Project No. 2150	Revision D: July 2021

The Cottage, Hilltop Road

Structural Survey Report For Planning

constructure

Structural Designers

Constructure Ltd
15 Bell Yard Mews
London SE1 3TY

constructure.co.uk
office@constructure.co.uk
020 7403 7989

QUALITY MANAGEMENT

PROJECT NO.	2150		
PROJECT NAME	The Cottage, Hilltop Road		
CLIENT	John Weidner		
PROJECT ADDRESS	The Cottage, Hilltop Road, NW6 2QA		
DOCUMENT TITLE	Structural Survey Report		
DOCUMENT REV.	D		
DATE	03.07.21		
PREPARED BY	Adam Harrison MEng CEng FICE	**TITLE**	Director
CHECKED BY	Alex Clifton BEng	**TITLE**	Senior Engineer

REVISION HISTORY

Rev.	Date	Issue Purpose	Prepared	Checked	Authorised
-	28.05.21	For Planning	AH	AC	AH
A	07.06.21	For Information/comment	AH	AC	AH
B	25.06.21	For Information/comment	AH	AC	AH
C	02.07.21	For Planning	AH	AC	AH
D	03.07.21	For Planning	AH	AC	AH

TABLE OF CONTENTS.

1. INTRODUCTION

Constructure Ltd were appointed in May 2021 for structural advice on the proposed refurbishment or rebuild of the property known as ‘The Cottage’, Hilltop Road. This report has been produced to accompany the Planning Application submission by Office Ten architects, describing the condition of the existing building, and possible options for a rebuild to bring the property up to modern standards, both in terms of sustainable materials usage, and lifetime energy usage. This report is intended to highlight issues with the existing construction, and makes recommendations for the proposed rebuild as being the most appropriate option.

Local ground conditions have been assessed through consulting the geological maps for the area, combined with local investigations from BGD borehole records. More targeted investigations are to be carried out to check the foundations to the boundary/shared wall footings to ensure that the proposals are well considered, and take full account of the existing conditions.

A selection of photos has been included within the report to accompany description of the key considerations/observations from the survey, undertaken the morning of 25.05.21.

2. THE SITE

The site of The Cottage is approximately 15m x 12m and flanked by adjoining properties to the north, south, and west, with Hilltop Road to the east.

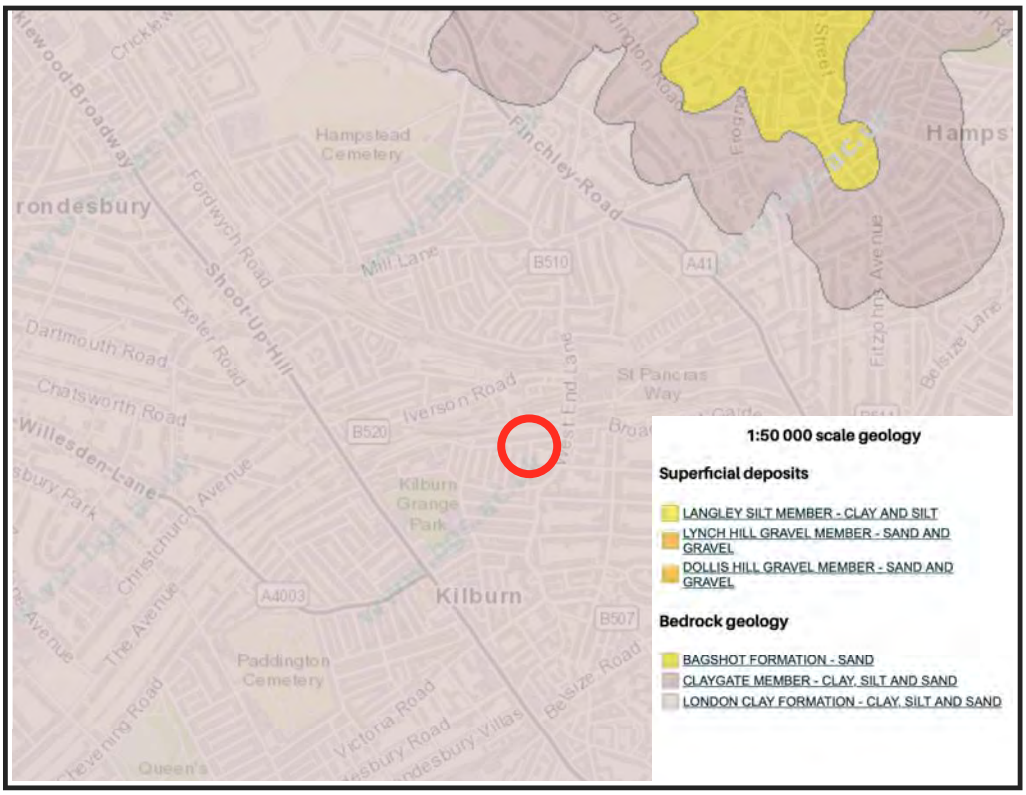
2.1. THE EXISTING STRUCTURE

The building is constructed to inferior standards when compared against modern builds, with inadequate foundations (likely leading to the movement which has caused damage both internally and externally), thin walls and finishes in a correspondingly poor condition. The building shows signs of structural distress and disrepair throughout, and in its current condition it represents numerous challenges for refurbishment, due to the extent of repair and upgrade required to meet modern building and energy usage standards.

A more detailed description of the observed building defects is given within section 4 of this report.

2.2. LOCAL GEOLOGY AND HYDROLOGY

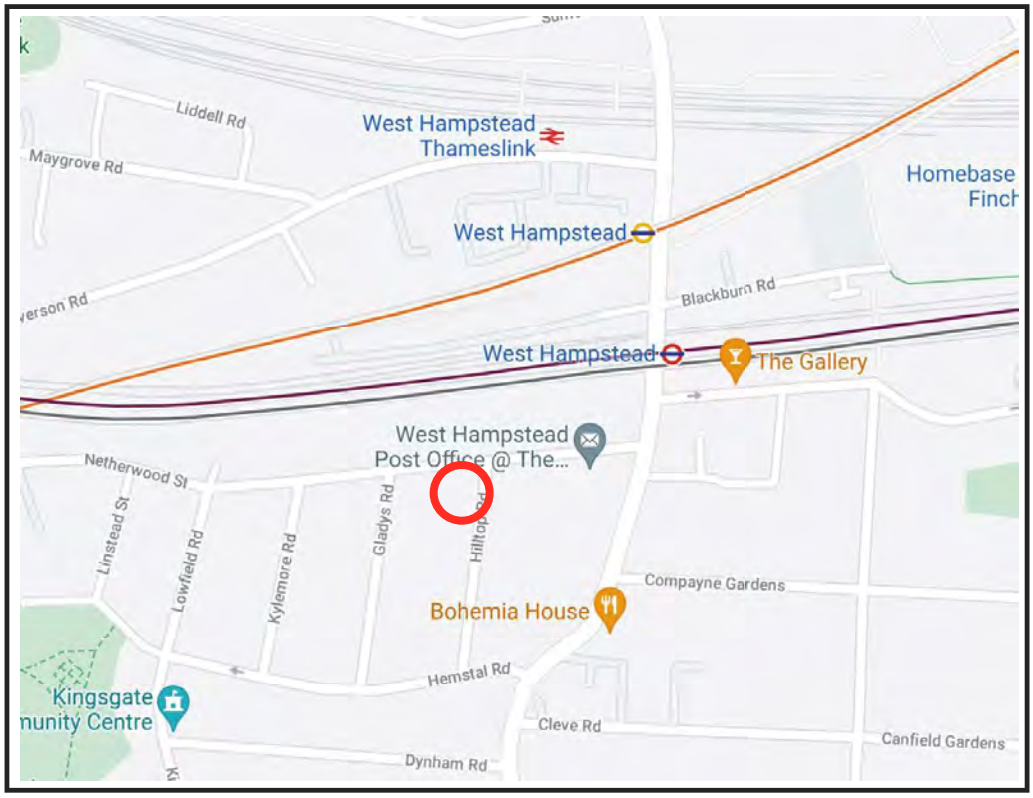
From geological maps for the area [Figure 1], the ground conditions (which will be confirmed through targeted investigations) are known to comprise a shallow layer of Made Ground onto London Clay, which is expected to be present at shallow depth, with the base of this strata at considerable depth below the site (c. 50-60m).



[FIGURE 1] LOCAL GEOLOGICAL MAP

2.3. LONDON UNDERGROUND

From the map with underground lines overlaid [Figure 2 - next page] it can be seen that the site is sufficiently far from London Underground infrastructure, with the closest line being approximately 100m away from the north boundary to the north. The tube and overground lines are above ground to this area, and therefore no consultation with the London Underground Asset Protection team is considered to be necessary.



[FIGURE 2] LOCAL TRANSPORT TUNNELS

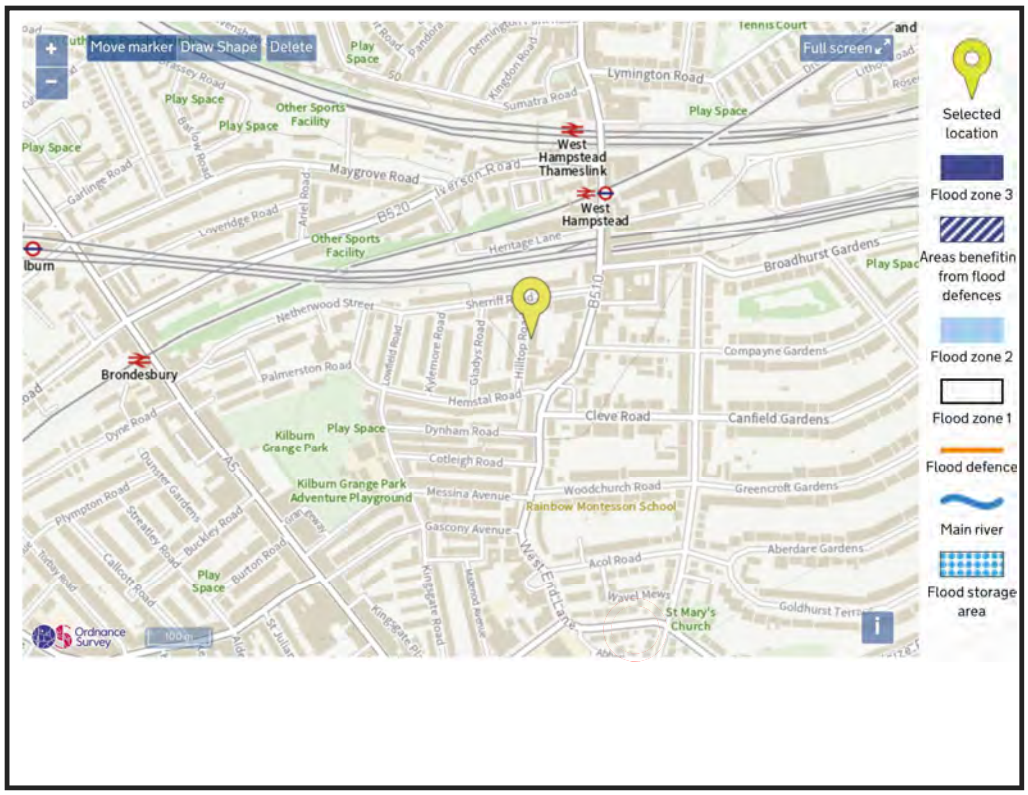
2.4. FLOOD RISK

From the extract of the Environment Agency's Flood Risk map [Figure 3 - next page] it can be seen that the site lies within Flood Zone 1. Therefore a Flood Risk Assessment and Hydrological Reports are not required as part of this application.

The Flood Risk Assessment concludes that there are low risks of flooding from overtopping of flood defences. There is also a low risk of groundwater flooding and flooding from other sources. The risk of flooding from sewers is also low.

2.5. EXISTING UTILITIES AND UNDERGROUND SERVICES

Existing services including sewers and drainage runs will be identified prior to commencing the works. It is known that there is an existing pipe running below the ground floor, approximately midway across the width of the property, which also serves some of the adjoining properties. The invert level of this run is to be investigated to check whether or not this section of floor can be lowered without relaying this section of drainage. The routes for water, electricity, gas and telephone are visible coming into the building, with the locations well known.



[FIGURE 3] ENVIRONMENT AGENCY FLOOD RISK MAP SHOWING SITE

3. INVESTIGATION WORKS

3.1. SITE INVESTIGATION

Some investigation works have been carried out previously to check foundation levels etc. but the results of these are not available by way of paper or electronic copies. We would recommend that an investigation is carried out from inside the existing kitchen area to check for the extent of, and formation level to, the shared footing along this boundary/ party wall.

3.2. RECOMMENDATIONS

We would recommend that prior to detailed design works being carried out, the existing footings to the perimeter should be checked by way of trial pits, and a medium depth borehole should be carried out to check the underlying soil conditions with depth, to enable detailed design of micro-piled/screw-pile foundations to be carried out during the construction phase.

4. OBSERVATIONS OF BUILDING CONDITION

4.1. EXTERNAL WALLS AND SURROUNDING PAVING

From the front of the property it could be seen that the building has suffered some historical movement, possibly as a result of shallow footings in combination with now pollarded plane trees along the street, roughly 5-6m from the facade line. A large crack was visible to the side of the first floor window [3], which was seen to reflect internally also, suggesting that the masonry here has completely lost tie action across the window head. The painted pebble dash finish to the masonry was extremely rough and patchy, suggesting there have been numerous historical repairs carried out (most likely to patch over areas of cracking to the masonry behind), and there was seen to be significant moss growth out of the render and window cill at ground floor level [17].

The kitchen area encloses onto the neighbours wall between ground and first floor level [7], and this wall appears to be potentially defective at the interface between the two in-so-much as this represent a likely water ingress position if not fully toothed. There is a lack of coping or flashing to the top of both sections of wall forming the sides of the existing kitchen, again suggesting these could be weak points for water ingress & damp issues.

To the west side of the property, the flank wall is seen to be in reasonable condition, albeit a chimney breast has been removed previously [16] and replaced with a rough finished block wall (un-rendered). As such we consider that this will be a possible line of water ingress, unless remediated [9].

A small lean-to structure is also present to the west side of the house, through which the main soil stack serving the upper levels passes through, and into a manhole located to the side of this half-height masonry structure.

The boundary wall to the west is seen to be in poor condition, with cracking visible through the painted brickwork [6]. To the south facade wall, cracking was visible to a number of locations, with render flaking/crumbling away from the masonry. This is reflected by internal damp, suggesting that the render is both letting water in, and holding this against the masonry creating damp internally [11].

The paving forming the driveway to the south of the property has visibly settled, and there is a dip which we understand creates standing water during wet weather. It was noted that there is a height difference between the neighbouring property to the south, and this driveway, with the adjoining property being founded at a lower level.

4.2. GROUND FLOOR

Inside the property, the condition was noted as being in general disrepair, with missing sections of ceiling throughout, and partially removed wall sockets etc. The ground floor is set across two levels, with steps down from the hallway into the living room. We understand this is partly due to the levels change across the site, and possibly also due to the sewer which runs underneath the hallway, and into a manhole within the neighbouring property garden.

The ground floor is formed from suspended timber joists, typically running side to side across the house. No areas were noted as being unusually bouncy, however, we would expect that given the damp issues elsewhere, and the general property condition, it is likely

that the floor joists have suffered from damp/rot over the years, and may therefore be unsuitable for reuse.

Within the living room, it was noted that several of the external walls were damp/showed signs of previous damp ingress, and there was a crack visible to the dividing wall between living room and entrance hallway [15]. From a detailed inspection of this crack, it was noted that a rotation of the wall appears to have occurred, possibly as a result of some movement to the front facade, with the crack being more pronounced at the top of the wall (near to the assumed lintel bearing position).

At the northern boundary The Cottage appears to have been constructed to enclose directly onto the wall of No. 10 Sherriff Road, with no wall substrate to The Cottage side of the boundary. The tiles are therefore expected to have been applied directly to what was previously the external wall to the adjoining property.

The ceiling was missing to the hallway [18] revealing floor joists over, roughly 100x50 at 400 centres. Some notching was visible to these.

4.3. FIRST FLOOR

At first floor level, the cracking to the front facade is reflected internally [14], with additional cracking visible to the side (north) wall [10]. This is consistent with a subsidence movement to the front facade, likely initiated by footings being insufficient depth, in combination with large trees to the pavement along Hilltop Road.

Where visible, the joists at first floor appear in reasonable condition, albeit some notching was noted, and also potential rot at bearing positions could be an issue where the render has cracked, such as along the south facade.

Within the bathroom to the north end of the property, there was a notable slope down towards the boundary with No. 10 Sherriff Road. This suggests that there has either been movement to create this slope, or that the support position to the north end has weakened sufficiently to create a slope in the floor.

The rafters forming the flat roof were visible above the hallway [13], with these also appearing in reasonable condition.

5. RECOMMENDATIONS

Based on our visual inspection of the existing property, we see 3 clear options therefore for the proposed construction, as follows:

1. Refurbishment and roof extension

As part of the potential refurbishment works, it may be necessary to underpin the boundary/shared wall foundations. which would add significant additional cost, and potential for disturbance to the neighbours. In addition to this, these works would be carbon intensive, further increasing the emissions generated as a result of the development, whilst not adding significant benefit to the refurbished property over its expected lifetime.

The issues noted with the front facade, and flank walls could cause numerous future problems if not remediated, with remediation likely to involve the following structural works as a minimum:

- Underpinning

- Re rendering to stabilise the existing masonry
- Re pointing
- Heli-fixing cracks within masonry
- Reinstating full ties between floor plates and external walls to meet modern design standards

In addition to the above, adding a storey to the existing building is likely to over-stress the existing footings, even with a lightweight build being utilised, which may then necessitate underpinning and strengthening works to the full perimeter, rather than just localised areas.

It should be noted that the points above only cover the structural items, and there are likely to be many other building upgrades required for architecture/fire/services etc. which could further complicate the refurbishment option.

2. Partial demolition and rebuild

If it were considered that the rebuild simply focussed on the areas where the building dilapidation appears most pronounced, in particular to the front façade, then significant temporary works would be required to allow the facade wall to be rebuilt whilst retaining other areas of the building. Once again, this would be extremely carbon intensive, and not of significant benefit to the finished building.

In addition to the facade works, the condition of the floors throughout was such that strengthening works/replacement works would likely be required to several areas, which would involve sequencing to avoid losing restraint to external walls, thereby slowing the works down, or further temporary works to brace the walls during removal and reinstatement. Again, we feel carrying out works of this nature when the existing building is in such a poor condition overall, would not be offer a good solution in either the short or longer term.

As with the full refurbishment (no demolition) option 1, it should be noted that significant additional works would be required as a result of improving and upgrading the building architecture, fire safety, and services throughout.

3. Full demolition and rebuild

Given the extent of these likely required works, the difficulty of stabilising the building and upgrading it to modern standards, and the associated cost and disruption of doing these, we feel that the best strategy would be to construct a new house to modern standards. At the same time, efforts can be made to re-use as much of the existing building fabric as possible in order to avoid costs and waste, and the generation of CO2 emissions from transporting materials away from site (see following Section 6 also).

A number of structural options would be considered for the new build, with these assessed against each other in terms of efficient material usage, carbon efficiency, and speed of construction. Techniques to minimise concrete could be utilised, such as mini-piles for the foundations in lieu of traditional strip footings, alongside cement replacement to lower the carbon emissions as a result of the build.

6. PROPOSED RE-USE OF BUILDING MATERIALS/STRATEGY FOR NEW BUILD

We propose that as part of the considerations of providing a new house to replace the dilapidated existing, as much material as possible should be salvaged and reused. The possible options considered for this are as follows:

- Possible re-use of some upper levels timbers in new building (where found to be suitably intact and in good condition), with existing floor boards stripped down in-situ and re-used
- Existing masonry crushed and used as sub-base material beneath the new property, with material spread across site to provide pile mat
- New foundations to be formed using either micro-piles, or screw piles, so as to utilise deeper bearing strata beyond the zone of influence of the nearby trees, with reduced concrete and steel reinforcement usage
- Minimise concrete requirements by forming a grillage of ground beams or shallow raft slab, possibly in combination with an earth friendly concrete (EFC) utilising high proportion cement replacement

In addition to the above, we propose to consider the use of timber cassettes where possible to form the new build, allowing a rapid construction, thereby minimising disruption to the neighbours, and also reducing road movements necessary as part of the works. In using this type of construction, it would also be possible to form a new structure with very high airtightness, further improving the lifetime sustainability credentials of the building.

[1] Neighbours wall to north

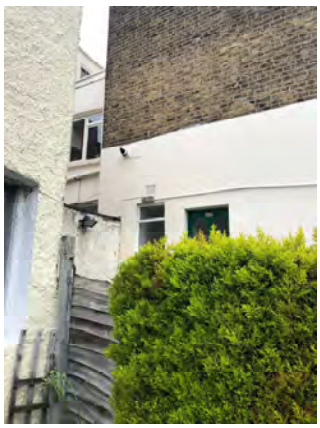
[2] West wall outside kitchen

[3] Front facade wall

[4] South facade wall

[5] Driveway

[6] West boundary wall

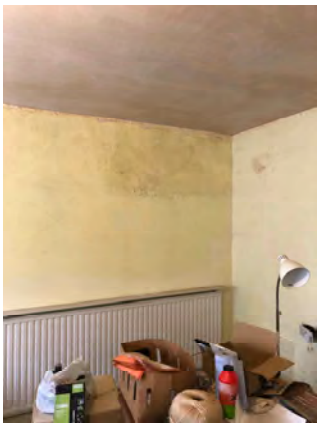


[7] Enclosed wall to north

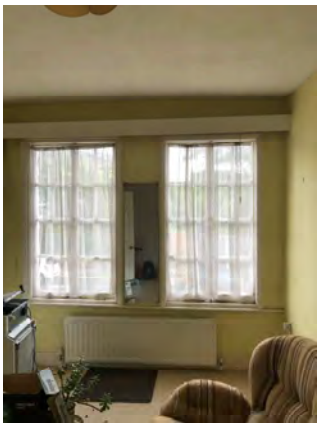
[8] SVP to west manhole

[9] West flank wall

[10] Bedroom wall - 1st floor

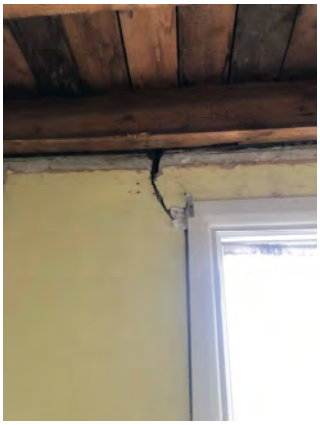


[11] Living room wall



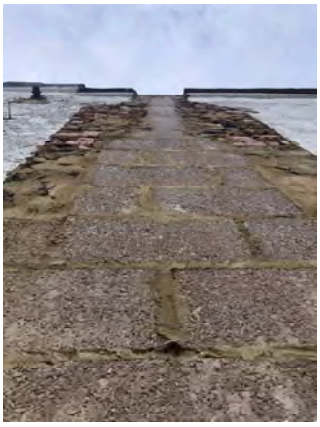
[12] Living room wall 2

[13] Ceiling over first floor hallway



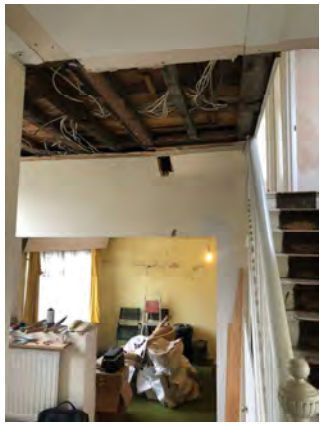
[14] Bedroom wall

[15] Living room dividing wall



[16] Infilled chimney - west flank wall

[17] Front facade wall



[18] View into living room from hallway