0.92	0.16
Floor	Suspended timber floor	0.46	0.25
Glazing	Single-glazed	1.6	1.6

With the exception of windows, the existing fabric has been estimated to perform far more poorly than current standards for thermal performance.

Updates for compliance with current legislation

Syntegra and Price & Myers have carried out an assessment of what would be required for the building to comply with current legislation, as follows:

- Insulating the existing flat roof and walls as much as possible without creating moisture risk (80mm mineral fibre)
- Replacing the heat source with electric Air Source Heat Pumps (ASHP) to allow the building to meet the Building Regulations targets for carbon emissions (DER and DBER)
- Replacement of MEP services throughout
- Structural works to repair any current defects, may include replacing defective joists, remedial details to defective loadbearing brickwork, etc.
- Remedial details as necessary to maintain dynamic structural performance (vibration) of floors, this may include replacing existing planks with new plywood, screwed to the joists, and/or inserting new steel beams to shorten timber spans.
- Series of new steel and/or timber trimmer beams to facilitate construction of central staircase and hoist from raised ground floor to first floor.

Pre-demolition audit

A pre-demolition audit has been carried out by Morrisroe. The survey explores the material components of the existing building, and their potential for recycling and reuse. Overall, the survey measured an estimated 648 tonnes (412 m3) of material that would arise from a full demolition of the building. A breakdown of materials and quantities measured is shown in Figure 6.

The report identified the potential for offsite re-use of some aspects of windows, vinyl flooring, steel staircases, carpet tiles and some elements of brick cladding. It identified recycling potential for all other materials.

Material	Total Tonnes	Total m3
Timber	26	56
Bricks	589	310
Gypsum	7	9
Glass	2	1
Carpet	0.3	0.2
Vinyl	0.2	0.2
Asphalt	17	8
Mineral Fibre	3	27
Steel	3	1
Total	**648 Tonnes**	**412m3**

Figure 6 Material Quantities of the existing building, extracted from Morrisroe's Pre Demolition Audit

3.4.2.4 Site Capacity Assessment

The principle of residential use as the best use for this site is set by the nature of the wider Conservation Area, the existing lawful use as a single dwelling house and by the resolution to grant planning permission set out by the LPA under planning reference number 2018/2415/P and 2020/2172/P.

The Conservation Area is primarily residential, but also with a range of small-scale independent school and occasional other uses, including employment, religious and educational. Retail and commercial areas focus on the northern and southern sections of Fitzjohn's Avenue, in particular Finchley Road to the south-west and Rosslyn Hill to the north-east. The townscape characteristics of the Conservation Area are based on residential buildings set-back behind small front gardens or front courts, with low front walls of hedges.

Looking closely at the immediate proximities within the Conservation Areas offers clues to the parameters within which capacity for this site can maximised. From the Camden Fitzjohns/Netherhall Conservation Area Character Appraisal and Management plan, December 2021:

Maresfield Gardens

Maresfield Gardens has predominantly 3-4 storey properties, mainly drawing on Queen Anne influences, but also Arts and Crafts, with some properties having fine detailing and articulation. A characteristic of the street is the varying heights, creating stepped townscape.

Maresfield Gardens is one of the four parallel north-south avenues, based around Fitzjohn's Avenue. Garden trees are an important part of the character.

Netherhall Gardens

Netherhall Gardens is one of the four parallel north-south planned avenues, with extensive and well-vegetated rear gardens. This road wraps around to the north to meet Fitzjohn's Avenue. Street trees and garden trees are an important part of the character.

The road has larger-scale properties, with many of 5-6 storeys. Architecturally, the street is mixed, with Queen Anne, classical elements, Dutch gables and other influences.

Some of the properties form part of a wider development, such as the stepped group of properties ascending north from Frognall, responding to the topography of the road. The most recent development adjacent to No. 12 reflects the gables and modulation of older properties, but avoids bland imitation.

Other new buildings, such as No. 11, are attempted replicas of historic buildings, but with weak detailing. This should be avoiding in the future.

Nutley Terrace

Nutley Terrace cuts through the parallel avenues, including Fitzjohn's Avenue. This means much of its length is flanked by side boundaries of properties fronting on to those avenues, including their rear gardens. This offers glimpses into the extensive areas of rear garden that separate the avenues.

The recent development at 5 Nutley Terrace demonstrates a good standard architecturally, but fails to complement the garden suburb character, especially in the hard surfaced front parking bays.

Fitzjohn's Avenue

Fitzjohn's Avenue provides the focus for the Conservation Area, and is characterised by its very wide road and pavements. It is one of the four parallel north-south, planned avenues with substantial backland areas comprising well-vegetated rear gardens.

The street comprises predominantly 4-5 storey properties, though with some variation. Many have raised ground floors. They are mainly yellow and red brick, some with contrasting brick detailing. Architecturally, they draw on different influences, with common features including bays, porches, gables and modulated facades.

The pavement is a mixture of York stone and black asphalt, where grass verges previously existed. Numerous street trees are missing. The Avenue is a traffic dominated route to Hampstead village. A large AQMA monitoring station is an incongruous element, in the middle of the road, though this may be a temporary structure. Some properties also have hard-surfaced frontages to create parking.

Conclusion

In conclusion, the development proposals for this site should focus on residential use to complement the scale and general townscape character of the Conservation Area. The options explored are further illustrated in the next section.

4 Development Options and Assessment Criteria

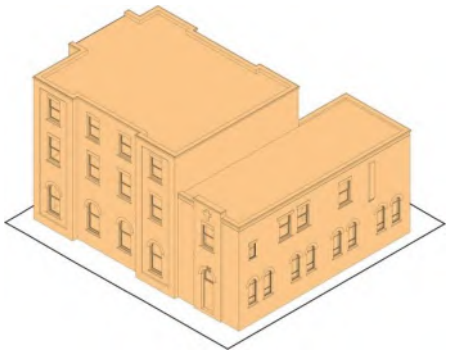
4.1 Options investigated

The development team have carried out a detailed assessment of the existing building condition and the wider site, explained in Section 3.4, to establish the sort of development that could be accommodated on the Site based on the local needs, context and policies, and the opportunities to do this in a sustainable manner.

Three potential development scenarios have been established, informed by this contextual backdrop. The proposals are for different levels of residential-led development at 39a Fitzjohn's Avenue. A consistent methodology has been explored for reviewing the Whole Life Carbon and broader impacts of the options. The options are explained below.

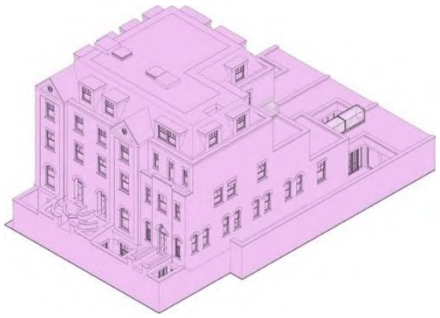
Option 1. Maximum retention and retrofit

Light touch refurbishment with retention of existing load-bearing building structure. Minimal intervention with demolition of the link wing between 39 and 39a Fitzjohn's Avenue. This option necessitates maintaining single dwelling use for 39a Fitzjohn's Avenue.



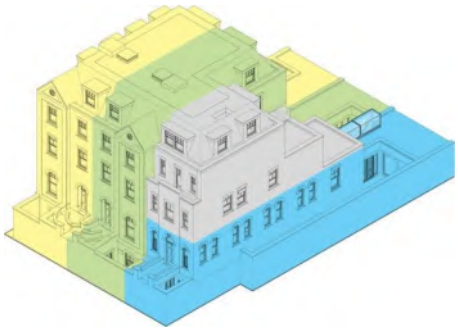
Option 2. Partial retention and maximum extension as single dwelling

Retain some building structure and the eastern façade to add roof, rear, and basement extensions. Demolish the link wing between 39 and 39a Fitzjohn's Avenue. This option necessitates maintaining single dwelling use for 39a Fitzjohn's Avenue.



Option 3. Partial retention and maximum extension and site occupancy

Retain some building structure and the eastern façade to add roof, rear, and basement extensions. Demolish the link wing between 39 and 39a Fitzjohn's Avenue, and provide new raft foundations and superstructure such that the layout can be rearranged to deliver 2 new houses and 2 new maisonettes



4.1.1 Selection of options to explore

These options have been selected based on meeting local housing need, and neighbourhood feedback. Their relative merits will be compared against their Whole Life Carbon impact.

Hampstead remains one of London's most prosperous neighbourhoods and a desirable area to live in, particularly suited to family living with a strong education, retail and cultural offer boosted by exceptional local parks and green spaces. The options selected considered the likely socio-economic profile of end users and how well their needs can be met both at 39a Fitzjohn's Avenue and in the wider neighbourhood. Hampstead is currently well served by very large family dwellings, with a comparably limited provision for smaller 4-to-6 bedroom family dwellings newly built or newly refurbished.

Whilst the established larger, prime housing stock in the area has traditionally attracted affluent occupiers, any development proposal at 39a Fitzjohn's Avenue must respond to local planning policies and housing needs. In particular, policy H7 of Camden Local Plan sets out the Borough's aspirations for a range of homes of different sizes that will contribute to the creation of mixed, inclusive and sustainable communities and reduce mismatches between housing needs and existing supply. Dwelling sizes should be assessed with a flexible approach having regard to the different dwelling size priorities for social-affordable rented, intermediate and market homes as well as any evidence of local needs that differ from borough wide priorities.

39a Fitzjohn's Avenue sits within a larger estate; to include the adjacent 39 Fitzjohn's Avenue, and the development site at the land adjacent to 46 Maresfield Gardens. The latter is part of the planning application this report is appended to, whilst 39 Fitzjohn's Avenue benefits from planning consent (planning reference number 2020_2169_P) for the conversion and extension of the house into 35 self-contained apartments. 29 self-contained apartments are instead proposed for a new-build mansion block to the land adjacent to 46 Maresfield Gardens.

The options assessed within this report will therefore consider not only the housing offer within the Hampstead neighbourhood but also the size and types of new homes, consented or proposed, within the larger estate.

Increasing the range and diversity of the housing offer will in turn foster a varied and cohesive community to enhance Hampstead cherished village-like character and contribute towards the quality of life for all of its residents.

- Option 1 involves limited alterations, with a view to maximising reuse and minimising embodied carbon. It consists of a single dwelling. The maximized retention limits the ability for other areas of the scheme to be improved.
- Option 2 introduces sensitive refurbishment and extensions to the existing building to maximise the size of the of accommodation, while retaining the structure and making acoustic, thermal, and fire performance improvements. Due to the retention of existing structure in this option, it consists of a single dwelling.
- Option 3 involves structural interventions to allow layout reconfiguration to deliver 2 new townhouses and 2 new maisonettes. This option is not able to retain as much of the existing development, but allows it to be split into more dwellings. It requires structural replacement, with only elements of the facade able to be retained.

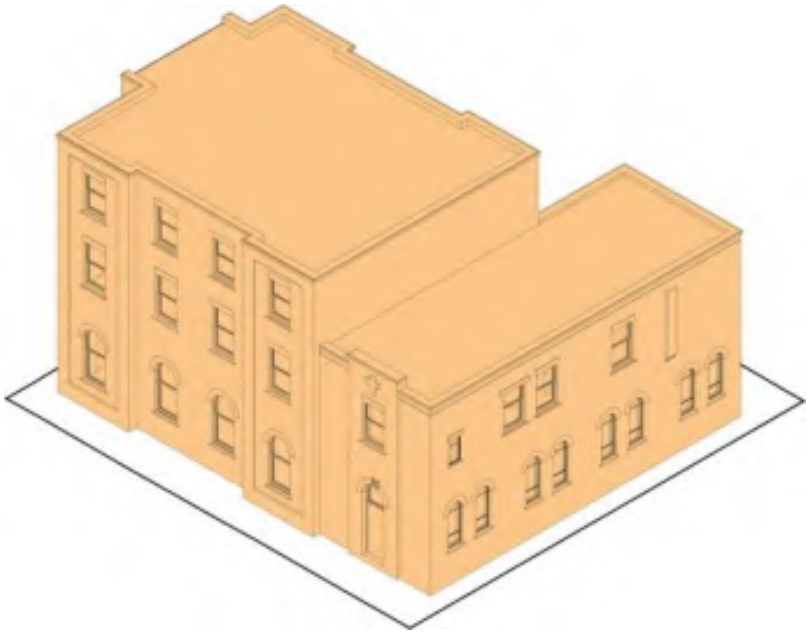
4.2 Option 1 – Maximum retention and retrofit

4.2.1 Option 1 - General Description

This option involves light touch refurbishment with retention of the existing load-bearing building structure. Structural interventions are minimal, but include the demolition of the link wing between 39 and 39a Fitzjohn's Avenue. This option necessitates maintaining single dwelling use for 39a Fitzjohn's Avenue.

Option 1 would require planning permission, as it involves demolition of the link wing and internal/external refurbishment within the conservation area.

Figure 7. Option 1 - Maximum retention and retrofit



4.2.2 Option 1 - Structural Intervention

The necessary structural interventions for Option 1 are as follows:

Demolish link between 39a and 39

- Demolition of the link
- Making good toothed in brickwork where link has been demolished
- Installing windows in position of old door (new lintel to facing brickwork likely required)

Maintain facades and internal floors

- Minor structural intervention required provided joists are in good condition, loads remain similar to existing, and levels are not altered.
- Structural works may include replacing defective joists, remedial details to defective loadbearing brickwork, etc.
- Dynamic performance (vibration) of floors may be suboptimal. Remedial details may include replacing existing planks with new plywood, screwed to the joists, and/or inserting new steel beams to shorten timber spans.

Alter walls and non-structural elements to deliver one single dwelling.

- Light touch temporary works required where demolishing internal load bearing walls (further investigations required to determine joist size, spacing, span and bearing condition).
- Series of isolated steel beams/box frames to be installed in place of demolished internal load bearing walls (Typically easier construction and more cost effective to have these as downstands within the rooms rather than lifted into the ceiling zone).
- Current assumption is that all internal walls are masonry and therefore at a minimum carry the load of the wall above, if not also the upper floor loads. Further investigations required to determine which walls are load bearing.
- Series of new steel and/or timber trimmer beams to facilitate construction of central staircase and hoist from raised ground floor to first floor.

Structural Frame Material: N/A, existing construction retained with minor alterations in steel and timber to create a more efficient single dwelling layout.

Pile length: N/A

Column spacing: N/A, existing walls dictate grids/spacing of load bearing elements.

Load bearing internal walls (as an estimated % of the structure): 90-100%, assumed (further investigations required to identify load bearing walls).

4.2.3 Option 1 - MEP strategy

This option has assumed the replacement of the heating system with an electric air source heat pump supplying radiators. Heating for the building is provided by a system which features reduced flow and

return temperatures, reducing thermal losses and space heat gain as compared to a traditional system. Room-by-rom heating controls increase efficiency.

Natural ventilation is utilised for comfort cooling, while extract ventilation has been proposed for kitchens and other wet rooms. This ventilation does not incorporate heat recovery. The proposed light fittings are 100% energy efficient fittings e.g LED lighting.

The building fabric performance assumed for the refurbished façade is shown in Table 2.

Table 2 Building Fabric performance for Option 1

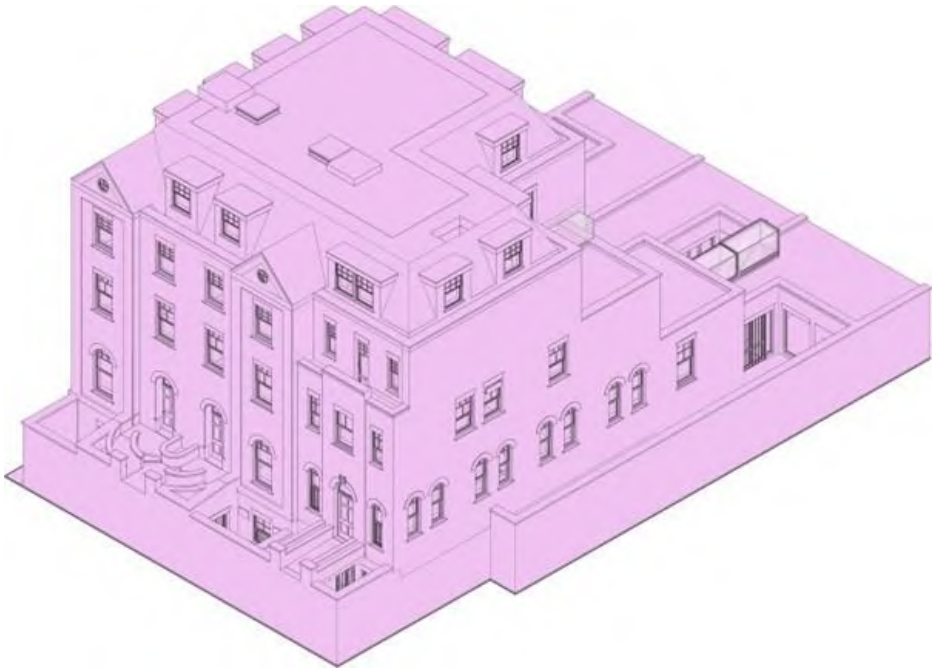
	Construction	U-value
Refurbished Elements	Wall	0.37
	Roof	0.16
	Floor	0.25
	Glazing	1.2
Thermal bridging (W/mK)		Default
Air Permeability ($m^3/hr.m^2$ at 50Pa)		5

4.3 Option 2 – Partial retention and maximum extension as single dwelling

4.3.1 Option 2 - General Description

This option involves retaining some building structure and the eastern façade, and adding roof, rear, and basement extensions. The link wing between 39 and 39a Fitzjohn's Avenue is demolished. This option necessitates maintaining single dwelling use for 39a Fitzjohn's Avenue.

Figure 8 Option 2. Partial retention and maximum extension as single dwelling



4.3.2 Option 2 - Structural Intervention

The necessary structural interventions for Option 2 are as follows:

Demolish link between 39a and 39.

- Carrying out the demolition itself
- Making good toothed in brickwork where link has been demolished
- Installing windows in position of old door (new lintel to facing brickwork likely required)

Maintain some of the facades and demolish the internal floor slabs.

- Extensive temporary works will be required to demolish all internal floors whilst retaining internal walls and façade. If levels are not changing, retaining the existing floors in the permanent condition may help simplify the temporary works.
- Isolated façade retention temporary works scheme required to the North elevation retained façade where the return wall is to be demolished (North West corner of the building), provided internal floors are retained. If internal floors are demolished, extensive temporary works scheme required throughout.
- Foundations to the temporary works will likely comprise large strip footings or pads, avoiding temporary piles (which might encroach with the Network Rail exclusion zones). Piles or minipiles might be acceptable if they are relatively short (12 to 15m maximum -already within the 10m clearance zone from the Network Rail Tunnel that runs underneath the site), and subject to a detailed ground movement analysis to verify stresses and displacements induced on the tunnel.

- Internal load bearing masonry walls can be retained but will require a detailed needling temporary works scheme ahead of casting an RC transfer slab at ground floor level, supported by a raft foundation and RC columns at basement level. It would be more appropriate to retain the façade and reconstruct the internals as a series of RC blade columns and flat slabs, to suit residential loading and grid spacing. This option allows greater flexibility of the internal layouts as most if not all internal structure will be removed.
- The costs and programme implications caused by the complicated temporary works scheme to retain all internal walls as well as the façade are likely to contribute a significant amount of embodied carbon, cost and programme to the scheme.

Add one additional floor slab within the envelope of the building with roof and rear extension.

- New lightweight steel frame and timber joist upper floor built above and tied into the existing Masonry structure. Loads to be kept within approx. 10-15% of existing structure to encourage reuse of existing foundations without the requirement of underpinning. If these loads are exceeded, localised underpinning may be required. Further investigations required to reveal width, depth and existing condition of foundations ahead of detailed design.
- Rear extension to be steel frame on mini piles with ground bearing RC slab and timber joist upper floors, bolted to existing masonry structure with slotted holes allowing differential settlement between the two structures. A piled foundation offers the most appropriate solution to mitigate differential settlement, especially when reloading and extending an existing structure. Mass concrete and/or a raft slab can be explored for the extension to alleviate loading of TFL tunnel below.
- An RC raft slab will be adopted at lower ground floor level to avoid piling above the TFL tunnel exclusion zones.
- Upper floor to be lightweight steel frame, to allow the construction of the proposed pitched roof/eaves.

Construct basement

- Façade retention temporary works scheme required to retain and underpin existing façade whilst constructing a basement larger than the buildings footprint. A series of large steel A-Frames and temporary underpins/needles will be required to achieve this.

Structural Frame Material: Existing façade retained. All internal/new structure to be RC frame with a steel frame roof/upper floor.

Pile length: New RC raft slab to be adopted as the foundation strategy, piling only likely in the temporary case to facilitate the façade retention temporary works scheme. Allow for 250/300mm dia. piles at 12-15m long.

Column spacing: 6m typically with a 200-225mm deep RC flat slab.

Load bearing internal walls (as an estimated % of the structure): 10-15%, allowing for vertical shear walls around the buildings core and additional offset shear walls to deal with any torsion in the buildings layout.

4.3.3 Option 2 - MEP strategy

This option has assumed the replacement of the heating system with an electric air source heat pump supplying radiators. Heating for the building is provided by a system which features reduced flow and return temperatures, reducing thermal losses and space heat gain as compared to a traditional system. Room-by-rom heating controls increase efficiency.

Natural ventilation is utilised for comfort cooling, while extract ventilation has been proposed for kitchens and other wet rooms. This ventilation does not incorporate heat recovery. The proposed light fittings are 100% energy efficient fittings e.g LED lighting.

The building fabric performance assumed for the new refurbished thermal elements is shown in Table 3.

Table 3 Building Fabric performance for Option 2

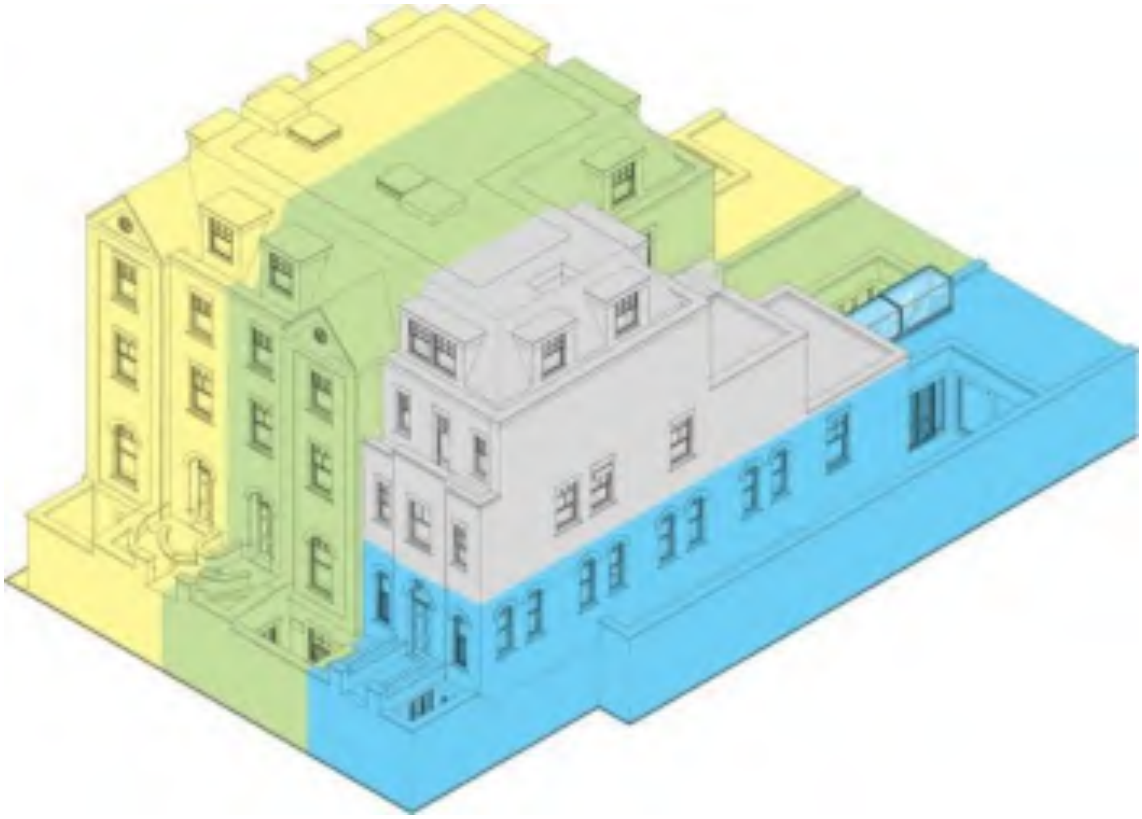
Construction	Refurbished U-value (W/m2K)	New (extension) U-value (W/m2K)
Wall	0.37	0.18
Roof	0.16	0.16
Floor	0.25	0.18
Glazing	1.2	1.2
Thermal bridging (W/mK)	Default	Lintels, Sils, Jambs – 0.02 Intermediate floor – 0.005 Flat roof – 0.05
Air Permeability ($m^3/hr.m^2$ at 50Pa)	5	3

4.4 Option 3 – Partial retention and maximum extension and site occupancy

4.4.1 Option 3 - General Description

Retain some building structure and the eastern façade to add roof, rear, and basement extensions. Demolish the link wing between 39 and 39a Fitzjohn's Avenue, and provide new raft foundations and

superstructure such that the layout can be rearranged to deliver 2 new houses and 2 new maisonettes.



4.4.2 Option 3 - Structural Intervention

The necessary structural interventions for Option 3 are as follows:

Structural Frame Material: Façade retained and underpinned. New Raft foundation with upper floors as RC flat slabs bearing on blade columns. Upper floor to be a lightweight steel frame to suit proposed pitch roofs/eaves construction.

Pile length: New RC raft slab to be adopted as the foundation strategy, piling only likely in the temporary case to facilitate the façade retention temporary works scheme. Allow for 250/300mm dia. piles at 15m long.

Column spacing: 6m typically with a 200-225mm deep RC flat slab.

Load bearing internal walls (as an estimated % of the structure): 10-15%, allowing for vertical shear walls around the buildings core and additional offset shear walls to deal with any torsion in the buildings layout.

4.4.3 Option 3 - MEP strategy

Each townhouse, and each maisonette will be served by an ASHP located in dedicated enclosures located external to each dwelling. This will provide space heating and Domestic Hot Water Services (HWS) from a local indirect Hot Water Storage Tank (HWST).

The dwellings will be heated by an UFH system designed to operate at lower LTHW temperatures, maximising the systems efficiency; the UFH manifolds shall be positioned in dedicated UFH cabinets located centrally on each floor in unobtrusive positions; the final positions are to be agreed with the Architects.

Lighting will be via efficient LEDs throughout. A 10 kWp PV array will be installed on the roof. The PVs will be south-facing with an inclination of 30^{o}.

Table 4 Building Fabric performance for Option 3

Construction	Refurbished (existing) U-value (W/m2K)	New (extension) U-value (W/m2K)
Wall	0.37	0.15
Roof	0.16	0.12
Floor	0.25	0.1
Glazing	1.2	1.4
Thermal bridging (W/mK)	Default	0.06
Air Permeability (m^3/hr.m^2 at 50Pa)	5	2

5 Sustainability Assessment Methodology

The energy and carbon performance of the development options has been assessed using the below methodology. Please note that the Whole Life Carbon modules (e.g. A1, B6 etc) referenced are explained in Figure 9.

Methodologies:

Regulated operational carbon emissions (B6) have been modelled in SAP 10.2.

Unregulated operational carbon emissions have been calculated using SAP 10.2 methodology on the basis of an all-electric development (eg no gas for unregulated uses such as cooking).

Upfront Embodied Carbon (A1-A5) has been modelled using OneClick Carbon Designer. This is a high-level modelling software, suitable for estimating carbon emissions at this early design stage.

Assumptions:

In-use embodied carbon has been assumed based on the GLA's recommendations from the Guidance on Energy statements, assuming 10kgCO_2/m^2 for B2 (maintenance), and 2.510kgCO_2/m^2 for B3 (repair), which is applied over the entire project lifecycle.

Having implemented the above methodologies and assumptions, the results have been projected across time assuming a 60 year lifespan.

Please note that, for cross-comparison, all Embodied Carbon modelling for this report has been carried out in Carbon Designer (an early-stage embodied carbon estimation tool from OneClickLCA). Subsequent, more detailed WLC analysis for the project has been carried out in OneClick LCA, but those results are not referenced here as it would not be a like-for-like comparison.

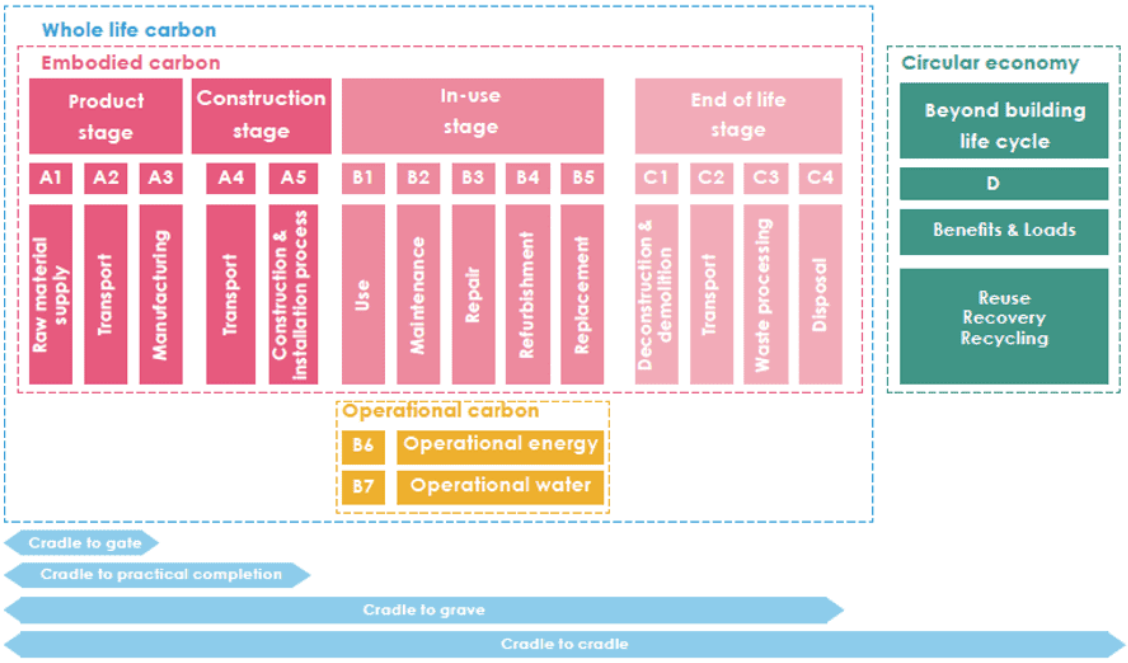


Figure 9 Whole Life Carbon Assessment "modules" (Source: LETI)

Other considerations such as land use / space optimization and long term viability have been taken into account when selecting the options to model, as explained in section 4.1.1.

The development team understands the need to reduce embodied carbon emissions and refurbish buildings where possible. Carrying out Whole Life Carbon modelling for these options will allow us to explore the carbon cost both upfront, and over the building lifecycle, to better be able to understand the extent of emissions and compare these to the potential benefits from each level of development.

6 Sustainability Assessment Results

6.1 Whole Life Carbon Assessment

6.1.1 Total Carbon Emissions

The results of the Whole Life Carbon Modelling for the three options are shown below in Table 5, Figure 10, and Figure 11. These results have been reported based on the total Carbon Emissions, in tonnes of CO2. The next section shows the results displayed as carbon intensity, i.e. as carbon per m^2 GIA.

Table 5 Whole Life Carbon Modelling Results

	Upfront Embodied Carbon Emissions (A1-A5)	Maintenance & Repair EC (B2-B3)	Regulated Operational Carbon Emissions (B6)	Unregulated Operational Carbon Emissions (B6)	Total Whole Life Carbon emissions
	Tonnes CO2				
Option 1	214	9	198	75	**421**
Option 2	1322	23	483	198	**1828**
Option 3	1335	23	371	198	**1730**

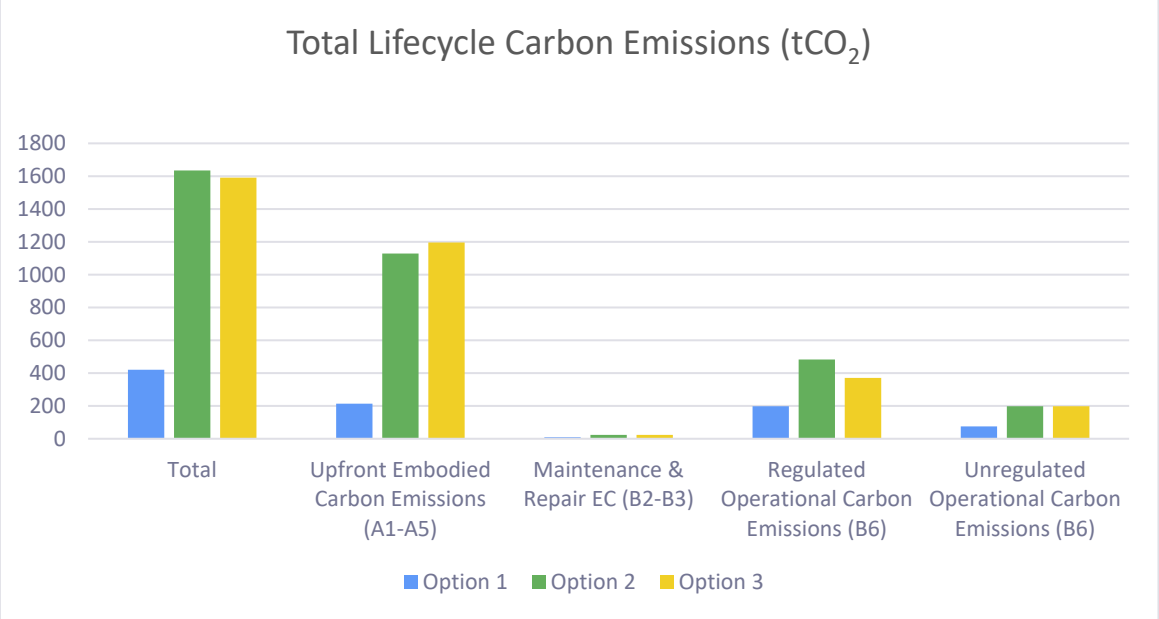


Figure 10 Comparison of carbon emissions results for each option, broken down by module

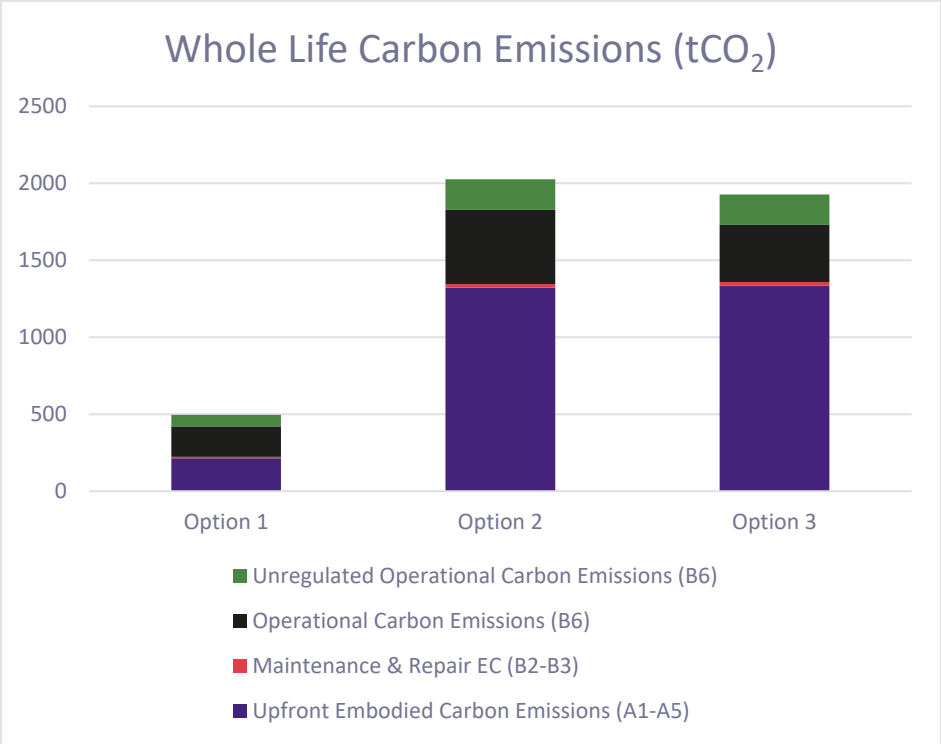


Figure 11 Comparison of overall carbon emissions results for each option

When looking at the results in terms of total carbon emissions, it can be seen that Option 2 has similar upfront emissions to Option 3. This is due to the requirement for additional steel frames for the addition of the basement to both options. The upfront and WLC emissions for Option 1 are significantly lower than for the other two. This is partly due to the retention, but also due to the fact that Option1 has a smaller floor area. A carbon-intensity (per m^2) assessment is needed as a cross reference – refer to the next section.

For options 2 and 3, upfront emissions are the largest contributor to WLC, while for option 1, upfront and operational carbon emissions are of a similar magnitude.

6.1.2 Carbon Intensity

Results for the development are shown using carbon intensity metrics in the following Table 6, and Figure 12, Figure 14, and Figure 13.

Table 6 Whole Life Carbon intensities for each option ($kgCO_2/m^2$)

	Upfront EC (A1-A5)	In use EC (B3-B4)	Regulated Operational Carbon (B6)*	Unregulated Operational Carbon (B6)*	Total Lifecycle Carbon Intensity
	kgCO2/m2				
Option 1	302	12.5	279	106	594
Option 2	602	12.5	257	106	975
Option 3	638	12.5	198	106	923

*Note – this has been calculated by summing the Operational Carbon emissions over the 60 year lifespan then dividing by the GFA.

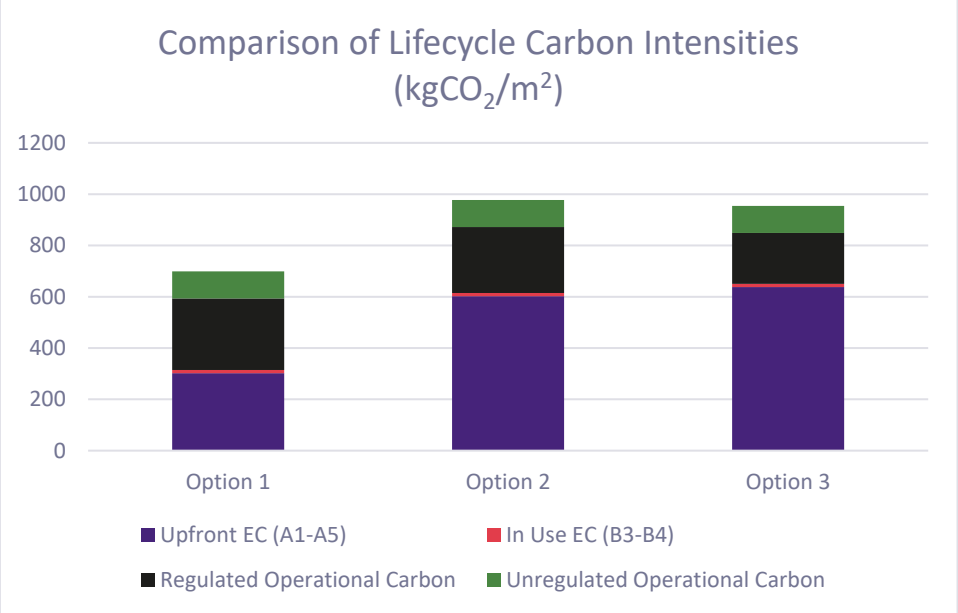


Figure 12 Lifecycle Carbon intensities for each option

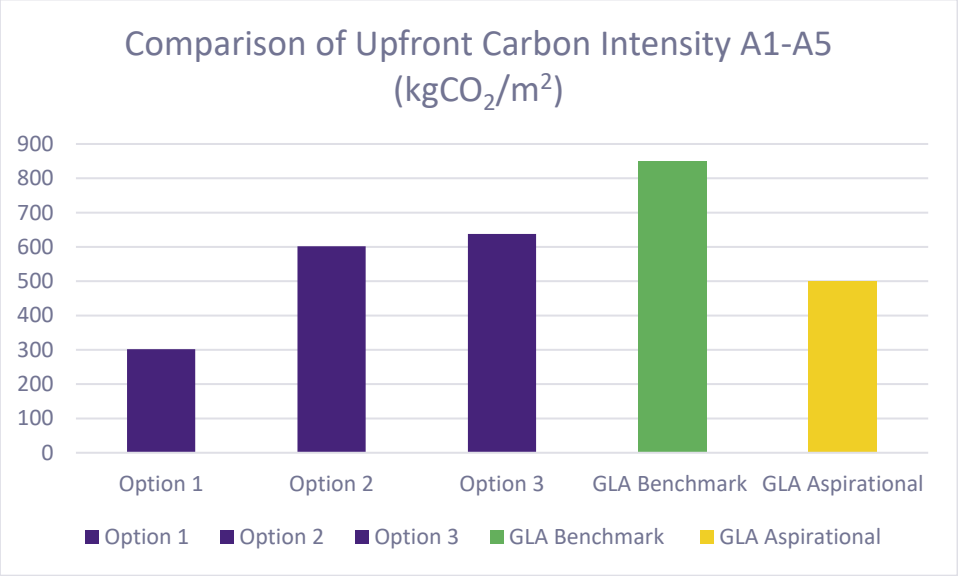


Figure 13 Upfront Carbon Intensities compared to GLA Benchmarks

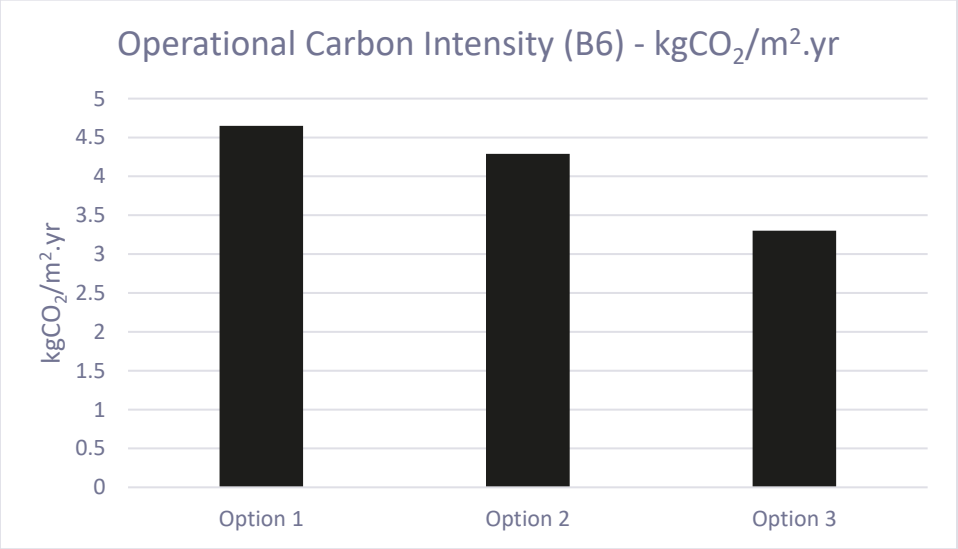


Figure 14 Operational carbon intensities for each option

The embodied carbon intensity for option 1 is lower than for Options 2 and 3 due to the reduced need for structural works for this option. The operational carbon intensity is highest for option 1, as it has the least potential to improve its thermal and building services efficiency due to the constraints of retaining the majority of the building. The operational carbon intensity improves (reduces) for each subsequent option, as more refurbishment takes place the potential to reduce operational energy and carbon increases.

Option 1 has the lowest overall carbon intensity, but it is around two thirds of options 2 and 3, a less dramatic reduction when compared to total carbon emissions, in reflection of the additional floor area granted in the subsequent options. All options are below the GLA benchmark value for upfront embodied carbon of residential, while Option 1 is below the GLA's aspirational benchmark.

6.2 Other Considerations

The options assessed within this report consider not only the housing offer within the Hampstead neighbourhood, but also the size and types of new homes, consented or proposed, within the larger estate. It is noted that the principle of residential development for the site at 39a Fitzjohn's Avenue has been established in consultation with London Borough Camden early in the planning pre-application process.

39a Fitzjohn's Avenue sits within a larger estate to include 39 Fitzjohn's Avenue and the development site at the land adjacent to 46 Maresfield Gardens. The latter is part of the planning application to which this report is appended, whilst 39 Fitzjohn's Avenue benefits from planning consent (planning reference number 2020_2169_P) for the conversion and extension of the house into 35 self-contained apartments in heritage settings. 29 self-contained lateral apartments are instead proposed for a new-build contemporary mansion block to the land adjacent to 46 Maresfield Gardens.

6.2.1 Public Consultation

A programme of public consultation was held in 2023 to present the proposals for the site at 39a Fitzjohn's Avenue and land adjacent to 46 Maresfield Gardens to the local community, residents and stakeholders. Feedback from this consultation is provided within the Statement of Community Involvement appended to this planning application. Density of development and the pressure this poses on local services was flagged as a priority issue from consultees. A flatted scheme for 39a Fitzjohn's Avenue would considerably increase the proposed/consented density for the larger estate and as such this would be likely met with strong opposition from the existing local community.

6.2.2 Unit mix in context of Wider Development

The larger estate includes a considerable offer for self-contained apartment living. The development team considered whether a similar offer could apply to 39a Fitzjohn's Avenue and although this is technically feasible, it is noted that a range of homes of different types and sizes is likely to attract diverse communities in line with Camden Local Plan and, generally, the existing character of the Hampstead area.

Self-contained family dwellings were therefore selected for the options at 39a Fitzjohn's Avenue. As the findings of this report will illustrate, the building can accommodate one or two large family dwellings ranging between 4,500sqft and 7,000 sqft. Beyond the larger estate, the immediate neighbourhood features several imposing properties of this size which would suit the needs of those looking for such properties and with the means to afford them. A further option is proposed for four smaller self-contained family dwellings at 39a Fitzjohn's Avenue which still deliver the generosity of spaces, multi-storey living and quality of external amenities that set family dwellings apart.

7 Evaluation of Results

The options have been assessed based on their Whole Life Carbon Assessments, alongside the suitability of the unit mix to meet local Planning Policy requirements, and taking into account feedback from the public consultation.

Option 1 involves limited alterations and delivers lighter whole carbon impact, particularly due to the lower upfront embodied carbon due to the retention of the existing structure and facade. It has the highest operational carbon intensity, by a margin over Option 2, reflecting the limited opportunity to improve its energy efficiency as a result of maximising retention. Although its Whole Life carbon emissions are lower, Option 1 only allows limited improvements to the existing building's energy efficiency, and does not improve its ability to meet local housing needs. The assessment has not assumed future refurbishments, however these would likely be needed in the short to medium term due to the need for additional homes, and to meet net zero targets. This high potential for further refurbishment counterbalances the perceived lower carbon emissions that have been modelled.

The refurbishment and extensions to the existing building associated with Option 2 mean that it is more carbon intensive than Option 1 over the life of the building (Whole Life Carbon), even if marginally lower in upfront carbon. Option 2 offers improved energy efficiency over the life of the building (whole life carbon) compared to option 1, but is less energy efficiency (in terms of carbon intensity) than option 3. These energy efficiency improvements would have holistic long-term sustainability benefits, and would likely result in the building being retained for longer without the need for future retrofits (and the associated carbon emissions). However, retaining the site as a single dwelling does not fulfil the site's potential when comparing against local and national planning frameworks, as it is unsuitable for meeting local housing needs.

Option 3 has higher upfront carbon emissions associated with the replacement of the structure to be able to split the site into four new dwellings. However, these upfront emissions are very similar scale to those of Option 2, and the benefits associated with making these changes are significant. Pursuing option 3 provides a positive response to local housing needs, especially when considered alongside the homes proposed over the wider development. It also results in the lowest operational carbon intensity (alongside a similar embodied carbon intensity to Option 2), due to maximising the potential to improve building fabric and building services. This results in lower operational Whole Life Carbon, and leads to Option 3 having a lower total Whole Life Carbon than Option 2. This lower operational energy intensity and lifecycle emissions will mean reduced energy bills for residents, and will reduce the strain on local electricity networks due to a lower lifetime energy demand.

8 Conclusions

The development team are committed to rationalising and justifying any necessary carbon emissions through the development at 39a Fitzjohn's Avenue. The analysis within this report show that the Whole Life carbon emitted for Option 3 is marginally less than Option 2, but admittedly is higher than for Option 1. Option 3 performs well against benchmarks and has the potential to deliver significant long-term

operational carbon savings, effective energy performance and a positive response to local housing needs and neighbourhood consultation. The operational carbon savings compared to Option 2 equate to over 100 tonnes of CO2 over a 60 year lifespan – similar to the impact of 5- return flights from London to New York. The benefits of option 3 are particularly emphasised when considering that Option 1 might end up having to be refurbished before the end of the lifecycle (Module B4 and B5 of Whole Life Carbon Assessment, excluded from this analysis exercise) to improve its operational carbon performance and/or to better meet the housing needs of the local area.

Following this assessment, it is proposed that Option 3 should be pursued to increase the number of dwellings on the site, and to allow these to be designed to a high level of energy efficiency, futureproofing them against the need to retrofit as the UK approaches its net zero carbon commitments.

Subject to planning, the next stage of detailed design for Option 3 will improve the scheme further against operational and embodied carbon, also considering ways to reuse existing materials from the site, while retaining the wider benefits that the proposals are able to offer.

9 Appendices

1) MEP Survey
2) Pre demolition audit

Also refer to the Drawings and sections of the existing building that have been submitted as part of this Planning Application.

QODA

Bristol | Cambridge | London | Norwich | Oxfordshire | Peterborough

www.qodaconsulting.com
enquiries@qodaconsulting.com

39A FITZJOHN'S AVENUE & LAND ADJACENT TO 46 MARESFIELD GARDENS

MEP SURVEY REPORT

Issue Purpose:	Final	Issue Date:	12th October 2023
Document Revision:	R02	Project No:	23-425

Cape House 60a Priory Road Tonbridge Kent TN9 2BL Registered in England. No: 2205560
T: 01732 350557 W: www.bsguk.com E: bsg@bsguk.com

Quality Standards Control

The signatories below verify that this document has been prepared in accordance with our quality control requirements. These procedures do not affect the content and views expressed by the originator.

This document must only be treated as a draft unless it has been signed by the originators and approved by a director.

Revision	*R02*
Date	12/10/2023
Prepared by	H. Eftekhary
Checked by	D. Gandhum
Authorised by	C. Collins

Limitations

Building Services Group Ltd ("BSG") has prepared this report for the sole use of the client in accordance with the agreement under which our services were performed. No other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by BSG.

The conclusions and recommendations contained in this report are based partly upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by BSG has not been independently verified by BSG, unless otherwise stated in the report.

The methodology adopted and the sources of information used by BSG in providing its services are outlined in this report. The work described in this report was undertaken in September 2023 and is based on the conditions encountered and the information available during the said period of time. The scope of this report and the services are accordingly factually limited by these circumstances.

Although every effort has been made to provide accurate content within this report, BSG makes no warranty or assumes no legal liability or responsibility for the accuracy or completeness of information contained in this report.

Where assessments of works or costs identified in this report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

BSG disclaim any undertaking or obligation to advise any person of any change in any matter affecting the report, which may come or be brought to BSG's attention after the date of the report.

Certain statements made in the report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. BSG specifically does not guarantee or warrant any estimate or projections contained in this report.

Copyright

CONTENTS

1. EXECUTIVE SUMMARY

1.1 General

The property at 39/39A Fitzjohn Avenue is located in the district of Camden and is comprised of two buildings attached via a linking block in 3 floors. It appears that 39 Fitzjohn Avenue was built first and 39A is an extension to the main building added during the life of the building (see Appendix A Image 1). Access to 39A was via a metal open staircase at the western side of the building, external walls appear to be made of 400mm brick work, without any specific insulation.

39A appears to be used as shared accommodation and comprises 3 floors and roof level.

- The roof level is flat, made of concrete with 1no water storage tank located at the southern part of the roof on a plinth.

- The 2nd floor comprises 7 No. bedrooms (room 21 and rooms 23 to 28) and 2 No. bathrooms, one appears to be used as a common bathroom and the other as an ensuite to room 23. Rooms are located on either side of a north to south corridor leading to the linking block to 39. The strip out of the 2nd floor was almost complete and the internal wall between the bathrooms was demolished.

- The 1st floor comprises 9 No. bedrooms, a common kitchen and a common bathroom. 4 No. of the bedrooms have an ensuite. Habitable areas are located on either side of an L shaped corridor which leads to the linking block to 39. Strip out works were ongoing at the time of the survey on this floor.

- The Ground floor comprises a communal kitchen and open space, 7 No. bedrooms, a large storage area and two small storage areas. All storage areas attached to the communal open area, and the bedrooms are located on either side of a corridor leading to the joint block to 39.

- The joining block connects 39 and 39a to each other, and comprises a staircase, 2no. toilets and cold-water services booster pump on the 2nd floor, heating plant room and electrical distribution boards on the 1st floor and common toilets and shower room on the ground floor.

This report is an MEP survey of the existing services at 39a.

1.2 Mechanical

Space heating services comprise of a wall mounted gas operated condensing boiler installed in the plantroom on the 1st floor of the linking block. Generally, twin panelled radiators are the means for space heating, installed inside the rooms underneath the window. Electrical heat emitters could be found in a few spaces for top up. Wet towel rails were installed in 1st floor ensuites.

The mains water is feeding a water tank on the roof, which in turn feeds a booster pump on the 2nd floor of the linking block. Boosted cold feed will go through a 300 litre calorifier on the 1st floor of the linking block. 1 No. electric water heater was serving the toilets on the ground floor of the linking block.

Ventilation is achieved by a combination of natural ventilation from the windows and generic air bricks in all rooms, and standalone scattered electrical extract fans and cooker hoods. No central ventilation or heat recovery system could be found.

Mains water and gas are coming from number 39, no individual mains for 39a could be found.

The foul and rainwater drainage system is a gravity system, comprising lead soil vent pipe of various sizes located on the outer part of external walls.

Plenty of retrofit pipework and plant could be found throughout the building in most of the services. These were found to be mostly done in a careless and unsystematic manner and lacked enough quality for recommendation to be retained in case of any major refurbishment or extension.

On the other hand, pipework and plant of a significant age was located in the building, estimated to be far beyond the recommended CIBSE life span.

No fire suppression system is installed.

1.3 Electrical

The incoming main service head, meter, switchgear, distribution boards and outgoing cabling are located in the basement of number 39 and are estimated to be 50+ years old and well beyond CIBSE recommended life expectancy.

Cabling inside the building has been installed at various stages during the properties history and is generally installed within closed slot trunking which has been removed in parts that have been stripped out. There is a mixture of wiring types and ages installed.

Fire alarm sensors and call points could be seen throughout the building, with exposed cabling. However, the fire alarm panel, originally located on the ground floor open space, was stripped out.

The emergency lighting provisions appear to be insufficient and would require further study to determine requirements and compliance with BS 5266, and likely requires a re-design.

No lightning protection provisions could be found on site.

There is no sign of any central ancillary services in the building, such as CCTV, data cabling and outlets, telephone, video entry and intercom or intruder alarm.

2. MECHANICAL SERVICES

2.1 Domestic Water Services

Cold water mains is supplied to 39 Fitzjohn Avenue via a blue polyethylene pipe of the size 32mm, which crosses the joining wall between 39 and 39A, and goes up to the roof to feed a storage tank. The storage capacity of the tanks is estimated to be 2500 litres.

The tank feeds a booster pump installed on the 2nd floor of the linking block, which feeds the water services to a majority of the building. the pump's duty point is at 2.2 bar with a flow of 32 l/min (0.53 l/s), which would be able to support 3 to 5 showers being used at the same time. The power input of the pump is 640W, single phase. The pump is in a fair condition, and can be re-utilised if a need arises, although, depending on the new design and type of occupancy, a bigger expansion vessel is recommended to reduce the number of start/stops of the pump.

Hot water generation is mainly through a 300 litre unvented calorifier, located in the plant room on the 1st floor, linking block. The calorifier comprises two single phase, electric immersion heaters, each with 3kW power, an LTHW coil with ancillary control equipment, a pressure vessel and pre-calibrated safety valves. The system is supplied with a hot water return pump, although hot water return pipework is not thorough and does not meet requirements for prevention of legionellosis. There is an electric hot water generator with a 10 litre storage capacity and heating power of 2kW to provide hot water for toilets on the ground floor. The unit is relatively new, although it is not recommended and it might be difficult to incorporate in any new design.

Domestic water pipework is a combination of different materials with obvious notions of retrofits, all in a very poor condition and different stages of life. Traces of copper, steel, PE and UPVC pipes and fittings were noted during the survey. Supporting was not done sufficiently and lagging needs to be redone throughout.

Generally, rooms were provided with a sink/hand washing basin or an ensuite, specifically on the 2nd and 1st floors. Pipework was routed in the flooring, skirting, exposed at low level or high level on the floor below.

A water softener was found in the basement of 39 which appeared to be redundant.

2.2 Ventilation / Air Conditioning

Generally, rooms are provided with openable windows and air bricks, although these were covered and sealed in rooms near the staircases to prevent trespassing or intruders. This is in violation of Part F of the Building Regulations and should be studied thoroughly in any future planning along with the equivalent area of air bricks as background ventilators.

Multiple standalone electric extract fans were noted with different specifications and manufacturers, mainly in ensuites and toilets. The performance of these fans could not be verified on site and removing and replacing them is generally recommended as part of any new design.

There are no air conditioning, central ventilation or heat recovery systems on site.

2.3 Heating

Heating is mainly provided via 1 No. 45kW condensing combi boiler located on the 1st floor of the linking block plant room. The boiler might have around 5 more years on life expectancy and has recently been serviced. The low temperature hot water goes through a combination of new/existing pipework to a series of twin panelled radiators throughout the building. Occasional wet tower rails were noted in the ensuites.

Pipework was routed in the flooring, skirting, exposed at low level or high level on the floor below with various material including steel, UPVC and copper tubes and fittings.

Occasional electrical heat emitters were seen in multiple locations to top up.

It appears that the original LTHW system was coming from the 39 plant room, with a one pipe circulation arrangement, connected to cast iron radiators, which is recommended to be replaced with a more modern design with higher efficiency and controllability.

2.4 Fire Suppression

No means of fire suppression was seen on site.

2.5 Drainage

Drainage pipework is a combination of what appears to be original pipework, mainly on stacks, built of lead pipes, and more recent retrofit connections consisting PVC-U pipes and fittings.

2.6 Gas and Water Incomers

Gas incomer is located in the basement of number 39, and feeds the gas fired boiler in the plantroom of 39A. The incomer is 42mm in size, with a maximum flow of 65 m^3/h. The size of the incomer and the meter appears to be capable of supporting any future development.

The water mains incomer is 32 mm in size, and is located in the basement of number 39. A 32mm blue polyethylene pipe connects the mains to the water storage tank on the roof. The pipework appears to be a recent retrofit, although the clips and supports are inadequate.

2.7 Miscellaneous

Generally, all the services appear to be in very poor condition, with lots of retrofit plumbing and fixtures that appear to have been undertaken at different stages of time. This might result in unsatisfactory and inefficient performance and will not be justifiable in terms of running costs, energy saving and maintenance. Generally speaking, these services are going to be very difficult to retain or incorporate in any future major changes or refurbishment of the building, although some major plant items may be reusable. A new all over design and implementation of mechanical services is recommended and required, more so since there are health and safety issues and discrepancies with building regulations requirements.

3. ELECTRICAL SERVICES

3.1 Incoming Power Supply & Transformers

3.1.1 LV Switchgear

The exact size and capacity of the electrical services incomer could not be determined, but is three phase and appears to be approx. 100 to 200 amp capacity (per phase) although, this is based on the meter only as the billing provided does not detail agreed capacity in kVA. Confirmation is required from the energy supplier, British Gas, to confirm. The service enters the building in a pipe sleeve via the basement of 39, to supply 39 and 39A via the UKPN cut out, energy meters and 60A TPN isolator. This supplies an array of switchgears, supplies the lighting and power, kitchen, plant and sundry items e.g., fire alarm. Multiple switchgears are signed with a cross and appear to be redundant.

The switchgears and isolators are estimated to be well beyond CIBSE recommended life expectancy.

3.2 Distribution Cables

In the absence of a main distribution board, multiple switch fuses are fed from a bus bar enclosure located in the switch room, each feeding different services in 39 and 39A e.g., the lighting and power, kitchens, sundry items e.g., fire alarm.

The sub main switchgear and cabling appears to exceed the CIBSE age stages of economic life expectancy and is in an average condition.

Retaining the cables and joints is not recommended and would need thorough testing and more intrusive investigation.

The main earthing and bonding is considered to be incomplete e.g., bonding of the pipework and plant items requires further investigation and testing if it is to be retained and to ensure it meets BS 7671.

3.3 Lighting and Small Power Generally

The lighting and small power is fed from the respective distribution boards mainly located at ground floor and 1st floor of the linking block. There are a number of these appear to be well beyond CIBSE recommended economic life expectancy of 20 years. Fuses were removed for asbestos survey and are generally considered to be at the final stages of economic life expectancy, if not past it. The lighting was partly stripped out; however, appeared to be a combination of recessed downlighters and wall mounted and ceiling mounted luminaires. The wiring to the luminaires was done via surface mounted plastic trunking and metal conduits.

A combination of recessed and wall mounted LV sockets were installed throughout the building.

3.4 Emergency Lighting

Although emergency lighting could be seen on the landings of the metal staircase, generally 39A lacks proper emergency lighting and emergency exit signs to comply with BS 5266. Further study would be required to confirm requirements and compliance. No testing certificates were available and the fittings were in a poor condition generally.

3.5 Fire Alarms

Retrofit smoke detectors and sounders are installed throughout the building; however, the main fire alarm panel has been stripped out. It is recommended that current operation, coverage and compliance with BS 5839 should be verified in conjunction with any planning / Building Control requirements.

3.6 Lightning Protection

No lightning protection system installed, the requirement for any protection system would need to be carried out by a specialist as part of any new design work.

3.7 Ancillary Services

No ancillary services could be located throughout the building.

4. CHECKLISTS

4.1 General Plantroom Checklist

General	Y / N	Comments / Reference
1. Is there adequate heating, ventilating, and lighting in plantrooms?	N	No ventilation could be seen in the plantroom.
2. Are plantrooms used as storage areas?	N	Plantroom needs cleaning and organising.
3. Is there adequate security of plant rooms to prevent unauthorised operation?	N	Booster pump was not in an enclosed space. Water tank on the roof was reachable.
Remarks:		

4.2 LV Electrical Installations Checklist

General	Y / N	Comments / Reference
1. Are there redundant cables and switchgear?	Y	
2. Is there adequate identification and labelling of switchgear, distribution board and circuits?	N	
3. Is there adequate display of warning and danger notices?	N	Lock and electrical danger warnings noticed, required for DBs.
4. Is the mechanical protection of cable systems adequate?	N	
5. Is the protection of cable systems against other causes of damage and deterioration (e.g. heat, chemicals) adequate?	N	
6. Are cables or conductors unduly exposed due to damage, corrosion, missing covers, etc?	Y	
7. Is there adequate mean of isolation (including isolation for mechanical maintenance?).	N	
8. Is there adequate means of emergency switching?	N/A	
9. Are there adequate barriers or enclosures against direct contact? Are those barriers or enclosures compromised e.g. due to damage?	N Y	
10. Are the appropriate circuit protective devices e.g. the use of mcb's, RCD or RCBO's.	Y	Needs further testing.
11. Are there adequate barriers against unauthorised tampering e.g. lockable cupboards.	N	Lock and electrical danger warning notices required for DBs.
12. Are there broken or disconnected earthing systems?	Y	Earthing and equipotential bonding considered to be insufficient.
13. Are there damaged flexible conduits?	N	
14. Is the main incoming power supply adequate for the power requirements of the building?	Y	In the absence of any electrical heating / cooking, could be considered as adequate supply.
15. Are the power supplies to different areas adequate to cater for the power requirements of those areas?	Y	Difficult to verify due to amount of retrofit services.
16. Is there evidence of overloading circuits?	N	
17. Are there adequate socket outlets and other points of supply?	Y	

General	**Y / N**	**Comments / Reference**
18. Are there temporary supplies and resulting safety hazards such as trailing cables?	Y	Temporary DB at GF open area – multiple extension cables throughout the building.
19. Are the cables properly segregated?	N	
20. Are there signs of cable deterioration (i.e. deterioration of insulation resistance) over a period of time? Check the results of periodic tests and inspections. Extrapolate results to identify any need to identify any need for replacement.	Y	No periodic test certificate has been provided.
21. Are cable systems old redundant e.g. Vulcanised Indian Rubber cables?	N?	R.F.?
22. Are there problems arising out of loose joints e.g. excessive temperature, vibration in busbar systems?	N	Could not be verified due to removal of the fuses for asbestos survey.
23. Are there any power quality problems, particularly where there are large microprocessor applications?	N/A	
24. Are the lighting levels adequate?		Could not be verified.
25. Are switching arrangements acceptable to the Client?	Y	To be confirmed
Remarks:		

4.3 Mechanical Installations Checklist

General	Y / N	Comments / Reference
1. Are there redundant plant and pipework systems?	Y	
2. Is there adequate identification of pipework systems?	N	
3. Is there adequate supply of heat to particular areas? (complaints from occupiers or operational records may be reviewed)	N	Multiple retrofit electrical heaters were seen.
4. Is there any evidence of back-end corrosion of the boilers?		N/A
5. Is there evidence of boiler section cracks?		N/A
6. Is there evidence of restricted flow due to waterside fouling?		N/A
7. Is there evidence of air-side fouling caused by poor combustion?		N/A
8. Is there adequate supply of combustion air to the boiler house?	Y	N/A
9. Is there adequate hot water capacity and supply points?	N	Hot water return appears to be inadequate. Retrofit electrical water heater was found.
10. Is the hot water system able to achieve hot water storage and supply temperature requirements stated in HS (G) 70?	Y	Systems need re-commissioning, to confirm, however, HWSR appears to be inadequate.
11. Are there adequate arrangements for the pasteurising calorifiers?	Y	Needs recommissioning.
12. Are there dead legs in the domestic hot water pipework configuration?	Y	
13. Is the domestic hot water temperature safe for the type of occupant?	Y	Temperature control equipment was installed in the plantroom.
14. Is there un-lagged pipework causing undue heat emission in specific area of causing danger to occupants?	Y	
15. Are the correct type of heat emitter installed and safe surface temperatures achieved for the type of occupant e.g. radiator surface temperature in homes for the elderly, emitters with sharp edges where persons could harm themselves?	Y	Could not be verified due to lack of information about the occupants.

General	Y / N	Comments / Reference
16. Are the obstructions to heat distribution from heat emitters and fan coil units e.g. radiators obstructed by furniture?	N	
17. Are there adequate barriers against unauthorised tampering and operation e.g. lockable plantrooms?	N	Booster pump was not in an enclosed space.
Remarks:		

4.4 M&E Condition Schedule

System	Plant item	Condition	Standard of maintenance	Comments
Air	Air handling general	N/A	N/A	
	Ventilation general	Reasonable	Reasonable	No central ventilation. No heat recovery.
BMS / controls	Control panels	N/A	N/A	
Chilled water	Chillers	N/A	N/A	
	Pumps	N/A	N/A	
	Pipe / treatment	N/A	N/A	
Condenser water	Well water	N/A	N/A	
	Pumps	N/A	N/A	
	Pipe / treatment	N/A	N/A	
Coldroom cooling	Compressors / condensers	N/A	N/A	
Fire dampers	Fire dampers	N/A	N/A	
Sprinklers	Pumps, tanks, pipe heads	N/A	N/A	
Ansul / gaseous		N/A	N/A	
Domestic water treatment	Softeners	N/A	N/A	Redundant water softener.
Domestic boosters		Good	Good	Needs to be located out of public access.
Drainage		Reasonable	Reasonable	TBC by Contractor.
Incoming MV systems	MV switchgear	N/A	N/A	
	Transformers	N/A	N/A	
LV distribution	Main switchgear	Poor	Poor	See the Report.
	Essential services switchgear	Poor	Poor	
	Distribution	Poor	Poor	
	Sub-main and distribution boards	Poor	Poor	
Lighting installation	Fittings	Reasonable	Reasonable	
	Wiring	Reasonable	Reasonable	
Small power installation	Fittings	Good	Good	
	Wiring	Good	Good	
Emergency lighting	System	Poor	Poor	Insufficient
	Wiring	Poor	Poor	Appears to be beyond life expectancy.

System	Plant item	Condition	Standard of maintenance	Comments
Fire & voice alarms	System	Poor	Not found	Main panel was stripped out.
	Wiring	Good	Good	
Lightning protection		N/A	N/A	
IT & Comms		N/A	N/A	
Lifts		N/A	N/A	

5. RECOMMENDATIONS

The following should be considered as parts of the next and more comprehensive design stages.

5.1 Mechanical Services

- Most of the services are either beyond economic life expectancy, or has been done in an unsystematic manner; therefore, retaining is not recommended. The only exception might be main heating plant items, including the boiler, the HWSR pump, the calorifier and relative control equipment and the booster pump.
- There are multiple discrepancies with building regulations that need to be addressed in any future design.
- Fire and life safety should be studied by a specialist as part of any future plans.

5.2 Electrical Services

The Electrical services installation is in a poor condition generally and we would recommend that it is fully stripped out and replaced as part of any future project work.

- Should any of the wiring installation be intended for re-use, a Full Periodic Inspection testing report of the whole installation is recommended.
- Recommend complete replacement of small power installation, including wiring, containment and accessory plates redesign in accordance with interior design, and to include necessary changes for ancillary services.
- Provision of power supplies to any new mechanical plant and ancillary services.
- Provision of a complete new lighting installation (internal and external, including any specialist decorative lighting design requirements. Provision of suitable control systems or switch points as required for each area.
- Emergency lighting provisions in key locations should be considered as part of any development works (Stairs, entrance, basement and DB locations etc). Final coverage and requirements to be determined in conjunction with relevant planning requirements and recommendations of BS 5266.
- Provision of security and access systems to suit future developments in conjunction with suitable specialists.
- Provision of new fibre incoming telephone and data linens as required to suit new development works. Application required via Openreach or other local provider.

6. APPENDICES

6.1 Appendix A – Asset Table

BUILDING SERVICES GROUP LIMITED
Cape House 60a Priory Road Tonbridge Kent TN9 2BL
Tel: 01732 350557

Project: 39A Fitzjohn's Avenue & Land Adjacent to 46 Maresfield Gardens

Project No: 23-425

Mechanical and Electrical

Category Scale
A = System is out-moded or ineffective and replacement would be beneficial
B = Systems operating in reasonable condition
C = Life safety system with potential issued that need to be addressed

Priority Scale
5 = Very Low Priority - generally greater than 10 years
4 = Low Priority - could be undertaken within 5-10 years
3 = Moderate Priority - would be of benefit if undertaken within 5 years
2 = Urgent Priority - should be undertaken within 1 year
1 = Immediate Priority

Item	Location	Plant Description	No. Of	Plant Details	Category	Condition	Age & Life Expectancy (Years)	Works Required	Priority	Comments
1	Roof	Water Storage Tank	1	Estimated capacity 2000-2500 litres	B	Could not be verified due to lack of access.	Could not be verified due to lack of access.	Replace with GRP or complete service.	1	
2	Second Floor Linking Block	Cold Water Booster Pump	1	Stuart Turner Jet 55-45	B	Good	Age: 1-2 Remaining: 13-14	-	5	In the absence of O&M or maintenance records, plant age was estimated.
3	1st Floor Linking Block	Calorifier	1	RM Cylinders 300 litre + 2 x 3kW immersion heater	B	Good	Age: 5 Remaining: 10	Chlorination, recommissioning	1	In the absence of O&M or maintenance records, plant age was estimated. Legionella concern.
4	1st Floor Linking Block	Gas Fired Combi Boiler	1	ecoTEC VU GB 466/4-5 Vaillant	B	Good	Age: 5 Remaining: 15	-	5	In the absence of O&M or maintenance records, plant age was estimated.
5	1st Floor Linking Block	Hot Water Services Return Pump	1	Grundfos UPS 15-50 N 130	B	Good	Age: 5 Remaining: 15	Recommission	5	In the absence of O&M or maintenance records, plant age was estimated.
6	1st Floor Linking Block	Control Equipment	1 Set	Various	B	Good	Age: 5 Remaining: 5	Recommission, upgrade	4	In the absence of O&M or maintenance records, plant age was estimated.
7	Various	Standalone Extract Fans		Various manufacturers	A	Poor	Age: 5-10 Remaining: 0-5	System to be replaced with more efficient system.	2	
8	Throughout Building	Wet Heating Pipework & Valves, Radiators		Various materials	A	Very Poor	-	Replace completely, add insulation.	1	Replace with more energy efficient design.
9	Throughout Building	Water Services Pipework & Valves			A / C	Very Poor	-	Replace completely, remove dead legs.	1	Legionella concern.
10	Various	Electric Panel Heaters		Various manufacturers and sizes.	A	Average	Age: 5-10 Remaning: 15-10	Supply cable size to be checked, system inefficient	2	Low cop electrical supply to be investigated.
11	Ground Floor Linking Block	Electric Water Heater	1	Ariston EUROPRISMA 10 Litre / 2 kW	B	Average	5	Supply cable size to be checked, system inefficient, chlorination.	1	Legionella concern due to deadlegs.

BUILDING SERVICES GROUP LIMITED
Cape House 60a Priory Road Tonbridge Kent TN9 2BL
Tel: 01732 350557

Project: 39A Fitzjohn's Avenue & Land Adjacent to 46 Maresfield Gardens

Project No: 23-425

Mechanical and Electrical

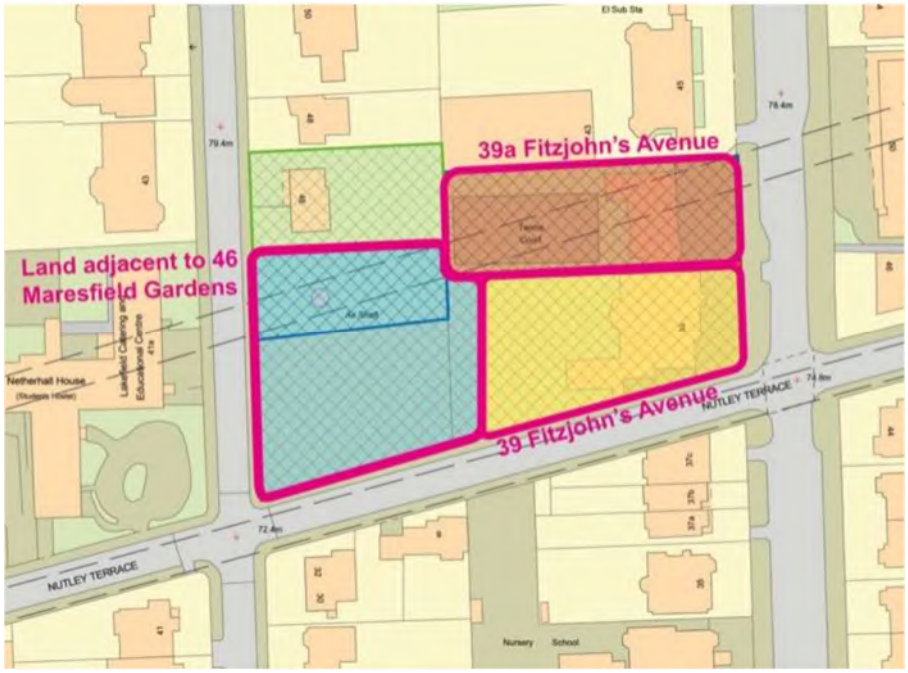
Category Scale
A = System is out-moded or ineffective and replacement would be beneficial
B = Systems operating in reasonable condition
C = Life safety system with potential issued that need to be addressed

Priority Scale
5 = Very Low Priority - generally greater than 10 years
4 = Low Priority - could be undertaken within 5-10 years
3 = Moderate Priority - would be of benefit if undertaken within 5 years
2 = Urgent Priority - should be undertaken within 1 year
1 = Immediate Priority

Item	Location	Plant Description	No. Of	Plant Details	Category	Condition	Age & Life Expectancy (Years)	Works Required	Priority	Comments
12	1st Floor Linking Block	Sub-Main Distribution Board	2		A	Average	Age: 50+ Remaning: -30		2	
13	Ground Floor	Sub-Main Distribution Board	Multiple		A	Average	Age: 50+ Remaning: -30		2	
14	39 Basement	Electrical Switchgear	1 Set		A	Average	Age: 50+ Remaning: -30		2	common with 39. new DB and Switchgear recommnded as part of any major redesign.
15	39 Basement	Water Incomer / Meter	1		A	Average	Age: 50+ Remaning: -30		2	new incomer for 39a is recommended.
16	39 Basement	Gas Incomer / Meter	1		A	Average	Age: 50+ Remaning: -30		2	new incomer for 39a is recommended.
17	39 Basement	Electrical Incomer / Meter	1 Set		A	good	35		2	new incomer for 39a is recommended.
18	Throughout Building	Lighting / Emergency Lighting	1 Set		A / C	Very Poor	Various		1	Retaining is not recommended.More efficient luminaires can be used througout.
19	Throughout Building	Sub Main Cabling	1 Set		A / C	Average	Various		1	Retaining is not recommended. Needs complete testing. Conduits are damaged in some parts.
20	Throughout Building	Fire Alarm	1 Set		C	Poor	No record of testing		1	Main panel stripped out

Notes:

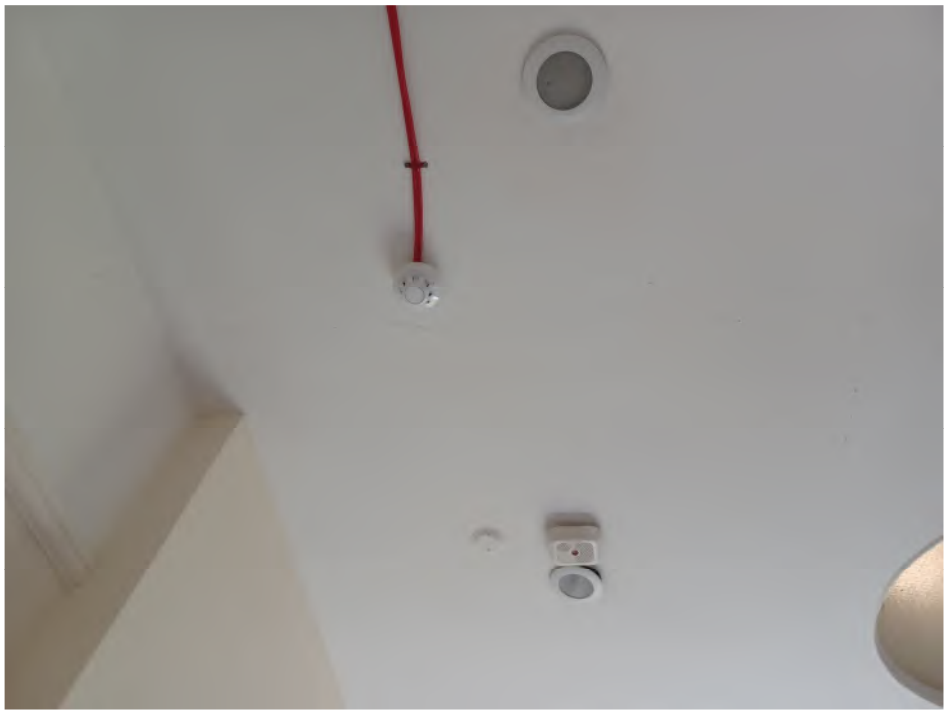
6.2 Appendix B – Photographs

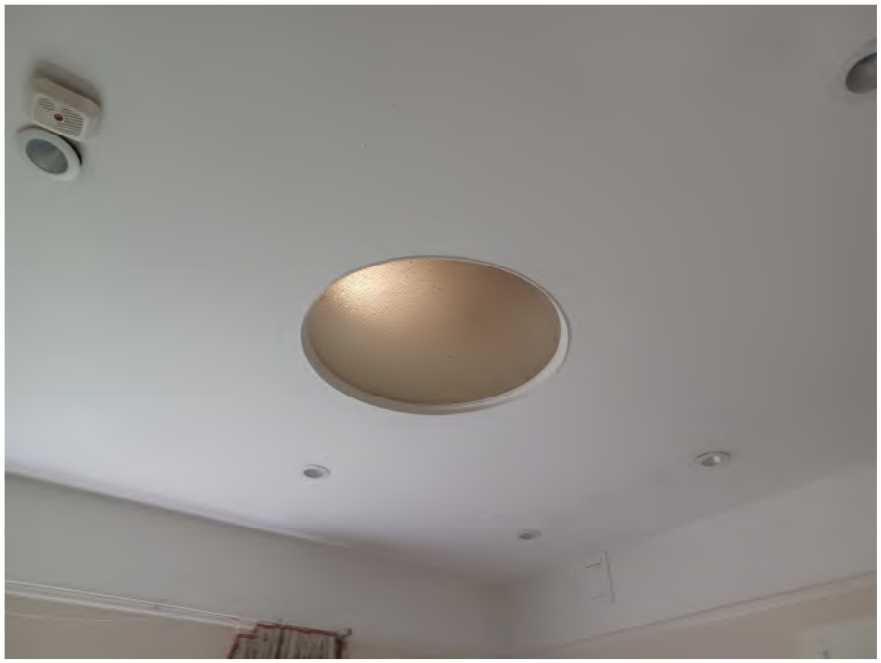
	1)	39/39a Fitzjohn Avenue
	2)	Lead Drain Stack, outside the building.

	3)	2nd floor, services has been stripped out.
	4)	Stripped out electrical feeding to the lighting.

	5)	Openable Windows and air bricks are main means of ventilation
	6)	Window and air brick are closed off occasionally.

	7)	Flat roof with water storage tank on a plinth.
	8)	Storm Drain is blocked and needs servicing.

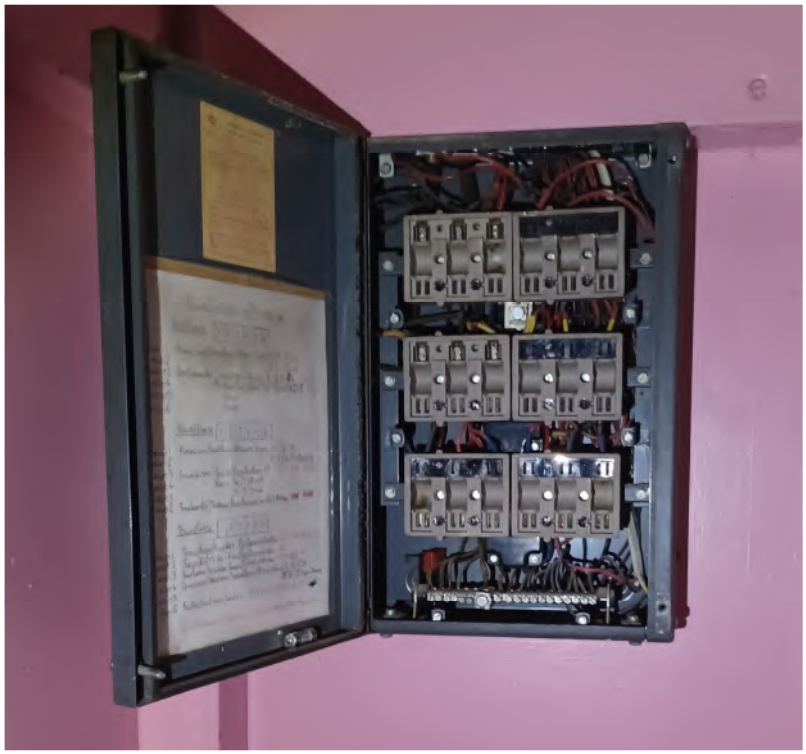
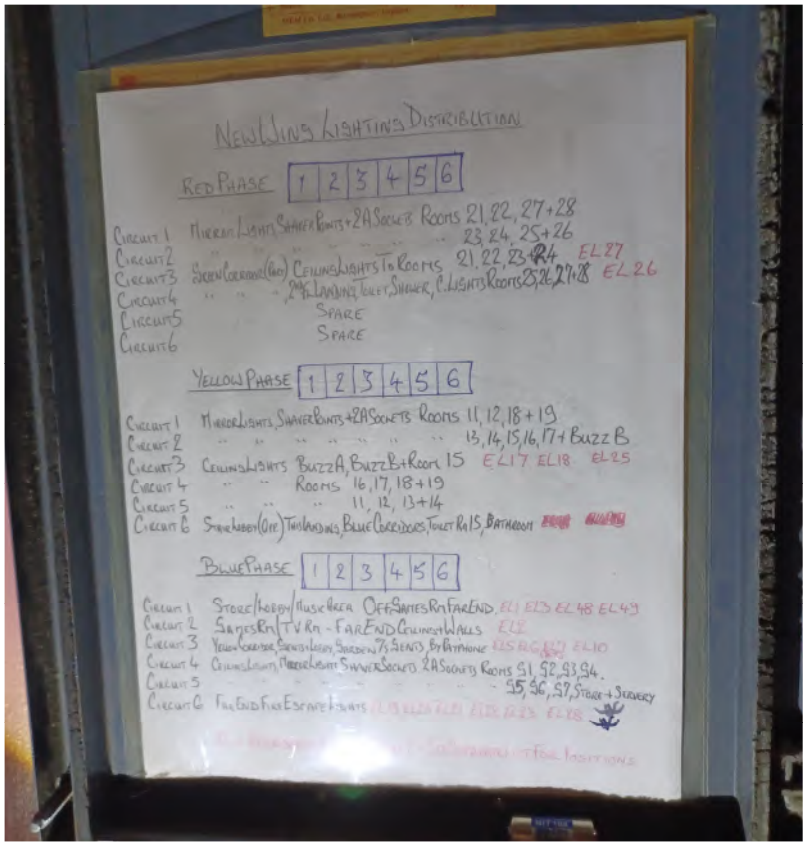
	9)	Wet radiators are generically installed underneath the windows.
	10)	Recessed downlight and smoke detector, 1st floor.

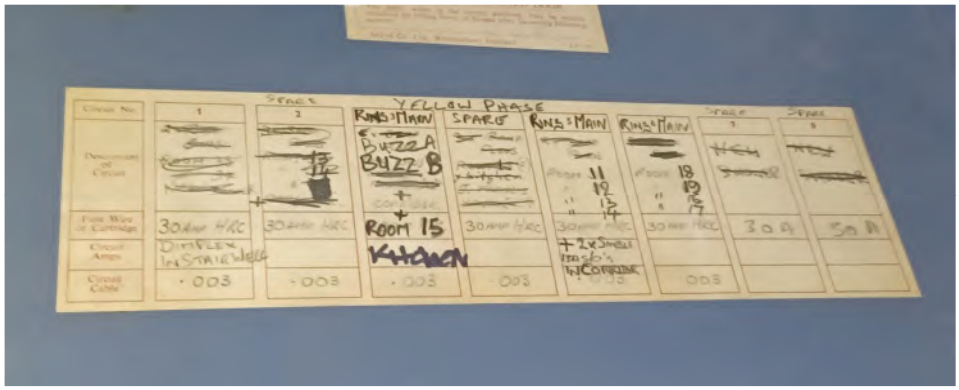
	11)	Northern extension has rooflights on the 1st floor.
	12)	Retrofit UPVC pipework to radiator.
 	13)	Recessed and surface mounted sockets.

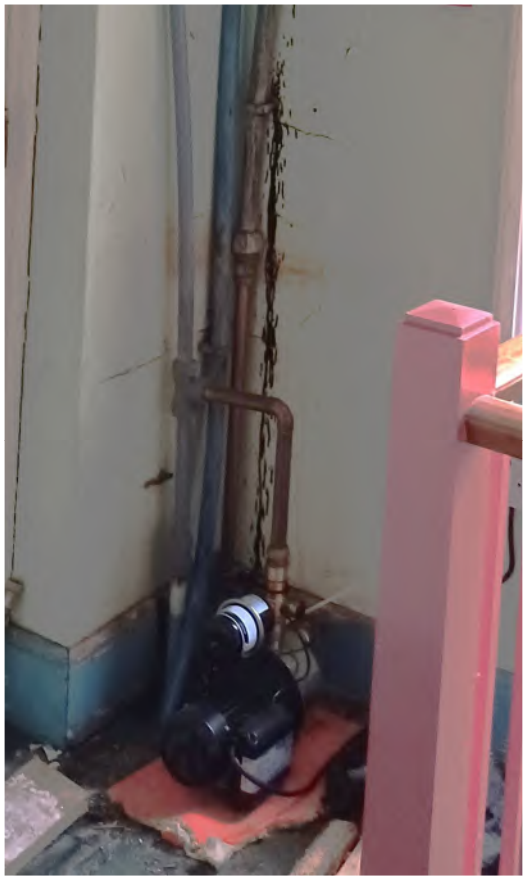
	14)	Occasional electric panel heater to top off heating.
	15)	Services running in the flooring.

	16)	Wet towel rail in en suite.
	17)	Ceiling mounted luminaire and plastic extract ductwork

	18)	Occasional stand alone in shower rooms and toilets.
	19)	Heating and hot water plant room with boiler at the back and the calorifier in the front.

	20)	1st and 2nd floor DB. Fused were removed for asbestos survey.
	21)	DB schedule

	22)	Sub-DB schedule
	23)	Plantroom needs cleaning. Pipework lack insulation. Works are in disarray. Different materials has been used.

	24)	Smoke detector and sounder
	25)	Pipework to and from the booster pump.

	26)	Ground floor DB.
	27)	External wiring not run in correct or adequate containment

	28)	Wall mounted luminaires
	29)	Heating pipework is in disarray and needs insulation.

	30)	Lead drain pipework- front façade of the building (east).
	31)	Old fashioned cast iron radiator and valves with one pipe arrangement

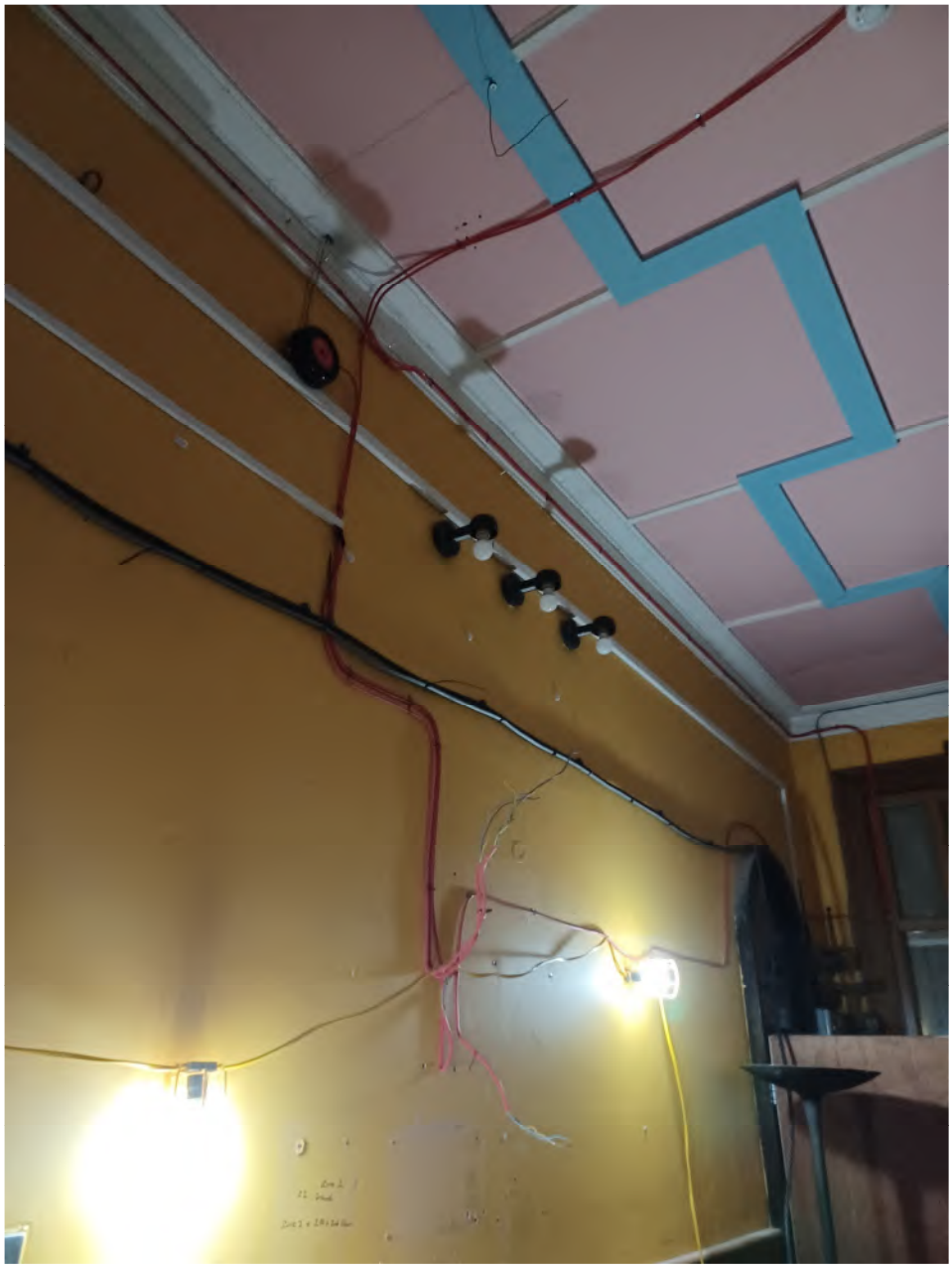
	32)	Ground floor DB
	33)	Electric water heater. Mains water pipe to the roof storage tank can be seen on top left.

	34)	Switch gear room, number 39.
	35)	Electrical meter

	36)	Electrical incomer cable
	37)	Incoming water meter, number 39.

	38)	Incoming water meter, number 39.
	39)	Redundant softener

	40)	Incoming gas meter, number 39.
	41)	Incoming gas meter, number 39.

	42)	Fire alarm panel has been stripped out.

39a Fitzjohn Avenue

Pre-Demolition Audit

August 2023

Revision No	Date	Description	Amended by	Issued to
01	**17/08/23**	**Pre-Demolition Audit**	**LT**	**Buro Four**

Contents Page

1 Executive Summary

1.1 Cantillon Limited have been invited by Buro Four to undertake a pre demolition audit to provide a detailed inventory of the materials in the building that will need to be managed upon demolition.

1.2 The pre-refurbishment/demolition audit was undertaken by Lawrence Tate. A visual survey of the building, combined with analysis of BlueBeam plans and survey drawings provided, were used to calculate the Key Demolition Products (KDP). The audit has investigated the key materials which are likely to rise from full demolition to aid with the decision making for the proposed development.

1.3 The quantities are as follows:

Material	Total Tonnes	Total m3
Timber	26	56
Bricks	589	310
Gypsum	7	9
Glass	2	1
Carpet	0.3	0.2
Vinyl	0.2	0.2
Asphalt	17	8
Mineral Fibre	3	27
Steel	3	1
Total	**648 Tonnes**	**412m3**

2 Scope

2.1 A pre-demolition audit will be performed on any existing buildings, structures or hard surfaces being considered for demolition.

2.2 The outcome of the pre-demolition audit will provide the client with a detailed inventory of the materials in the building that will need to be managed upon demolition.

3 Site Details

3.1 39a Fitzjohn Avenue is a residential building located in South Hampstead, close by to the Finchley Road tube station.

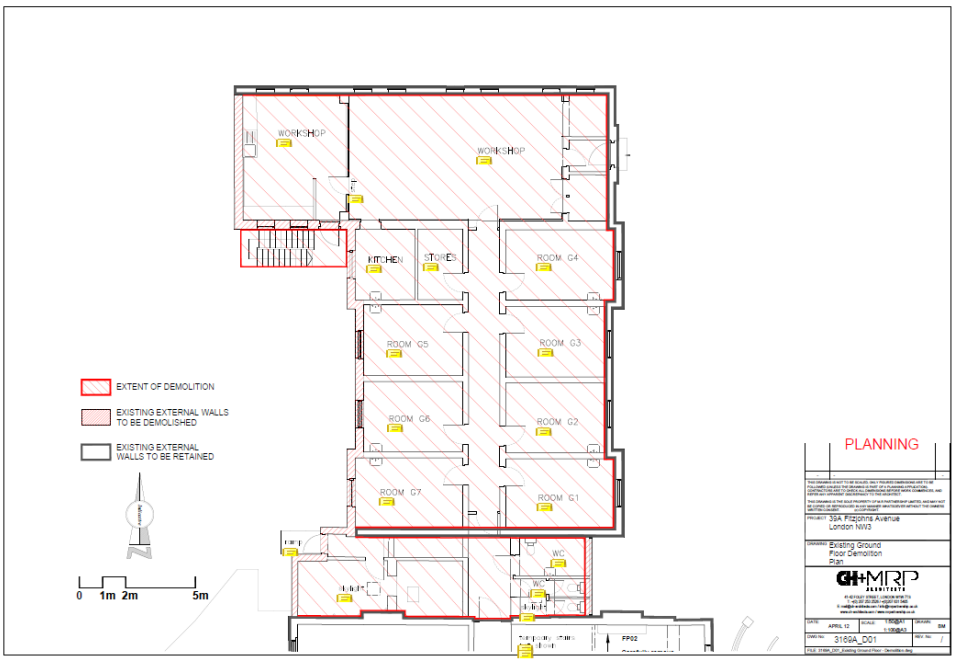
3.2 39a Fitzjohn Avenue is currently and occupied building by live in guardians on a house by multiple occupations basis.

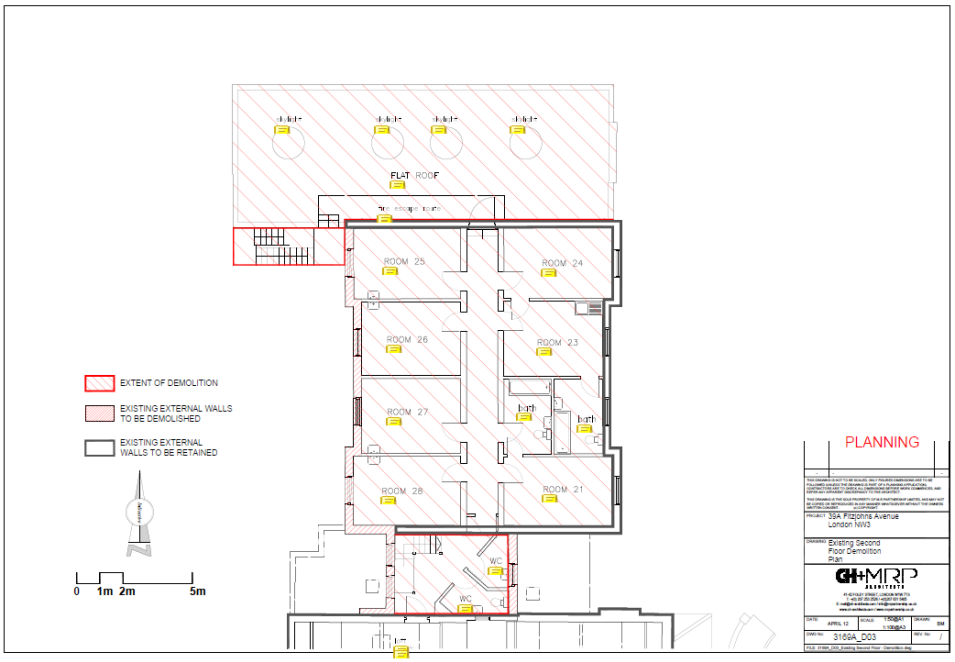
4 The Pre-Demolition Audit

4.1 Cantillon subsequently arranged a site visit & were able to achieve access within the occupied building to undertake a visual, non-destructive survey.

4.2 All estimates are based on drawings sent from CH+MRP Architects, Cantillon's site visit and previous specialist demolition and engineering experience.

5 Typical Floor Layouts:





6 Full Demolition Results

6.1 After our site visit Cantillon built up the below table to identify and quantity the key materials of the building. Using the drawings provided by CH+MRP Architects, these were loaded into BlueBeam to find the dimensions and properties of the buildings.

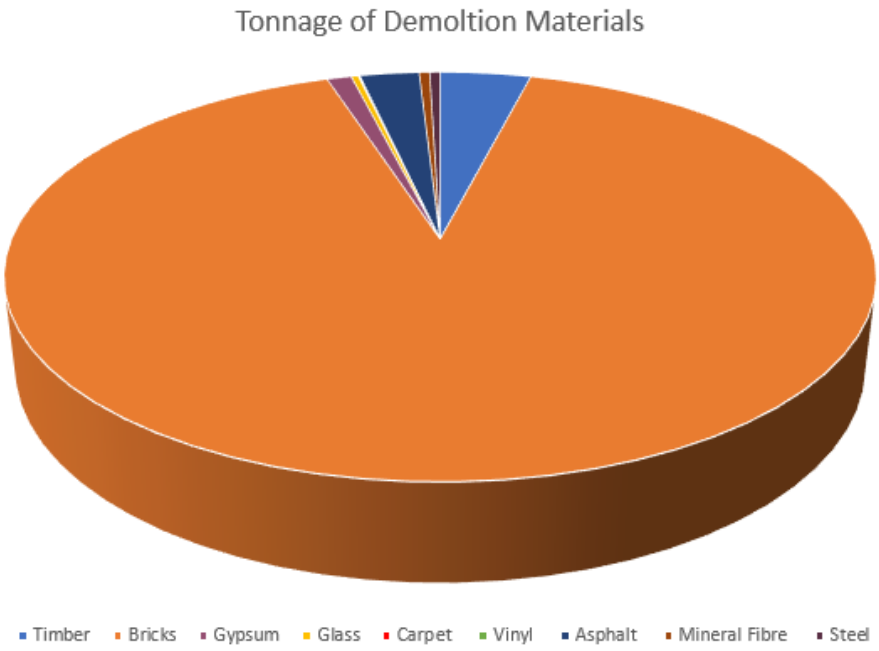
6.2 Overall, there is an estimated 648 tonnes (412 m3) arising from the demolition.

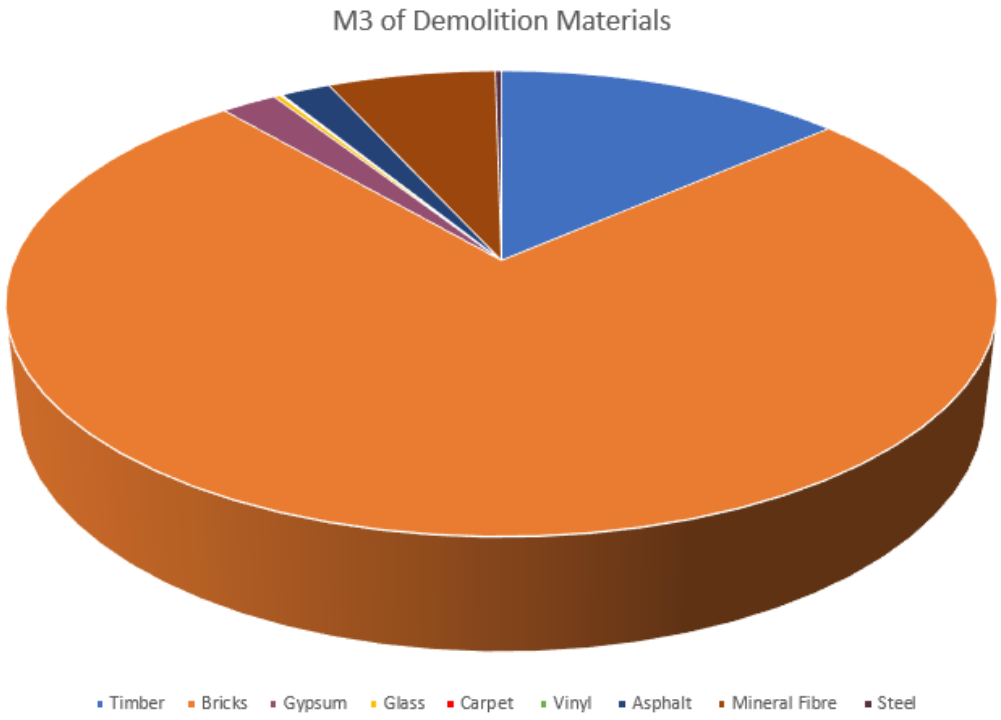
6.3 Each of these Key Demolition Products are described later in the report (Appendix A) detailing their arising, likely management options and next steps (where applicable) to support reuse and/or higher value recycling.

Chart of Demolition Results:

Material	Total Tonnes	Total m3
Timber	26	56
Bricks	589	310
Gypsum	7	9
Glass	2	1
Carpet	0.3	0.2
Vinyl	0.2	0.2
Asphalt	17	8
Mineral Fibre	3	27
Steel	3	1
Total	**648 Tonnes**	**412m3**

6.4 Graphs of estimated tonnage arising from demolition:





7 Reuse & Best Practice Summary

7.1 Cantillon have used their well-established environmental management principles to outline the order of priority for waste management options, highlighting the worst (disposal) and best favourable (prevention) environmental options.

7.2 The subsequent sections provide detailed options for reusing and recycling each key reusable product and demolition material.

7.3 It is generally recommended to allow for a long lead in time to maximise and facilitate the reuse of products and components. The greatest opportunities for reuse come with extensive planning and logistical constraints agreed prior to works being undertaken.

7.4 To optimise the potential for reclamation of the identified items, the following suggestions can be considered:

- Engage in discussions with the client, sharing the findings of the report, and explore possibilities for closed loop reuse in comparable projects or future development/refurbishment endeavours
- Where possible, allocate on site storage specifically for segregating slaved items
- Cantillon have contacted various local re-processors and recyclers during the pre-demolition audit who we have worked with before on previous projects. Companies such as Globechain, Community Wood Recycling, WrapIT and Tarkett which are found in the Circular Economy Guidance for Construction Clients have been helpful in this process and will be consulting with moving forward.
- Globechain are a reuse marketplace that connect companies with charities. This platform has so far diverted over 5.1 million kgs of waste from landfill through reuse and with over £2m of savings to charities
- Community Wood Recycling are a social enterprise network who sell a range of reclaimed wood for reuse including flooring, doors, window frames, decking and furniture.
- WrapIT facilitate the process of organisations accessing, giving away or loaning office furniture, equipment and other resources.
- Tarkett are a flooring supplier that operate a take back scheme for recycling.
- Appendix A provides a summary of material/product types, along with recommended best practices and factors to consider for maximising the circular economy opportunities. It encompasses the identified reuse options and provides an estimate of the potential reuse and recycling rates that can be realistically achieved.

Appendix A

MATERIAL	LOCATION	MATERIAL FRACTION	CODE	PROCESS	Deconstruction Requirements - Scope of Work	Potential need for off site storage	Volume or area	Tonnage	Potential target for reuse (%)	Potential target for recycling (%)	Demolition Stage Suggested/or specific item: *- Early Salvage Period* *- Soft Deconstruction* *- Hard Deconstruction*	Confirmation of certification to be provided to prove quantity and end of life destination	Suggested Waste Stream Destination	Comments on handling process and best recycle route identified	Innovation Opportunities
MINERAL FIBRE	*Mineral fibre is assummed to be located within roof construction.*	MF_Mineral Fibre	MF_Mineral Fibre_01	Recycle	Remove mineral fibre installtion for roof construction. Segregate and to send to waste facility for recycling.	N	27m3	3 Tonnes	N/A	100%	Hard Deconstruction	Yes	Waste transfer facility	Material will be sepearated on site, loaded into skips & sent away via its waste stream.	This material can be recycled and turned into new rockwool insulation.
GLASS	Glazing to external windows within the façade	*External windows*	GLS_Windows_01	Recycle	Glass to be recovered from glazing units, segregated and removed from site as recycled glass	N	1m3	2 Tonnes	N/A	100%	Hard Deconstruction	Yes	Waste transfer facility	There is potential for glass windows panels to be reused or to be removed to a cullet merchant for recycling off site. Further investigation would be required to determine the suitability of the glass for either of these options.	Recycled into bottle glass, lower grade into glass fibre and the lowest grade into aggregate.
			GLS_Windows_02	Recycle	Contractor to separate glass from frame on site without breaking the glass. Store the glass neatly on a skip for specialist manufacture pick up.	Y	1m3	2 Tonnes	20%	100%	Hard Deconstruction	Yes	Manufactuer	Material will be sepearated on site, loaded into skips & sent away via its waste stream. Any contamination of glass on site will limit potential reuse.	Subject to investgation from manufactuer & on site trial
			GLS_Windows_03	Reuse Off-Site	Dismantle and store all façade windows with frame, without breaking them for potential redistribution.	Y	1m3	2 Tonnes	5%	100%	Hard Deconstruction	Yes	Manufactuer	Material will be sepearated on site, loaded into skips & sent away via its waste stream. Any contamination of glass on site will limit potential reuse.	Subject to investgation from manufactuer & on site trial
VINYL FLOORING	Viynl flooring is generally located within the bathroom and kitchen areas.	Viynl Flooring	VF_ViynlFlooring_01	Recycle	Remove viynl flooring and arrange for recycling of materials, where possible.	N	0.2m3	0.2 Tonnes	N/A	100%	Soft Deconstruction	Yes	Waste transfer facility	Separate material on site, loaded into skips & sent away via its waste stream.	Seperated and re-ground as feedstock to make new plastic products.
			VF_ViynlFlooring_02	Reuse Off-Site	Identify viynl flooring in good order and locate end user, willing to re-use on orginal format. Agree take back with manufactuer.	Y	0.2m3	0.2 Tonnes	5%	100%	Soft Deconstruction	Yes	Manufactuer / Supplier e.g Tarkett	Suitable viynl flooring will be removed carefully, and taken off site by supplier. Any damges, or poor quality floorin will be seperated on site, loaded into skips & sent away via its waste stream.	As well as the supplier, local charites and companies will collect good quality flooring for reuse.
STEEL	Steel external stair case	Steel Staircase	SteelStaircase _01	Recycle	Remove steel staircase, segregate and send to waste transfer facility for recycling	N	1m3	3 Tonnes	N/A	100%	Hard Deconstruction	Yes	Waste transfer facility	Separate material on site, loaded into skips & sent away via its waste stream.	Steel products will be sent their waste trasnger facility, proceded and turned into new products in the UK.
			SteelStaircase_02	Reuse Off-site	Recover steel ceiling panels, set aside for re-use. Identify specialist manufacturer for potential take back or reuse potential.	Y	1m3	3 Tonnes	100%	100%	Hard Deconstruction	Yes	Charity / Donations	A trial would need to be carried out on site to ascertain the viability of this, depending on quality of the staircase. If removed okay, seprated and kept ready for collection. MDL can carry out a trial prior to the commencement of demolition. A small section will be removed to see how these come out and if any damages take place.	Local charities and companies could be intrested in reusing this staircase in full for reuse.
ASPHALT ROOFING	Asphalt Roofing	ASP_AsphaltRoofing	ASP_AsphaltRoofing_01	Recycle	Remove asphalt roofing from roof, segregate and send to waste transfer facility for recycling.	N	8m3	17 Tonnes	N/A	100%	Hard Deconstruction	Yes	Waste Transfer Facility	Separate materials on site, loaded into skips & sent away via its waste stream.	Asphalt recycling process sorts the materials and repurposes the shingles to fill cracks and pot holes in roads.
CARPET TILES (CRT)	*Carpet tiles are generally located within the internal walkway areas*	CRT_CarpetTiles	CRT_CarpetTiles_01	Recycle	Remove carpet tiles and arrange for recycling of materials, where possible.	N	0.2m3	0.3 Tonnes	N/A	100%	Soft Deconstruction	Yes	Waste transfer facility	Separate material on site, loaded into skips & sent away via its waste stream.	Processed into high grade solid recovered fuel for renewable power generation worldwide.
			CRT_CarpetTiles_02	Reuse Off-Site	Identify carpet tiles in good order and locate end user, willing to re-use on ordiginal format. Agree take back with manufacturer.	Y	0.2m3	0.3 Tonnes	50%	100%	Soft Deconstruction	Yes	Supplier	Suitable carpet tiles will be removed, stacked on pallets and taken of site by supplier. Off cuts and damaged tiles will be seperated on site, loaded into skips & sent away via its waste stream.	As well as the suplier, Local charities and companies will collect carpet tiles for reuse.
BRICKS (BRK)	*Masonry facades to garden & internal walls to be demolished*	BRK_Bricks	BRK_BricksCladding_01	Recycle	Bricks that canot be salvaged for re-use to be sent for processing into aggregates off site, via waste transfer facility using best practice	N	310m3	589 Tonnes	N/A	100%	Hard Deconstruction	Yes	Waste transfer facility	Separate material on site, loaded into skips & sent away via its waste stream.	Opportunities for recyled products to go back in construction / infrastructure projects in the UK. E.g Essex Highways
			BRK_BricksCladding_02	Reuse Off-Site	Provide feedback on segregating intact bricks in dedicated pallets without breaking them for potential redistribution. Investigate disassembly.	Y	310m3	589 Tonnes	20%	N/A	Hard Deconstruction	Yes	TBA	The mortar surrounding the internal bricks is a modern cementation, meaning there is a high risk to damaging these bricks when removing. A trial would have to be undertaken on site to see the quality of them once removed. MDL can carry out a trial prior to the commencement of demolition. A small section will be removed to see how these come out and if any damages take place.	Reused bricks could be made into decorative features within the new development.
GYPSUM (GYP)	Gypsum board to internal lining	GYP_GypsumBoard	GYP_GypsumBoard_01	Recycle	Plaster board to be stripped by hand and set aside for recycling, via dedicated waste transfer facility	N	9m3	7 Tonnes	N/A	100%	Soft Deconstruction	Yes	Waste transfer facility	Separate material on site, loaded into skips & sent away via its waste stream.	The gypsum powder is seperated from the paper covering and filtered, which can be used as new plaster. The paper element is recylcled and turned into new paper.
			GYP_GypsumBoard_02	Recycle	Plasterboard that doesn't have any applied finishes to be segregated and sent back to British gypsum for recovery and reuse	N	9m3	7 Tonnes	10%	N/A	Soft Deconstruction	Yes	Suppiler e.g British Gypsum	Plasterboard that doesn't have any applied finishes to be segregated and sent back to supplier e.g British gypsum for recovery and reuse. Untouched plasterboard has been located within the building above the bedroom doors, it will be removed carefully and seperated, ready for its removal off site.	Untouched plasterboard to be sent back to supplier for reuse.
TIMBER PRODUCTS (TIM)	Flooring, joists, skirting, doors and frames generally through out.	TIM_TimberProducts	TIM_TimberProducts_01	Recycle	Timber is handled by their best practice recycling route, segregating and sending off site for timber reprocessing via transfer facility	N	56m3	26 Tonnes	N/A	100%	Soft Deconstruction	Yes	Waste transfer facility	Separate material on site, loaded into skips & sent away via its waste stream.	Recyled material will be used as biomass for renewable power in UK power stations.
			TIM_TimberProducts_02	Reuse Off_Site	Contractor to take out good quality timber without damage, stack neatly for potential redistribution. Indicate possibility for storage.	Y	56m3	26 Tonnes	20%	N/A	Soft Deconstruction	Yes	Charity / Donations	Appropriate timbers will be selected by the client. These can be seperated and stored ready for collection by local charties / companies.	Timber doors have previosuly be reused in rehabilitation centres for painting.

MATERIAL BREAKDOWN

DEMOLITION CONTRACTOR SECTION

Appendix B

The below are suggested waste facilities / suppliers, but may be subject to change, dependent upon market conditions, or availability.

Material	Company	Website
Glass	Saint Gobain	https://www.saint-gobain.com
	Westminster Waste	https://westminsterwaste.co.uk
Steel	Cleveland Steel	https://cleveland-steel.com
	Total Waste	https://www.twm.co.uk
	EMR	https://uk.emrgroup.com/
	BFA	http://www.bfarecycling.co.uk/
Carpet	Tarkett	https://www.tarkett.co.uk/
	Westminster Waste	https://westminsterwaste.co.uk
Bricks	Days	https://www.dayaggregates.co.uk
	RMS	https://rmsconcrete.co.uk
Gypsum	British Gypsum	https://www.british-gypsum.com/
	Westminster Waste	https://westminsterwaste.co.uk
Timber	Community Wood Recycling	https://communitywoodrecycling.org.uk/
	Westminster Waste	https://westminsterwaste.co.uk
Asphalt	Tarmac	https://tarmac.com
Mineral Fibre	Rockwool	https://www.rockwool.com/uk
	Westminster Waste	https://westminsterwaste.co.uk
Vinyl	Tarkett	https://www.tarkett.co.uk/
	Westminster Waste	https://westminsterwaste.co.uk