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Pre-Redevelopment Audit

For Planning

41 Sheldon Avenue

For

Mark Tognolini and Eva Stengaard



Revisions schedule		
Issue Date: 19 th June 2024		
Report prepared by: Han-Chieh Lee, Consultant, CarbonPlan Engineering		Date: 13 th June 2024
Checked by: Alan Calcott, Director, CarbonPlan Engineering		Date: 14 th June 2024
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A	19 th June 2024	Amended to include Design Team Comments
B	11 th September 2024	Updated with the Planning responses, highlighted in BLUE

Section 2.1.3 extent the paragraph with more detail information addressing the following planning responses:

“The applicant should robustly explore the options for retaining existing building (either wholly or in part) The pre-development audit has not demonstrate how these options have been explored and how the existing brick load bearing wall has limited its flexibility to rearrange the layout”

Please do not print unless necessary.



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Executive Summary

This Pre-Redevelopment Audit has been conducted by Carbon Plan Engineering to demonstrate how the 41 Sheldon Avenue has considered whether existing buildings, structures, and materials have the potential to be **retained**, **refurbished** and **incorporated into the new development, or demolished and recycled**.

This audit forms part of the Circular Economy analysis and has been used to inform the design.



The 41 Sheldon Avenue currently is used as a 3-storey dwelling with front, back garden, garage, and conservatory, totalling site area 1,620 m². The main building façade is uninsulated and the roof have a high risk of water leakage which will need to be recovered. The majority of the construction is uninsulated which is not compliance with the current Building Regulation and lead to a low EPC rating. However, this report will explore all the possibility of retained, refurbished, or reused.

The following drawing indicates all of demolition on 41 Sheldon Avenue.



Potential of Reusing existing elements

The brick façade is in an adequate condition and can be retained based on the building survey, however the fabric is not energy efficient with no insulation. Moreover, the Heritage Report has concluded that.....

“After the Pre application engagement, the potential to retain and adapt is fully explored, concluding that a full replacement will be more efficient than remodelling the existing building. The benefit of a full replacement is to build a more sustainable and energy efficient high quality housing.”

Recycling

The intent is that over 95% of all demolished and stripped out non-hazardous materials are recycled. Details of how this will be handled are set out in the accompanying pre-demolition audit.

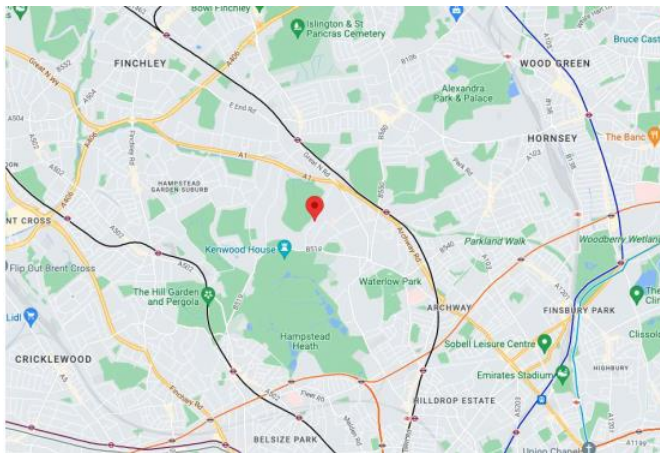


1. Introduction

Radcliffe have appointed Carbon Plan Engineering to carry out a Pre-Redevelopment Audit to demonstrate how the 41 Sheldon Avenue development, in the London Borough of Haringey, has considered the potential of existing buildings, structures and materials be **retained**, **refurbished**, or **incorporated into the new development**. The audit was carried out as part of the feedback for the submitted planning application and will be used to inform the design.

1.1. Site Description – What is there now?

41 Sheldon Avenue is within the administrative area of the Borough of Haringey. The Site is situated within the Central Activities Zone location and proximity to Highgate Underground Station as identified in the Council's adopted Local Plan. The dwelling backs onto the Highgate Golf Club however demolition and construction will not impact the surrounding area.

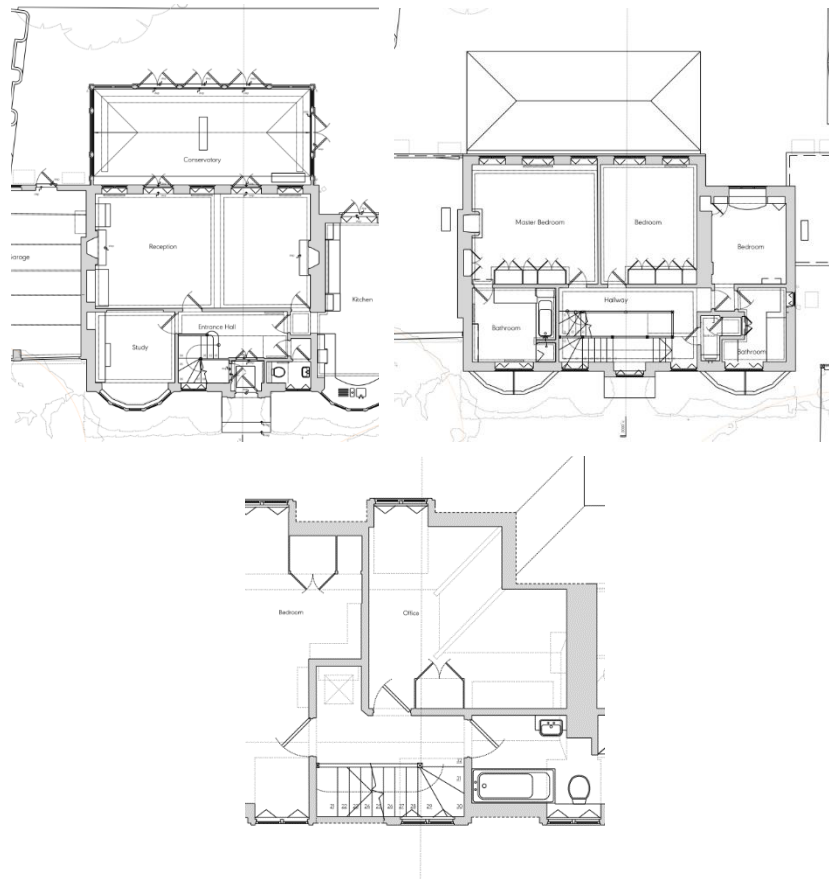


41 Sheldon Avenue comprises of a 3-storey dwelling with a large garden area, conservatory and garage. The main building is uninsulated with an external façade of a brick cavity wall with timber frame and single glazed windows.

The roof consists of a softwood pitched roof frame which has sustained water damage over time.

The conservatory consists of solid brick wall with timber frame double glazed windows and has its own air conditioning unit along with under floor heating that runs throughout the conservatory, kitchen and drawing rooms.





The GIFA of the existing building has been determined by Stage 3 Outline Specification and site surveys measurements.

GIA: 350.1 m²

Site Area: 1,620 m²

1.2. Project Description – What will happen?

A planning application for the redevelopment has been submitted for the following scope of works to the development area, and the planning submission commentary required the project to develop a Circular Economy Statement which includes this Pre-redevelopment Audit.

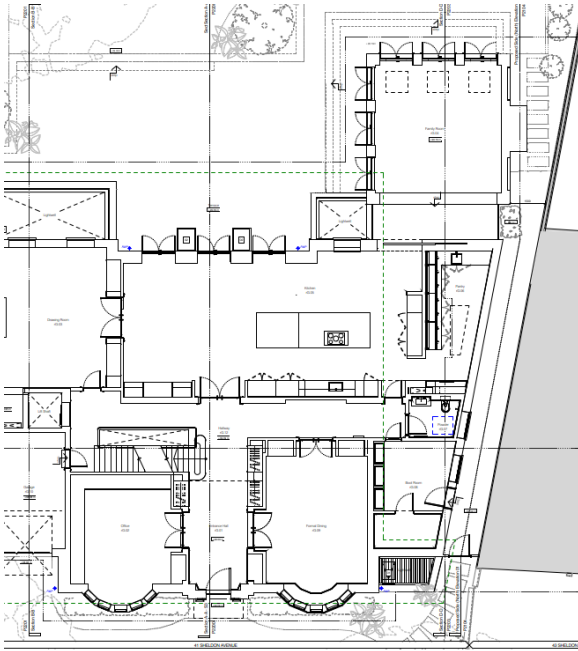
- ❑ Construction of a new property at basement, ground, first and loft floors – two side wings, and ground floor extensions to the side and rear.
- ❑ New exterior walls are to be of red/brown brick construction to match the materiality and detailing of the existing front façade.
- ❑ Double storey bays to the front facade comprising faceted joinery and curved masonry.
- ❑ New roof, with tiles to match the existing, lead flat roofs and six dormer windows detailed to match the existing. Flat roofs to pavilion, side extension and rear terrace.
- ❑ Excavation and construction of a new basement under the footprint of the existing house.
- ❑ Excavation of 2 no. lightwells to rear garden, and 1 no to front garden.
- ❑ Frameless structural glazed link to ground floor rear garden pavilion.
- ❑ New finishes, fittings, joinery and services throughout.
- ❑ ASHP in the rear garden with the PV array to roof.

The plans below show the locations for the new elements of the proposed re-development.

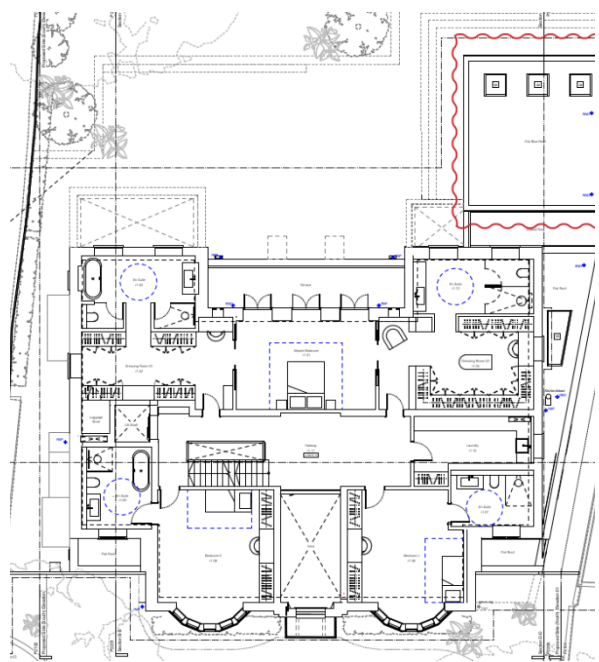
Proposed Front View



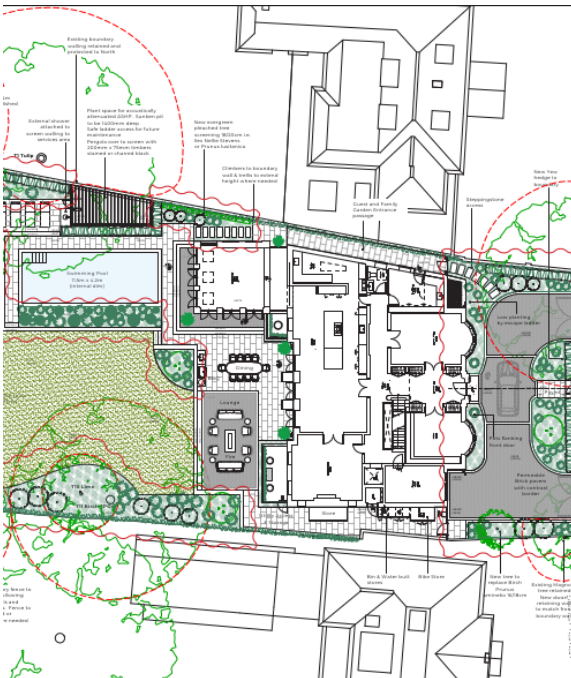
Proposed Ground Floor Plans



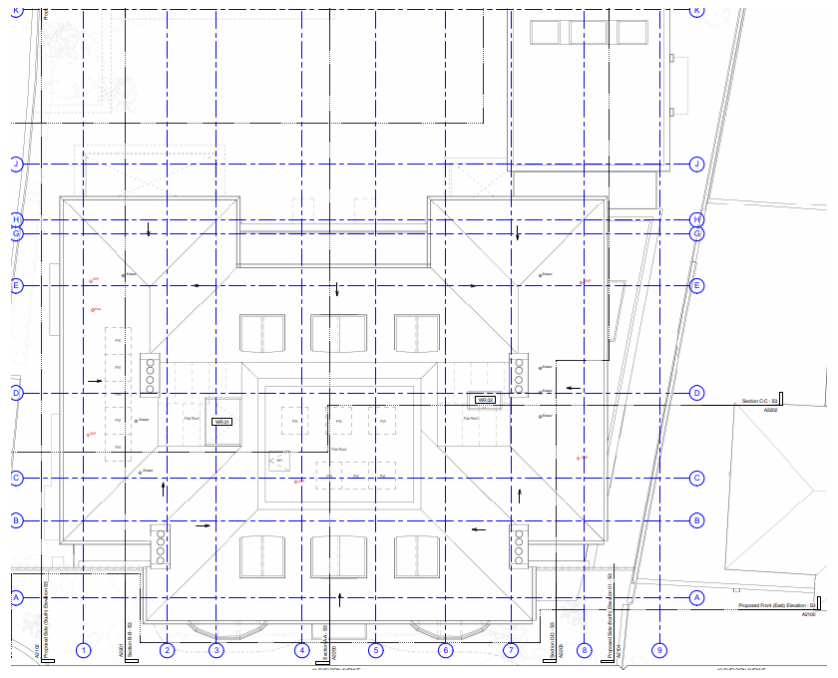
Proposed First Floor Plans



Proposed Landscape Plans



Proposed Roof Plans



1.2.1. Extent of Demolition

To enable the development proposals the demolition of the following elements is required:

- ☐ Removal of all facades, internal element, finishes and services from the existing building
- ☐ Removal of all out building element: garage, conservatory, front garden wall, and brick store.

The following image indicates the area of this demolition which extends to all of the existing structures and façade.



This project proposed a full demolition of the development represent the removal of 100% of the total GIFA and around 100% of the total Mass.



1.3. Re-Redevelopment Audit requirements

The planning submission commentary has requested that Circular Economy statement is developed which – as per the London Plan – requires a Pre-Redevelopment Audit which fully explores the potential of “*retention / part retention, extending and upgrading of the existing structure*”.

Referring to the London Plan 2021, Policy SI 7(B) requirements point Local Authorities and Developers in the direction of the GLA published guidance on the development of Circular Economy Statements in 2022 where they set out the detailed requirements. The documents make it clear that Pre-Redevelopment and Pre-demolition audits are to be submitted along with Circular Economy Statement at Outline application and Full application stage.

The following summarises these requirements:

Applicants should complete and submit a pre-redevelopment audit as supporting evidence to their Circular Economy statement, where a robust in-depth assessment has not already been completed.

The audit should include the following tasks:

- ❑ Should be conducted early on (at pre-application stage) and should inform the design.
- ❑ Include an analysis that fully explores options for retaining existing structures, materials and the fabric of existing buildings into the new development; and the potential to refurbish buildings before considering substantial demolition.
- ❑ Applicants should outline in the pre-redevelopment audit an explanation of the existing buildings on the site and brief description of state of their repair.

Details should include:

- the building's age.
 - key materials
 - photos of typical internal spaces and facades
 - site plans
- ❑ Provide an understanding of the materials arising during the refurbishment and demolition phases of a redevelopment in order to help with development of a resource management plan¹.
- ❑ Identify products that remain in their current form and / or materials to be recycled which could be incorporated into subsequent development.
- ❑ Provide evidence for any external assessments that have been used to inform the Pre-redevelopment Audit

In addition the Pre-redevelopment audit should provide signposts to the following specific to the site, its context and the design proposals.

- ❑ Ensure the management of material from the demolition or refurbishment process is in line with the waste hierarchy i.e. maximise reuse and closed loop recycling and minimise waste to landfill

¹ This is generally covered in the accompanying Pre-Demolition Audit.

- ☐ Show how the design team and future contractors can minimise waste generation during the redevelopment process
- ☐ Set out a route to compliance with waste legislation where waste is generated.

1.4. Interaction with Pre-Demolition Audit

The pre-demolition audit provides detailed quantities for **all** materials that are part of the existing buildings within the development boundary of the site.

These are summarised within this Pre-Redevelopment Audit

The demolition audit also identifies where buildings are to be demolished and whether any are to be stripped out, detailing the level of strip out for each. This is also summarised for within this Pre-Redevelopment Audit

Finally, the demolition audit sets out potential routes for re-use and recycling of materials removed from site as appropriate.



1.5. Methodology

Key	Action	Details of process
A	Collection and examination of available information 	Information about the structures, facades and all other materials that may be reused, refurbished and recycled should be gathered and analysed. The types and amount of information available will depend on the type and age of the building. Sources of information include Site drawings/information models/ Site photographs/ Asbestos survey/ Structural engineers survey
B	Site visit to collect further information. 	Site Surveys have been carried out to gather further information about the types and amounts of materials present and the condition of these elements/components. The surveys should take place as early as possible following the decision to redevelop the building but also it is preferable to visit the building post-occupation to ensure that all the necessary information can be gathered. Prior to the surveys a site specific risk assessment and method statement should be prepared, and a site induction should be provided to those carrying out the audit.
C	Estimation of types and amounts of materials. 	The aim of steps 1 and 2 is to determine detailed quantities of the different elements present and record information on the condition of these elements. Information on the fixtures and fittings (including furniture and computer equipment) should also be recorded. See Appendix A. For audits prior to refurbishment, the existing site plans and the proposed floor plans can be used to determine which elements are to be removed as part of the refurbishment. For audits prior to demolition, measurements of all the elements present should be recorded.
D	Assessment of suitability of material for reuse/recycling/other waste management method 	For each of the types of materials likely to arise from the redevelopment, an assessment of the best management option should be carried out following the waste hierarchy. Reuse on site or off site: Reuse of the component without further processing. (Where reuse seems appropriate onsite, i.e. in the subsequent development, this should be highlighted.) Closed Loop Recycling: Recycling/reprocessing into the same component e.g. ceiling and carpet tile or plasterboard take back schemes Open Loop Recycling: Recycling/reprocessing into a different component e.g. the shredding of a pallet to produce wood chips for particle boards Recovery: Typically used to describe generic separation and recycling of materials (usually at a waste transfer station), but there may be occasions where this could describe biological treatment such as composting. Energy recovery: Incineration of waste to provide energy. Disposal: Disposal of waste via landfill, incineration without energy recovery or other form of treatment/encapsulation (e.g. for hazardous/difficult waste).
E	Recommendations for materials management and target setting 	Based on the information gathered about the types and amounts of materials and the potential for reuse and recycling, targets can be set for different waste management methods. A range of targets can be set for overall amount of materials reused on or off site in their original form, recycled on site, closed/open loop recycled off-site.



2. Existing Buildings Details

This section sets out the results of our desktop analysis and survey work providing for each building the following:

Description of the building in its current state including:

- ☐ Year constructed
- ☐ Building Use
- ☐ Total GIFA
- ☐ Whether the building is occupied
- ☐ Description of the servicing strategy
- ☐ Assumed constructions with references as appropriate
- ☐ Quantification of the elements that exist within the building



2.1. General Details

	41 Sheldon Avenue, Haringey, London N6 4JP	
	Year of Construction:	1920's
	Building Use:	Residential
	Storeys:	3
	Occupied?	Yes
	Gross Floor Area:	350.1 m ²
	Notes:-	

Key Building Components

Description		Details	General Description
Construction	Frame	Timber frame with brick load bearing wall	The main building façade consists of a brick wall with a cavity which is uninsulated. The frame uses a softwood pitched frame which entirely encloses the second-floor accommodation. The GF and upper floor construction has been determined from the exiting building and surveys drawings. The façade for the conservatory also incorporates a cavity wall which is uninsulated. Timber frames with double glazed glass is used for the windows. The garage includes a solid brick wall with a timber frame and felted roof, the brick stores are of same construction however have noticeable and substantial cracks.
	GF	Ground Bearing slab	
	Upper Floors	Timber floor	
	Roof	Timber rafter roof Clay tile finishes	
	Windows Facade	Wooden frame with single glass	
	Finishes	Timber flooring and tile in wet rooms	
	Other	Conservatory is wooden frame and double glass	
	Other	One brick chimney and one metal flute chimney	
Services	Heating	Fireplaces and gas boiler	The building contains a condensing gas boiler, radiators and electric underfloor heating in the conservatory, drawing room and kitchen. The conservatory is also supplied with its own air conditioning unit from the garage.
	Cooling	Small AC for conservatory	
	Ventilation	Extract fan in WCs	
	Lighting	Fluorescent / LED lighting throughout	
	DHW	gas boiler	
	Other		



2.1.1. Pictures & Condition

Façade: The main building consists of **uninsulated** brick wall (assumed is Cavity) with timber frames an single glazed windows – Garage is single solid brick wall and the roof is timber frame with felted finishes. One brick chimney and one metal flute on site.



Condition: The property is of age where lead paint could have been used.

Brick Store



Condition: Not in good condition large crack observed

Garage



Chimney



Condition: Main chimney has some frost damage

Metal flue pipe



Condition: Flashings around the flue are basic and could be prone to seepage.



Frame & Roof structure: The pitched roof frame is made from softwood. There is some load bearing wall which has been removed to create a large drawing room.



Condition: Poor condition with localised leaks



Condition: Poor condition with regular patching to stop water intrusion



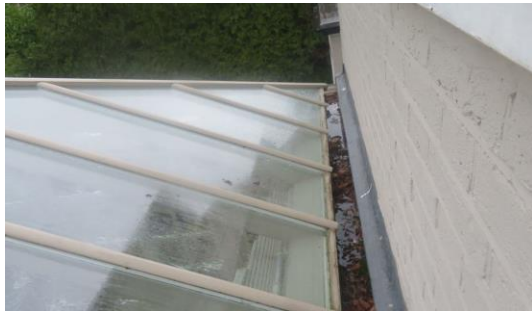
MEP Service : All services will need to be removed and are assumed to be recycled, the building uses an abnormal amount of energy to heat and cool, evident by the EPC rating. Plastic cabling is used instead of more modern metal products and wiring appears to be convoluted. It is also believed cast iron distribution pipework is used which would have to undergo a degree of re-plumbing if they were to be retained.



Other – Conservatory : The conservatory consists of **uninsulated** brick wall (assumed is Cavity) with hardwood timber frames and double glazed windows. Tiling is used as flooring however there has been noticeable large cracks on certain tiles. The roof would have to undergo patching to stop rain penetration.



Condition: Floor tiling is quite bad with cracking.



Condition: Average quality however patching would have to be done if the roof was retained.

Hard landscaping: The garden contains a large amount of hard landscaping with several deficiencies such as cracking.



Condition: Adequate patio tiling but some minor cracks

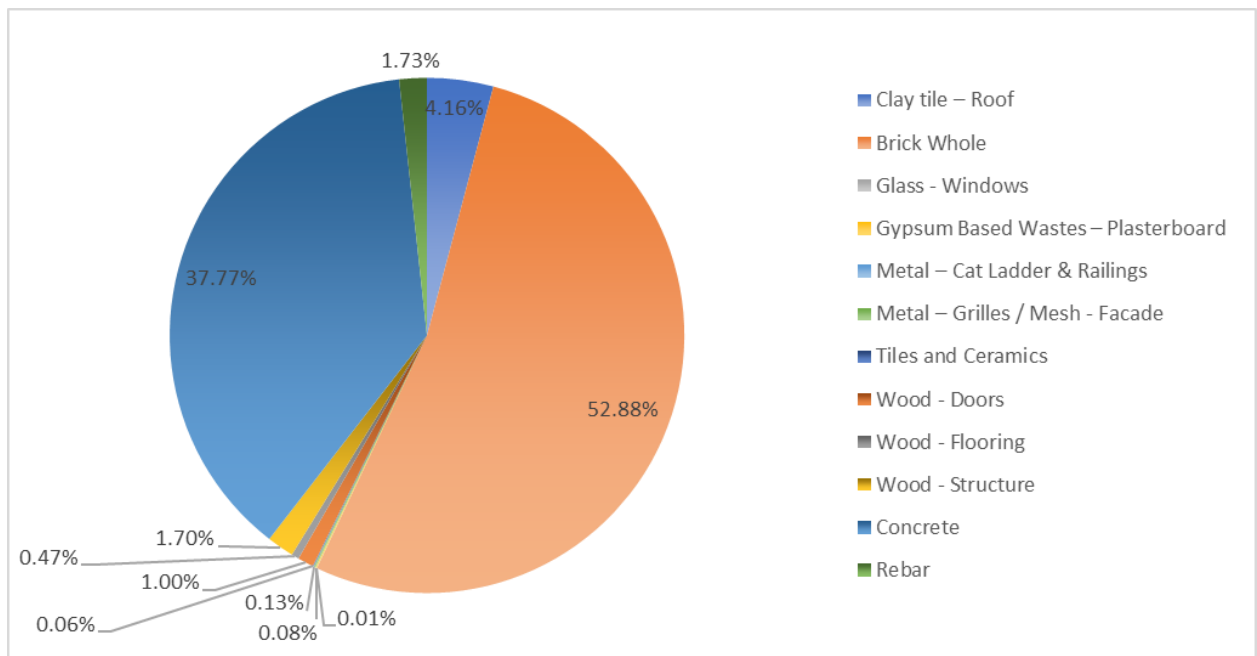


Condition: A large and noticeable crack that goes down the middle of the boundary wall.

2.1.2. Summary of Quantities

The following table summarises, by weight and volume, the quantities of materials identified within the building. Please refer to the Demolition Audit for a detailed breakdown of these materials.

	m3	Tonnes	
	Existing Building		
Existing Materials	Volume	Weight	Percent by Weight
Clay tile – Roof	6.58	10.53	4.16%
Brick Whole	69.60	133.77	52.88%
Glass - Windows		0.03	0.01%
Gypsum Based Wastes – Plasterboard	0.26	0.21	0.08%
Metal – Cat Ladder & Railings	1.00		
Metal – Grilles / Mesh - Facade	16.72	0.33	0.13%
Tiles and Ceramics	0.4	0.15	0.06%
Wood - Doors	55	2.53	1.00%
Wood - Flooring	1.7	1.2	0.47%
Wood - Structure		4.3	1.70%
Concrete	39.8	95.54	37.77%
Rebar		4.38	1.73%
		252.97	



2.1.3. Further discussion of retaining, refurbishing

❑ Reuse the in-situ brick façade and timber roof which could be re-used – UNLIKELY

The main existing brick walls (assuming cavity) incorporate wall ties that can corrode creating an external horizontal cracking, the new external walls will integrate cavity walls with a brick external layer lined with either multicoat plaster or metal studs with two layers of plasterboard. The new brick façade will achieve a 0.14 U-value. The roofing on the existing building has seen water intrusion with repairs and patching occurring, the proposed roof is set to include numerous materials from insulation, breather membranes, battens and plasterboard. In the last survey it was also observed that the some roof tiles were damaged and slipping away, It does state all re-useable tiles salvageable from demolition can be re-used in areas of new construction.

Further to the above, this project aims to deliver modern high-quality residence. The full refurbishment will lead to lack of amenity space for the clients and their families because it won't be able to construct basement. This will loss a large part of the amenity space and reduce the garden area to allocate the amenity space on ground floor level with extension.

- ❑ **Potential for reuse and substantial refurbishment – NO**, it is considered that any minor positive contribution made by the existing building will be significantly outweighed by the benefits presented by the proposed development which will be more sustainable, higher quality, and have a local distinctive design which help to improve the articulation of the current building. The conclusion is that a full replacement rather than re-using or refurbishing the existing building will allow more efficient, sustainable and overall, a more high-quality build which falls in line with previous work along Sheldon Avenue and by the local council.

The Design Team have considered the option of partial retain and refurbishment, however, there are limitation and drawbacks as follows(Referred to the document “23002_41 Sheldon Avenue Planning Response_”):

- ❑ The retained front façade well possibility cause worse linear thermal bridges value and u value when connecting to the new façade. The u-value and air tightness will improve but won't be new build standard. Moreover, this measure reduces the internal floor area due to the extra thickness of the insulation and plasterboard finishes added on top of the existing 350mm solid brick wall.
- ❑ Low floor to ceiling level which is lower than 2.5m (London Plan suggested height), retained the front façade also limit the main entry floor to ceiling height to 2.1m. – not appropriate to the modern standard.
- ❑ To retain the Front façade will require additional structure (temporary) to support before it can be connected to the new structure. (Please see section 3.1.1 of the WLC report for the result of this option which shows a higher carbon impact than full demolition option)
 - Additional piles
 - Cantilevered concrete slab



- Steel restraint structure
- ❑ Retain the front façade also reduce the opportunity of reusing the brick on site due to the front façade is the major source of the brick can be reuse because the brick on the back façade is painted and the side façade have different type of brick as reported by the architect.
- ❑ Retaining the facade restricts access to the rear of the existing building which will extent the programme and increase the difficulty for the demolition and construction of the basement.
- ❑ It would be difficult to retain the bay window of the front façade, will most likely need to be replace which also reduce the actual area can be retained and need new steel frame.
- ❑ There is some non-original brick on the front façade which will need to be replaced to match the retained façade. (further reduce the retainable area, diagram shown in the following page)
- ❑ The room size will be limited due to the Bay window which need to be centred along the room.



Facade to be retained - after demolition, image by MWA



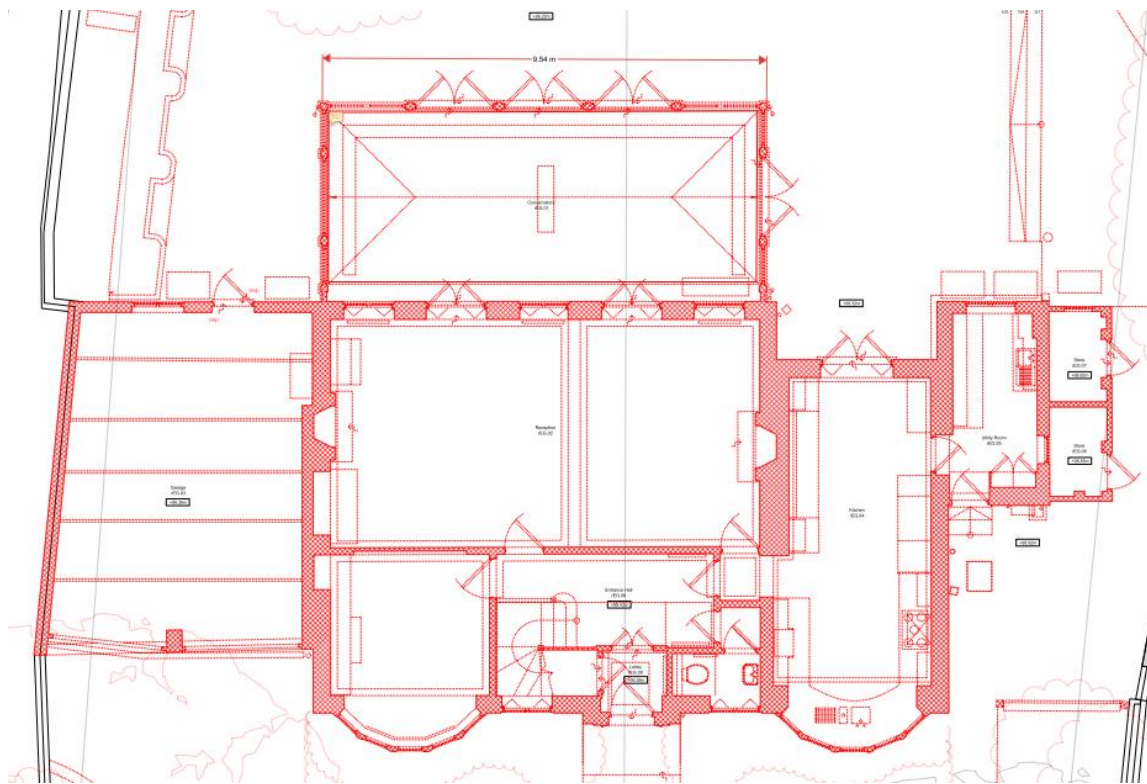
3. Demolished Elements

The following sections describe the parts of the site that are to be demolished or stripped out. Justifying the purpose and quantities of the elements, which are being removed.

3.1. Main building

All of the main building is being demolished.

The existing roof, all existing walls, structural elements, and conservatory will be removed and replaced in steel frame, insulated brick wall, and high insulated window (double glazed) to suite the new building regulation and build a more energy efficient dwelling.



- ❑ **Frame:** All of the existing frames will be demolished, which included load bearing brick wall, timber floor slab and timber roof. The brick in good condition will be re-use on site.
- ❑ **Facade:** All of the façade elements will be demolished, which included uninsulated Cavity brick wall, solid brick wall, wooden frame single glazed window. The brick in good condition will be re-use on site.
- ❑ **Service:** All of the services to be removed and recycled.

Note: Please see the detail information for demolition and recycled measures in demolition audit.



3.2. Hard Landscaping

The boundary walls of the property are in desperate need of repair which a major crack down the middle of the main boundary wall. The patio tiles are in adequate condition however minor cracks are beginning to form. The existing hard landscaping should therefore not be retained or re-used.



- ☐ **Conservatory:** All of the existing conservatory will be demolished, which includes timber frame double glazed windows, tiling and roof.
- ☐ **Garage and Brick Store:** All of the elements will be demolished, which included uninsulated brick wall, wooden frame roof and felt finishes.
- ☐ **Front Garden Wall:** All of the wall to be removed and possibly re-used.

3.3. Total Area & Volumes demolished – Whole Building

The following schedule sets out all the data calculated into a single schedule which represents all of the materials that currently existing on the site.

	m3 Tonnes		
	Existing Building		
Existing Materials	Volume	Weight	Percent by Weight
Clay tile – Roof	6.58	10.53	4.16%
Brick Whole	69.60	133.77	52.88%
Glass - Windows		0.03	0.01%
Gypsum Based Wastes – Plasterboard	0.26	0.21	0.08%
Metal – Cat Ladder & Railings	1.00		
Metal – Grilles / Mesh - Facade	16.72	0.33	0.13%
Tiles and Ceramics	0.4	0.15	0.06%
Wood - Doors	55	2.53	1.00%
Wood - Flooring	1.7	1.2	0.47%
Wood - Structure		4.3	1.70%
Concrete	39.8	95.54	37.77%
Rebar		4.38	1.73%
		252.97	

	m3 Tonnes		
	Demolished / Removed		
	Volume	Weight	Percent by Weight
	6.58	10.53	100%
	69.60	133.77	100%
		0.03	100%
	0.26	0.21	100%
	1.00		100%
	16.72	0.33	100%
	0.4	0.15	100%
	55	2.53	100%
	1.7	1.2	100%
		4.3	100%
	39.8	95.54	100%
		4.38	100%
		252.97	

4. Conclusions

Following the hierarchy within the GLA Circular Economy we have determined that the design approach of **Demolish and Recycle** should be followed.

Demolish and Recycle

Traditional demolition, with elements and materials processed into new elements, materials and objects for use on the site or on another site.

- ❑ **Structure(frame), superstructure:** The existing wall and façade would reduce the flexibility in arrangements for new layout (The bay window location limited the room size, sue to the bay need to be the centre of the room) and the floor to ceiling height (less than 2.5m). Moreover, the roof is not in a good condition with leaking issue. The timber frame would need to be demolished and recycled while the brick can be reused on site if in good condition or they should be recycled.
- ❑ **Skin /shell e.g. façade:** The quality of the existing façade is sub-standard for a dwelling building; the single glazed glass means high energy output during winter/cold months. Uninsulated brick cavity walls also drive the energy output of the building alongside the single glazed windows. All of the brick should be reused on site if they are in good condition, or they should be recycled and replace with new facade of u-value 0.14. The timber frame windows are expected to be removed and recycled and replace by well insulated double glazed window unit.
- ❑ **Space / plan / interior / interior space:** All the internal wall and finishes would need to be demolished and recycled.
- ❑ **Services (building):** Current plant provision results in an inefficient building in terms of energy use. This means a high rate of operational carbon per m² per year continues to be emitted which is evident by the buildings low EPC rating. All the service are expected to be recycled and replace with high efficient equipment.
- ❑ **Stuff / content:** The existing fitting and furnishings to the dwelling are all expected to be removed and recycled and replaced by new finishes, fittings and joinery throughout the building.



The following sheets are extracts from the calculations which are included within the accompanying Demolition Audit.

[illegible]

41 Sheldon Avenue		✓			✓		✓		✓		5th June 2024	Rev	-	
List of waste identified on site and estimated to be generated during the project														
Waste Type	EWC Code	Produced	Re-use on site?	Re-use %	Reclaim for re-use	Reclaim for re-use %	Recycle / reprocess	Recycle %	Safe Disposal	Landfill	Landfill %	Estimate Quantity	Units	Comments / Describe how reduced, reused, recycled
Insulation (Other)	17.06.04	✓					✓	100%				unknown		TBC
LED Lighting - containing POPs and hazardous substances	16-02-13*	✓							✓	100%		unknown		Various light fittings
LED Lighting - containing NO hazardous substances	16-02-14	✓					✓	100%				unknown		Various light fittings
Mattresses, furniture and other bulky household items	20.03.07	✓					✓	100%				unknown		Assumed to be removed by client
Metal - Posts & Bollards	17.04.07													
Metal - Car Ladder and Railings	17.04.07	✓					✓	100%				1.00	No	External railing located on the South Side
Metal - Barriers - Armco	17.04.07													
Metal - Façade panel	17.04.07													
Metal - Grilles / mesh - Internal	17.04.07													
Metal - Rebar	17.04.07													
Metal - Steel Framing - Façade	17.04.07													
Metal - Grilles / mesh - Façade	17.04.07	✓					✓	100%				16.72	m2	External metal grilles
Metal - Window Frames	17.04.07													
Metal frames to Ceilings and Partitions - Steel	17.04.07													
Metal - Radiators	17.04.07	✓					✓	100%				unknown		TBC
Mixed demolition and construction wastes	17.09.04	✓					✓	100%				unknown		TBC
Mixtures of concrete, bricks, tiles and ceramics	17.01.07	✓					✓	100%				unknown		TBC
Other (specify) - Payment Machines & Gates	VEEE - POP?*													
Other (specify) - EV Chargers	VEEE - POP?*													
Other (Specify)														
Paper	20.01.01													
Plastic	17.02.03	✓					✓	100%				Unknown		Plastic guttering and cables
Refrigerators and air/con equipment	16.02.11*	✓					✓	100%				Unknown		AC for conservatory
Stone Slabs / Stone Facades	17.05.04													
Services - AC Indoor Unit	20.01.23*													
Services - AC Outdoor Unit	20.01.23*													
Services - AC Outdoor Unit	20.01.23*													
Tiles and ceramics	17.01.03	✓					✓	100%				0.4	m3	Assumed kitchen, bathrooms, en-suite and conservatory are all ceramic till
Tiles, ceramics, etc. containing dangerous substances	17.01.06													
Wood - External Decking, Benches, etc	17.02.01											Unknown		TBC
Wood - Doors	17.02.01	✓					✓	100%				55	No.	Wooden doors
Wood - Flooring	17.02.01	✓					✓	100%				1.7	m3	Assumed bedrooms, hallways, office, reception and lobby all as wood tiling
Wood - Structure	17.02.01	✓					✓	100%				4.3	Tonnes	Assumed 800mm between each joist and 400mm between each batten