Residential

Commercial

Retail

Conservation

Project Number:	2018-059
Address:	58a Redington Road, London, NW3 7RS
Client:	D Belov & G McDougal
Title:	Structural Report on Proposed Demolition.
Date:	14th March 2018.
Revision:	01

Structural Report on the Existing House: 58A Redington Road, London, NW3 7RS

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Preamble:

This report has been prepared by Elite Designers on the instruction of TAG Architects, acting on behalf of the clients and is for the sole use and benefit of the clients.

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Terms of Reference:

Elite Designers were appointed by the clients to prepare a Structural Demolition Report in support of a planning application for the proposed works at 58a Redington Road, London, NW3 7RS.

This report has been prepared by:

B Huxtable CEng, MIStructE MICE

General.

The property comprises a semi-detached family house on three floors: Basement, Ground and First floors. It has previously been extended to the rear on three levels, and also with a subterranean extension to the front.

The house is significantly narrower that the adjoining property.

The ground levels fall to the rear, with a slight fall across the width of the house.

Policy CC1 : Climate Change Mitigation.

'Camden Local Plan 2017, section 8: Sustainability and Climate Change' requires measures to be used to mitigate against climate change, as stated in Policy CC1. This requires the production of CO2 from both the building in use, and from the use of materials in the building fabric, to be considered and be minimised.

The existing building has solid masonry walls with no insulation. The basement extension to the front has no internal insulated linings to either the walls or the soffit of the roof slab. It is not expected to have external insulation to the walls, but may have limited rigid insulation on top of the roof slab.

The r.c. 'balcony' slabs of the rear extension extend with no thermal breaks, thus creating significant 'cold bridges' across the full width, at three levels. The floor slabs are built into the solid masonry flank walls, so will also act as 'cold bridges' for the full length of both sides.

The need to extensively re-model the house would not only eliminate these energy-wasteful shortfalls, but also provide excellent opportunities to introduce well-insulated walls, windows, roofs and ground floor slabs. These issues are covered in more detail in reports by others.

Policy CC1 requires that the proposed demolitions are necessary as the existing building cannot be retained and improved. This has been demonstrated in the body of this report. Clauses 8.15 to 8.18 require that a minimum of 85% of the demolition materials are diverted from the waste stream, and comply with the Institution of Civil Engineer's Demolition Protocol. In addition, the redevelopment is to minimise the materials used; and use materials with low embodied energy.

Appendix B addresses the ICE Demolition Protocol, and an audit of the main materials produced in the demolition.

The replacement house would be designed to modern standards to comply with the Building Regulations, using efficient design methods. For example, to minimise the cement content in aggregate blocks, the minimum required strength of blocks would be specified to carry the loads appropriate at each storey. Similarly, reinforced concrete would be designed and specified to make best use of the reinforcement, and by proportioning the concrete member sizes such that an optimum steel content is achieved where-ever possible.

Existing Constructions.

The original house comprised load-bearing masonry external walls, with timber-joisted floors supported on internal and external load-bearing walls. The internal walls have since been significantly altered and replaced with beams and columns. The roof is pitched, with timber rafters supported at mid-storey height, creating coombed ceilings to the first floor. The walls and stairwell have also been altered significantly.

The rear extension comprises reinforced concrete (r.c.) slabs at each level, with r.c. balconies projecting to the rear. The slabs are supported on thick, solid masonry walls. These walls appear to have little or no insulation. Lateral stability of the rear extension appears to rely on the main house's rear façade only. It has a flat roof with low parapet walls.

The existing rear extension flat roof appears to have no significant depth of insulation.

An enclosed front entrance 'porch' has been added to the house, with an r.c. roof slab which bears on masonry walls, and is exposed to view.

The front basement extension comprises r.c. slabs and walls. The basement floor level is lower than that of the house.

The floor levels in the rear extension also do not match those of the original house, and create floors at Ground, Basement, and sub-basement levels. This latter faces onto the rear garden, taking advantage of the general slope in the ground. The slab soffits are exposed within each storey, with floor-to-ceiling heights as low as 2.4m.

The rear facades have wide picture windows in the rear extension, and French windows in the original rear façade at First floor level.

There are a number of secondary staircases, as well as the principle one in the main house. These are all very narrow, to maximise the adjacent room dimension (given the limits of the existing house).

Existing Layouts.

The floor layouts have created a series of interconnected spaces on multiple levels, with vertical circulation requiring multiple narrow stair wells. Circulation spaces are very narrow. The main stairs leading from the entrance hallway is located very close to the entrance door, and is also very narrow.

The level of the rear extension flat roof is very close to that of the cill to the French windows at First floor level. There appears to be minimal falls on the roof finishes, resulting in ponding of rainwater.

The rear extension and altered rear section of the original house are wider than the original house, thus providing more useable rooms.

Proposed Works.

To make the house fit for the required purpose, it would need to be subjected to substantial alterations to eliminate the in-efficient and un-suitable, multiple floor levels; to create reasonable floor-to-ceiling heights; to create viable vertical circulation; and to create usable circulation spaces. Therefore, significant alterations to the floor plates (timber joisted, and especially the r.c. slabs) would be required. This would also require alterations to windows in facades, etc.

It is proposed to provide acceptable circulation and stairwell widths without compromising room dimensions, by matching the width of the house to that of the rear extension. This would require the flank wall of the house to be taken down and be re-built off new foundations.

It is also proposed to eliminate the significant cold bridges due to the projecting r.c. balconies and canopies, to the rear and to the front.

Alterations to the front façade fenestration (to suit the new internal room and stairwell layouts), would be required.

Impediments to Alterations.

Removal of the rear extension slabs would leave two free-standing flank walls that would require significant alterations to suit new floor constructions. The condition of the walls is not known, but cutting into the walls for beam bearings, and more importantly for the removal of the embedded slab edges, would disturb the brittle cement-mortared brickwork.

The main house has many openings in load-bearing internal walls, and there would be a requirement to significantly alter these previous interventions. Therefore, there would be very little fabric that would not be disturbed.

The small principle stairwell would need to be infilled, and a new stairwell created. This latter would cut through floor joists, and require local strengthening. Local strengthening would be required throughout, to suit altered partition wall locations. Therefore, there would be little of the floors that would not be disturbed.

Infilling of front façade windows, and the creation of re-located windows, would leave little of the masonry un-touched. It would also be very difficult to truly match new brickwork to the existing. Therefore, reconstruction would be more viable.

Proposed Demolitions.

Rather than having to use extensive temporary works propping, to allow the extent of the un-avoidable alterations to be made, it would be more efficient and thus preferable to take down and re-build not only the rear extension but also the main house's flank wall and front facade. The materials that would be removed from the site would include concrete, reinforcing steel, and brickwork (with cement mortar). Timber floor finishes and plaster wall finishes would also be removed. This would also apply to the front entrance 'porch'.

The extent of the necessary works to the internal walls and floors of the house would suggest that it would be more efficient to replace these completely.

The flank wall of the house would be taken down and re-built, to allow the house to be constructed to a more reasonable width, as noted above.

The front façade would be taken down and be re-built to suit the increased width and new fenestration arrangements.

It would be viable to carry out all demolitions using hand-held power tools, except for the r.c. slabs which would require a combination of diamond sawing and hand-held power tools. Demolition arisings would be transferred into skips located in the front driveway, over the front subterranean extension. The roof slab of this extension would need to be back-propped for the loads from skip lorries and loaded skips.

Materials Processing and Re-Cycling.

It would be viable to remove plaster finishes from walls by hand, and to segregate this waste from other materials.

It would be viable to remove timber floor finishes and to segregate this for re-cycling or for energy production. Timber studs and joists can also be segregated for re-cycling or for energy production.

Reinforced concrete slabs would need to be cut up on site, for removal to an off-site re-cycling facility. Reinforcing steel would be liberated by crushing of the concrete. Crushed concrete may be used as a construction material, in new concrete, for example. Reinforcement can be re-cycled into new structural steel, etc.

The brickwork of the flank walls could be segregated and removed from site for processing, by crushing, for use in construction materials, for example in hard-core to DoT Specifications.

For works to the main house, plaster-boarded ceilings and partition walls can be segregated as a waste material from other materials.

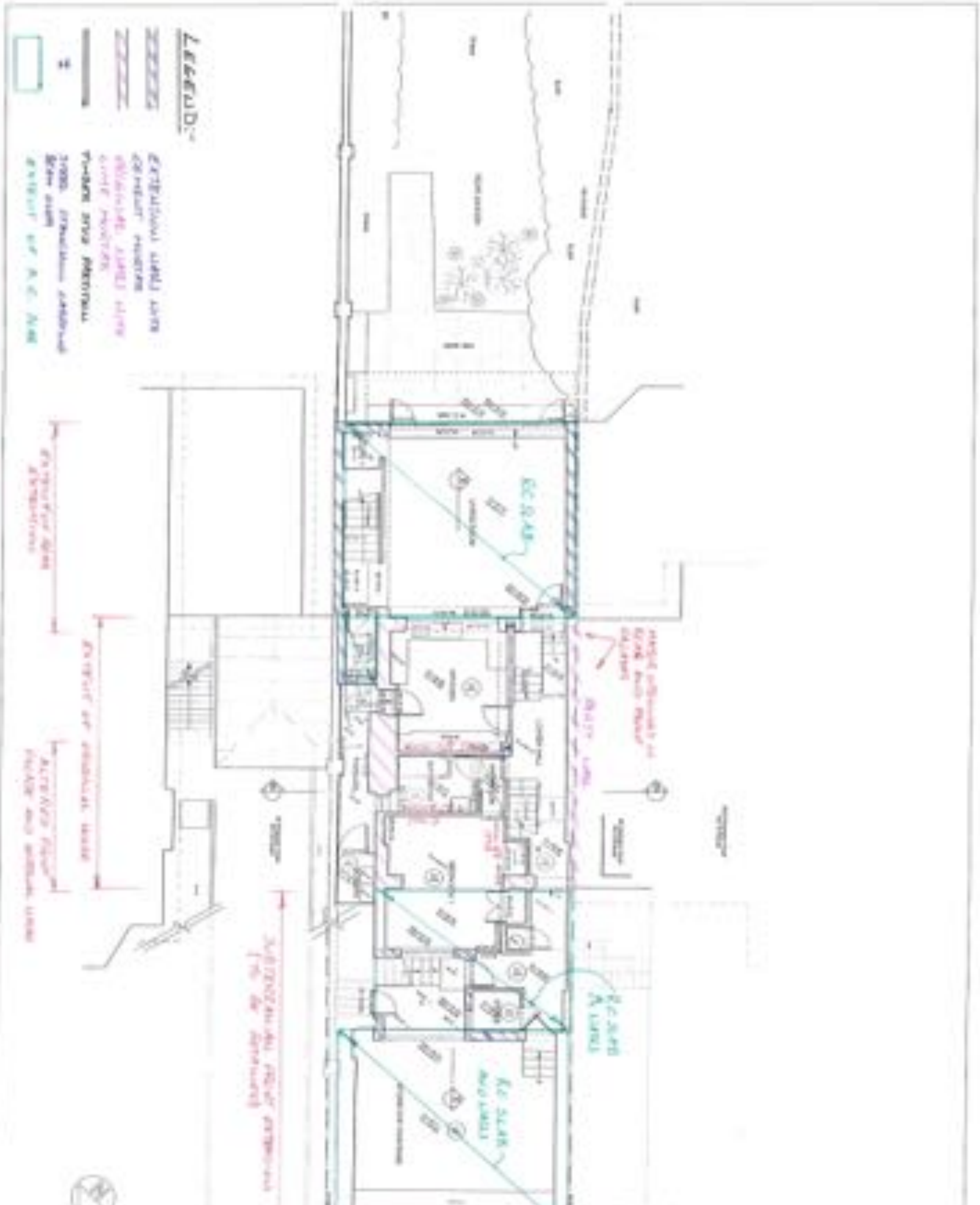
New Constructions.

New walls, floors and roofs would be designed and specified to comply with current Building Regulations standards, using new matching materials, or bricks recovered from the demolitions. Walls would be of cavity construction. Floors and roofs would be of timber construction. Cavity walls would require significantly less fired clay brickwork than solid walls (less embodied energy), and load-bearing blockwork would be designed to minimise the wall thickness and (by only specifying the required strength at each storey) the cement content would be minimised (and thus the embodied energy).

Efficient design would limit the quantities of materials required, whilst providing a more flexible use of the internal spaces of the property. This would therefore enhance the house’s ongoing future use and possible alterations by new owners. All structural materials could be re-cycled at the end of life of the building.

Appendix A

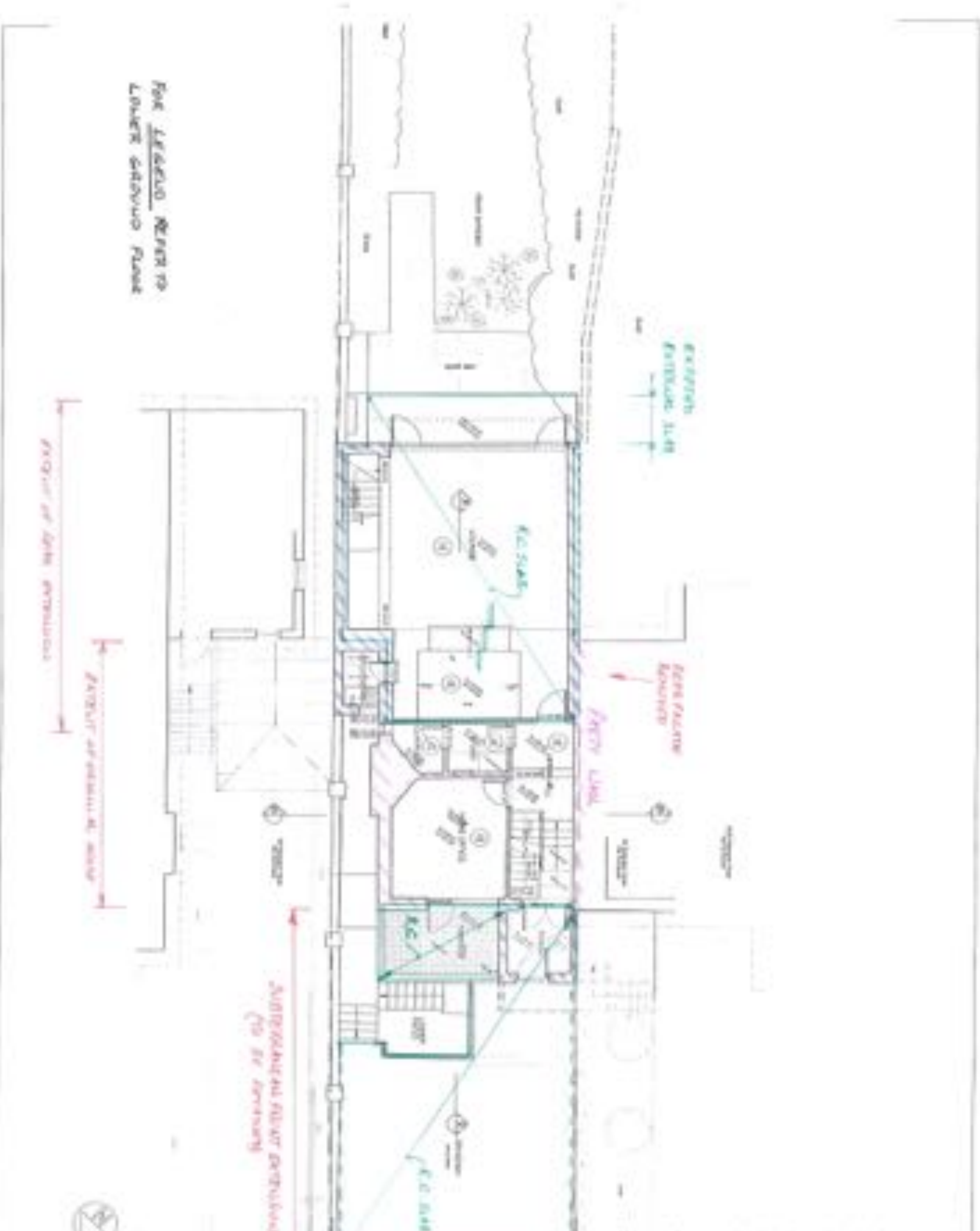
Annotated Plans 'As Existing'



Measured survey drawings based on the CadMap Ltd.

PRELIMINARY

LOWER GROUND FLOOR PLAN - EXIST	TAG	07.17	1:100 @A3
58A REDINGTON ROAD		150	503
MR DANIEL BELOV			



Measured survey drawings based on the CadMap Ltd.

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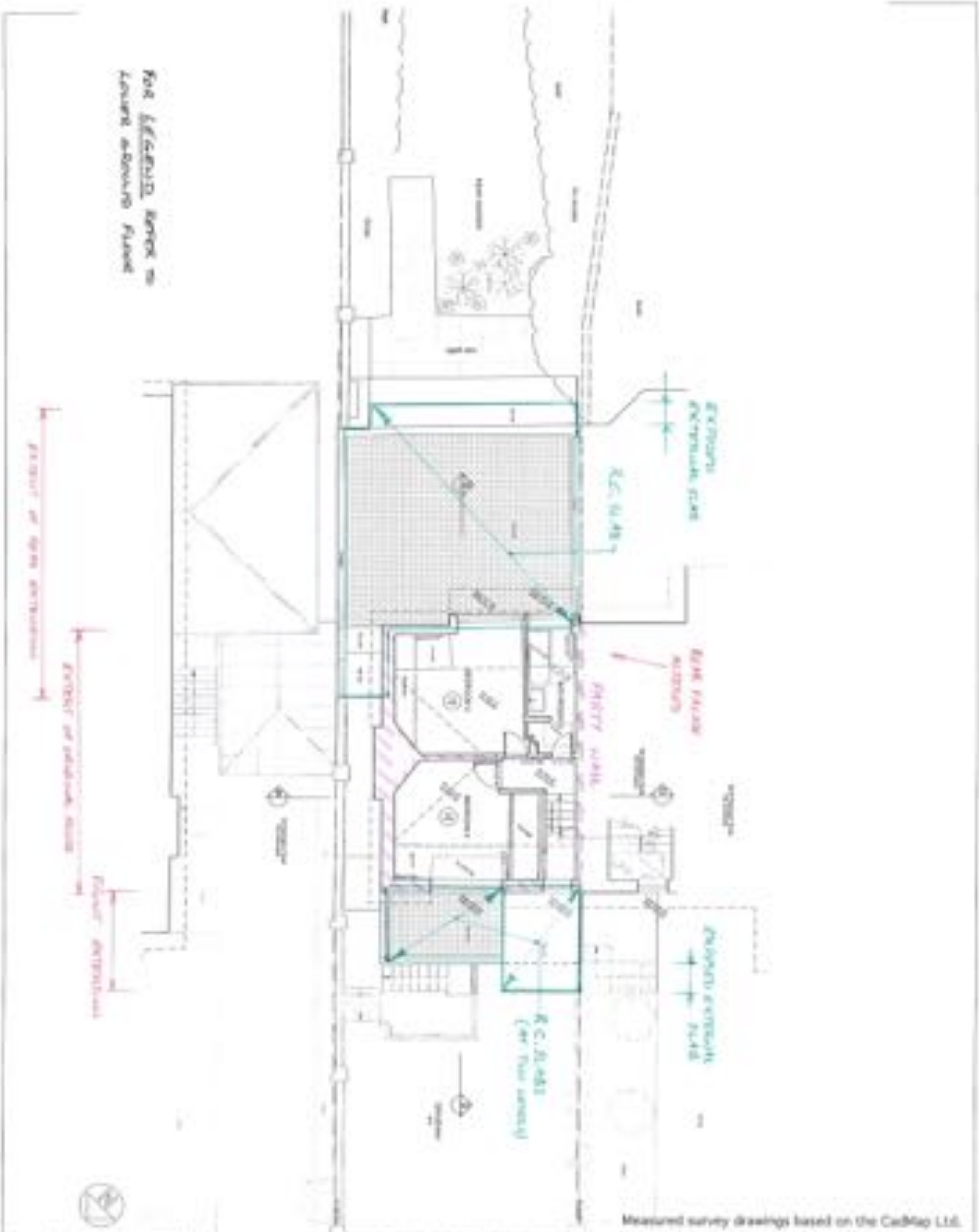
PRELIMINARY	UPPER GROUND FLOOR PLAN : EXIST.	TAG	07.17 / 1:100 @A3
	58A REDINGTON ROAD		150 / S04
	MR DANIEL BELOV		



Measured survey drawings based on the CadMap Ltd.

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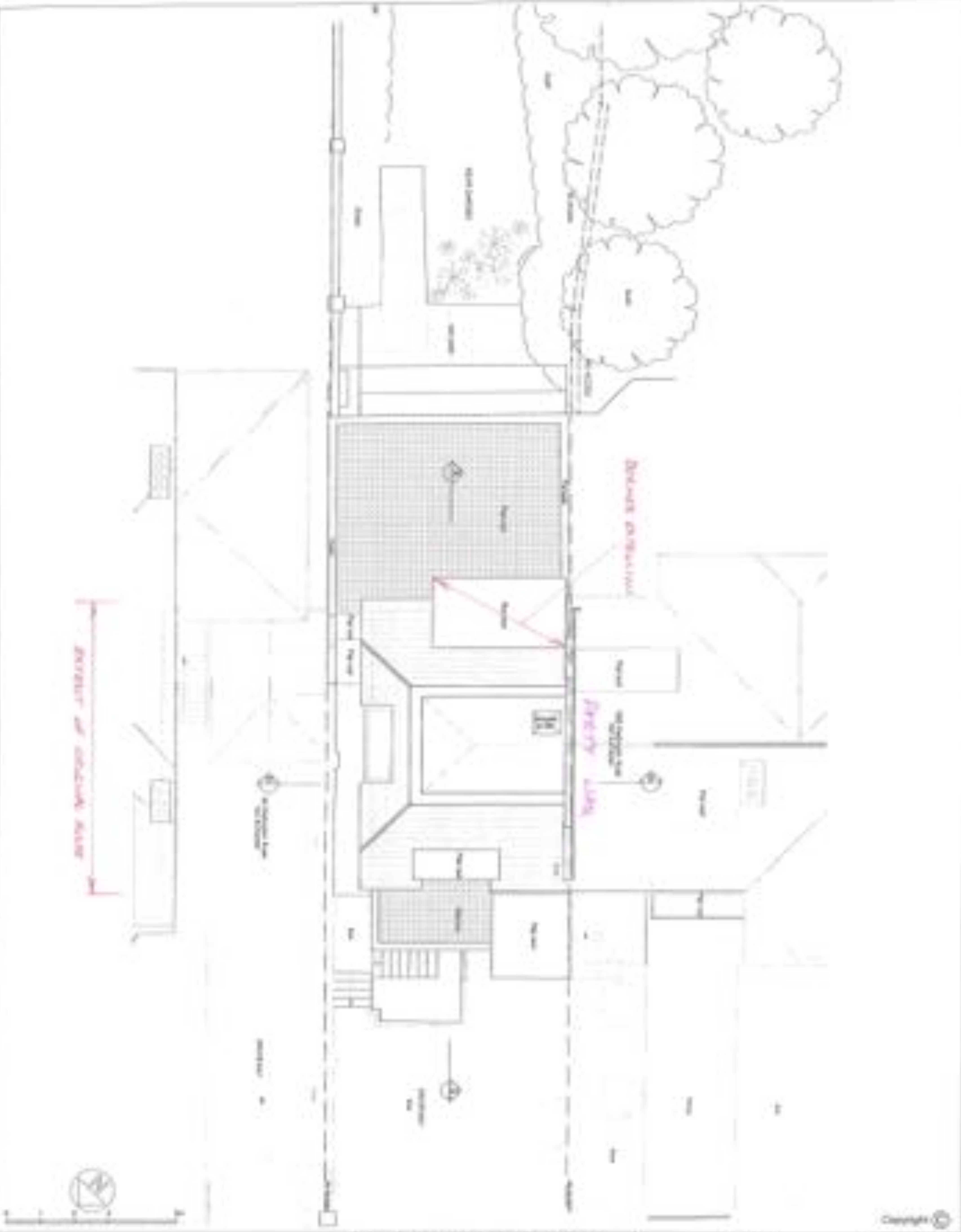
PRELIMINARY

FIRST FLOOR PLAN - EXIST.	TAG	07.17	1:100 @A3
58A REDINGTON ROAD		150	S05
MR DANIEL BELOV			



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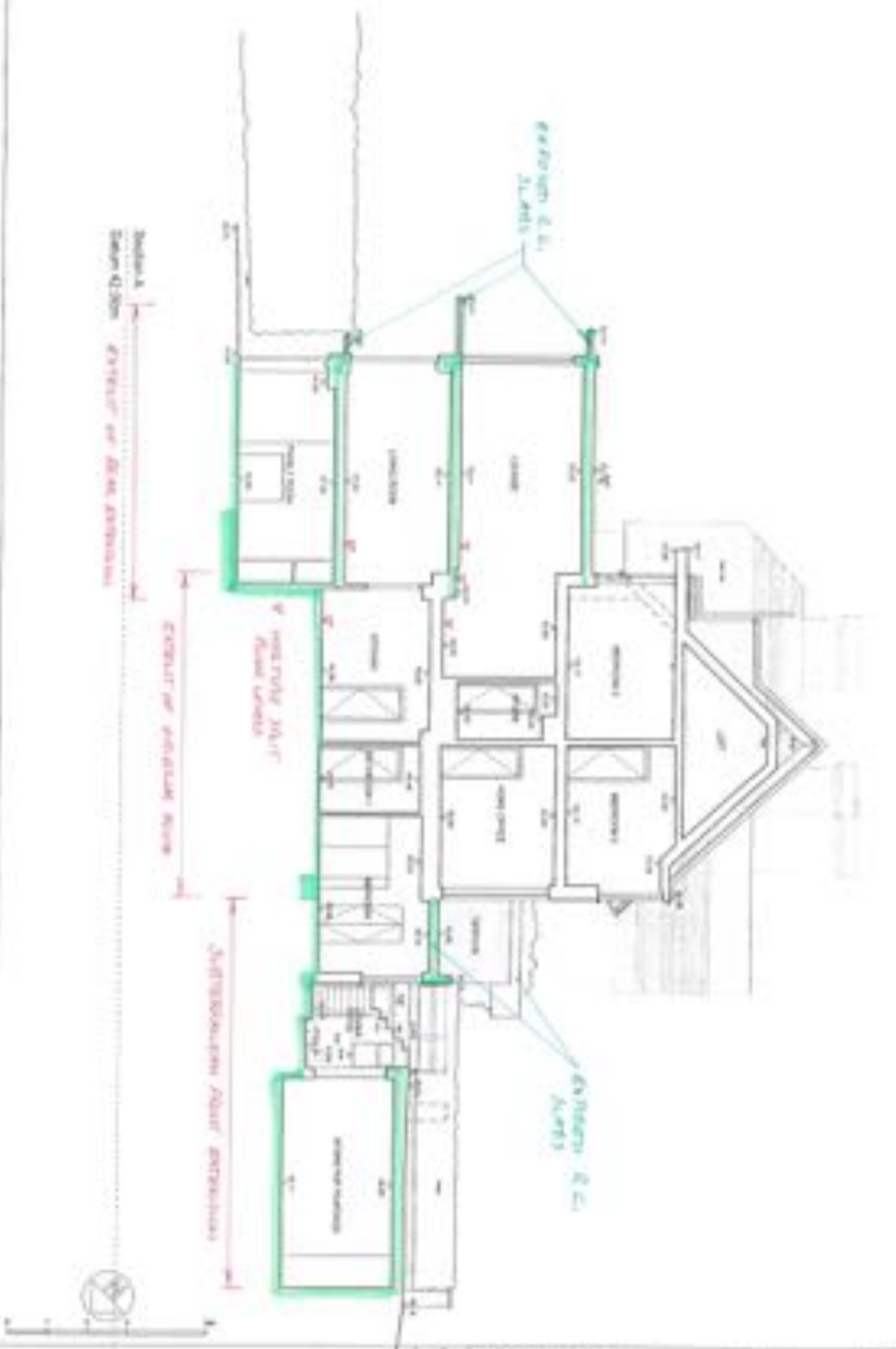
PRELIMINARY	ATTIC FLOOR PLAN - EXIST. 58A REDINGTON ROAD MR DANIEL BELOV	TAG

07.17	1:100 @A3
157	S06



PRELIMINARY

Drawing	SECTION A-A - EXIST
Project	58A REDINGTON ROAD
Client	MR DANIEL BELOV

TAG

Date	Scale
07.17	1:100 @A3
Job	Drawing
157	S08

Appendix B

Demolition Protocol.

The Institution of Civil Engineer's Demolition Protocol requires consideration be given, and priorities to be applied, such that waste is minimised. A waste hierarchy is defined, thus:-

Buildings and Infrastructure:

- Re-Use: The front subterranean extension and Party Wall would be re-used. The former would be up-graded *in situ.*

- De-Construct: The roof tiles could be removed for re-use, and could be stored on site to minimise transportation.

- Demolish: The following would require to be demolished and removed from site:
  - Timber roof, stud partitions and floor structures.
  - Internal block and ½-brick walls.
  - Steel beams and stanchions.
  - R.C. floor and roof slabs.
  - Solid brickwork rear, flank and front facades.

Materials and Components:

- Re-Use *in Situ*:
  - Roof tiles.

- Re-Claim:
  - Bricks from lime mortar-bonded masonry (original walls). These would be taken off site for cleaning by hand, and some may be able to be re-used in the new cavity walls.
  - Timber floor boards (if any).

- Re-Use *ex-Situ*:
  - The owner has not secondary project at another site, therefore no materials could be re-used ex-situ.

- Re-Cycle / Recover.
  - Brickwork from the rear extension are anticipated to be bonded in cement mortar, therefore the bricks would not be possible to re-claim. Therefore, the masonry could be recycled into crushed hard-core, being processed of site.

- Concrete from r.c. slabs could be recycled for use in ready-mixed concrete, being processed off site. It could also be used in road-base materials, for granular fill, etc.
- Steel form beams and from reinforcement could all be re-cycled into new steel, being processed off site.
- Plasterboard form ceilings and from stud partitions could all be re-cycled, being processed off site.
- Timber from joists, studs and rafters could all be recovered for the production of energy, or other uses.

- Land Fill:
  - Asphalt from flat roofs would be segregated, and sent to land fill.
  - Plaster finishes from masonry walls could be removed from the wall *in situ*, then sent to land fill, prior to the walls being taken down.

Appendix C

Demolition Materials Quantities Assessment

An audit of the weights of the main construction materials has been carried out (see following pages), and the percentages of the materials that could be re-cycled are as follows:

- Materials Re-Used and Re-Cycled: 241 tonnes (96%), of which, 5.1 tonnes re-used *in situ*.
- Materials to waste: 9.2 tonnes (3.6%).

calculation sheet	page no. 01	project no. 2018-049
project 58A REDINGTON ROAD NW3	by [signature]	checked.
section APPENDIX 'B':- DEMOLITION MATERIALS: ASSESSED QUANTITIES.	date 5/3/2018	date

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REAR EXTENSION.

Roof & Floors: Area ≑ 6×7 = 42m² at roof
& ≑ 6×7 = 42m² at ground and basement levels (not including canopies).
& ≑ 42m² at sub-basement levels.

Roof:

Materials : asphalt 42m² × 0.02m × 600kg/m³ ⇒ 504 kg
screed 42m² × 0.05m × 2400 ⇒ 5040
r.c. slab 42m² × 0.175m × 2400 ⇒ 17,640

Σ = 23.2 tonnes

Ground Floor:

timber boards & battens 42m² × 0.02 × 500 ⇒ 420 kg
r.c. slab 42m² × 0.2 × 2400 ⇒ 20,160

Σ = 20.6 tonnes

Basement Floor: As Ground 20.6 tonnes

Sub-basement: timber boards & battens, as Gd 420kg
r.c. ground slab 42 × 0.15 × 2400 15,120

Σ = 15.5 tonnes

Re-Cycled Materials:-

Timber 3 × 420kg ⇒ 1260kg
Screed 5,040 kg
R.C. (concrete & steel) 73,080 kg
73.4 tonnes

Non-Re-cycled Materials:-

Asphalt 0.5 tonnes

calculation sheet	page no. 02	project no. 2018 - 059
project	by BM	checked
section	date 5/3/2018	date

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Flank & Rear Walls:

Total Length = 5.5 + 5.5 + 1.2 = 12.2 m
Height = 9.0 m
Thickness = 0.325 m

⇒ Σ Area = 109.8 m²

Σ Volume = 35.7 m³

Materials:

Plaster 109.8 × 0.02 × 1000 kg/m³ ⇒ 2196 kg

Brickwork 35.7 × 2000 kg/m³ ⇒ 71,400 kg

Σ = 73.6 tonnes

Re-cycled Materials :-
Masonry 71.4 tonnes

Non- Re-cycled Materials :-
Plaster 0.2 tonnes

Rear Extension Summary:-

Total for materials to waste stream = 0.5 + 0.2 = 0.7 tonnes.

Total for materials to be re-cycled = 79.4 + 71.4 = 150.8 tonnes

∴ Percentage Re-cycled = (150.8 / (150.8 + 0.7)) × 100/1

= 99.5 %

calculation sheet	page no. 03	project no. 2018-053
project	by TB	checked
section	date 5/3/2018	date

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MAIN HOUSE.

Roof:-

Area on plan ≑ 6 × 8.7 = 52.2 m² on plan
× 1.4
≑ 73.1 m² on slopes

Materials:-

clay tiles 73.1 × 70 kg/m² ⇒ 5,116 kg
rafters & battens 73.1 × 12 kg/m² ⇒ 877 kg
plasterboard 73.1 × 15 kg/m² ⇒ 1,096 kg

First Floor:-

Area ≑ 5.4 × 7.3 m = 39.4 m²

Materials:-

timber boards 39.4 × 0.02 × 500 kg/m³ ⇒ 394 kg
joists 39.4 0.05 × 25 × 0.2 × 500 ⇒ 493 kg
plasterboard 39.4 × 15 ⇒ 591 kg

Ground Floor:-

As First Floor

Basement Floor:- 39.4 m²

Materials:

timber boards & battens 39.4 × 0.02 × 500 ⇒ 394 kg
r.c. ground slab 39.4 × 0.15 × 2400 ⇒ 14,184 kg.

Internal Walls:

PTO

calculation sheet	page no. 04	project no. 2018-053
project	by TKH	checked
section	date 5/3/2018	date

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__Internal Walls:-__

First floor total length = 7.8 + 4.6 + 0.7 + 1.2 = 14.3 m
height = 2.7 m

⇒ Area = 38.6 m² of stud wall

Ground floor total length = 5.3 + 5.2 + 1.5 = 12.0 m
height = 2.8

⇒ Area = 33.6 m² of stud wall

& also 2.7m × 2.8 ⇒ 7.6m² of ½-brick wall

Basement floor total length = 3.6 + 3.3 + 3.6 + 1.7 = 12.2m
height = 2.7m

⇒ Area = 32.9m² of stud wall

& also 3.7m × 2.7m ⇒ 10.0m² of ½-brick wall

Stud Walls:-

Σ Area = 38.6 + 33.6 + 32.9 = 105.1 m²

Materials: plasterboard 105.1 × 2 × 15 kg/m² ⇒ 3,153 kg

timber 105.1 × 0.1 × 0.5 × 2.5 × 500 ⇒ 6,569 kg

½-Brick Walls:-

Σ Area = 7.6 + 10.0 = 17.6m²

Materials: plaster 17.6 × 2 × 0.02 × 1000kg/m³ ⇒ 704 kg

brickwork 17.6 × 0.1 × 2000 ⇒ 3,520 kg

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section	date 5/3/2018	date

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Re-Cycled Materials :-

Timber: 877 + 394 + 394 + 394 + 493 + 493 + 4569 kg => 7.6 tonnes

R.C. (concrete & steel): 14.2 tonnes

Brickwork: 5.5 tonnes

Σ = 27.3 tonnes

Re-Used Materials :-

Clay tiles 5.1 tonnes

Non - Re-Cycled Materials :-

Plasterboard & Plaster: 1034 + 591 + 591 + 2153 + 1800 kg => 6.1 tonnes

Main House Summary :-

Total for materials to waste = 6.1 tonnes

Total for materials to be re-used = 5.1 tonnes

Total for materials to be re-cycled = 27.3 tonnes

$\therefore$ Percentage Re-cycled $= \frac{32.4}{32.4 + 6.1} \times \frac{100}{1}$

$= 84\%$

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section	date 5/3/2018	date

<u>Main House External Walls:-</u>

Flank Wall: Length ≑ 8.3 m
height ≑ 11.0 m

∴ Area ≑ 91.3 m² → 60 m² of 9"
→ 31.3 m² of 13½"

Front Facade: Length = 6.0 m
height ≑ 8.0 m

∴ Area ≑ 48.0 m² of 9"

Allow for window openings:

(2.5 × 2.0) + (2.5 × 2.0) + (0.5 × 2.0) + (0.7 × 0.8) + (1.1 × 0.8)
+ (0.5 × 1.1) + (2.6 × 2.4)
= 5.0 + 5.0 + 1.0 + 0.6 + 0.9 + 2.6 + 6.2 = 21.1 m²

∴ Nett area of 9" wall ≑ 60 + 48 − 21 = 87 m²

Area of 13½" wall = 31.3 m²

Total = 118.3 m²

Materials:

Plaster: 118.3 × 0.02 × 1000 kg/m³ ⇒ 2,366 kg

Brickwork: 87 × 0.215 × 2000 ⇒ 37,410 kg

31.3 × 0.325 × 2000 ⇒ 20,345 kg

<u>Summary:-</u>

Total for materials to waste = 2.4 tonnes

Total for materials to be re-cycled = 57.8 tonnes

∴ Percentage Re-cycled = $\frac{57.8}{57.8 + 2.4} \times \frac{100}{1}$

= 96 %

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section	date 5/3/2017	date

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<u>Grand Summary</u>

Total of Materials to waste = 0.7 + 6.1 + 2.4 = 9.2 tonnes

Total for Materials to be Re-Used or Re-Cycled = 10.8 + 5.1 + 167.3 + 57.8 = 241.0 tonnes

∴ <u>Percentage Re-Cycled</u> = $\frac{241.0}{241.0 + 9.2} \times \frac{100}{1}$ = <u>96.3 %</u>

> 85%

<u>Therefore the Local Plan Target of 85% can be achieved.</u>

<u>Ref:</u> Camden Local Plan 2017: Section 8: Sustainability & Climate change
Policy CC1: Climate change mitigation
Paragraph 8.17: 'divert 85% from waste stream'.

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