IKT CONSULTING
STRUCTURAL ENGINEERS LIMITED

ENGINEERS REPORT

Site Address

Sneinton,
Nottingham.

Prepared for

A Client

Date: 01 September 2020

ENGINEERS REPORT

INTRODUCTION

We have been asked by **A Client** to comment upon structural issues present at the property.

My report has been prepared specifically in connection with structural damage and major building issues present at the property. It does not deal with the general condition of the building, decorations, services, damp, timber, rot or infestation etc, except where these matters are considered to be relevant to any structural damage.

Whilst every effort has been taken to appraise the property fully, we have not been able to inspect those areas, which are covered, unexposed or inaccessible and cannot, therefore, confirm that any such areas are free from defect.

All directions are given as if facing the house from the front elevation.

DESCRIPTION OF PROPERTY

The property is a two-storey end terrace house built circa 1900. The house comprises solid load-bearing walls and a pitched roof. To the front, there is an open porch and an old coal chute leading to the front cellar. To the rear right hand of the building, there is a two-storey rear wing. There is a shared passageway to the left-hand side, which is used by this and neighbouring properties as access to their rear gardens. The drainage system is by the rear and left-hand elevations to the front of the property.

FIGURE 1
Photograph of the front elevation

SITE TOPOGRAPHY

The site, upon which the house was built, slopes slightly from the rear to the front of the plot.

OBSERVATIONS/ DESCRIPTION OF THE DAMAGE

The following is an abbreviated description of the damage. The photographs included in this section of the report illustrate the extent of the damage.

FIGURE 2
Photograph of the rear elevation.

EXTERNALLY

Front Elevation:

- The house from wall front right-hand corner/party wall area is fairly vertical at ground level and first-floor level.
- The house front wall central area is fairly vertical at ground level and first-floor level.
- The house front left-hand corner is fairly vertical at ground level and first-floor level.
- The sitting room window sill is fairly level.
- The roof ridge tiles are fairly level.
- The guttering to the front of the property is poor. See comments and recommendations.
- There is severe sag to the roof tiles against the gable wall. See Figure 1, together with comments and recommendations.
- There is a severe sag to the roof ridge tiles within the centre of the property. See Figure 1, together with comments and recommendations
- The mortar joints to the front building wall are badly weathered in places. See comments and recommendations.
- There is rising damp evident within the front wall. See comments and recommendations.

- There is poor pointing and perished/spalling bricks to the chimney stack. See comments and recommendations.
- The chimney flaunching appears cracked and loose in places. See comments and recommendations.
- The flashings at the junction between the front chimney stack and the roof coverings appear to be poorly sealed and defective. See comments and recommendations.

Gable Wall:

- There is access to the rear gardens of this and other properties by a shared line adjacent to the gable wall. See Figure 1, together with comments and recommendations.
- The front left-hand corner of the gable wall is out of vertical by 1% at ground level.
- The central section of the wall is fairly vertical at ground level.
- The rear left-hand corner of the gable wall is out of vertical by 1% at ground level.
- There is no sign of Damp Proof Course within the gable wall.
- There is damp evident within the gable wall. See comments and recommendations.
- There are numerous perished bricks at low and high levels to the gable wall. See comments and recommendations.
- The mortar joints to the gable wall are badly weathered in places. See comments and recommendations.

Rear Elevation:

- The house rear wall is out of vertical by 1% at ground level and by 30mm at roof level. See
- comments and recommendations.
- There is a diagonal crack 2 - 3mm in width below the dining room window. See comments and recommendations together with Figure 5.
- The dining room window sill drops towards the kitchen by some 30mm.
- There is diagonal crack 2-3mm in width and significant moment to the dining room brick arch lintel and repointing carried out to the rear wall above the brick arch lintel. See comments and recommendations.
- There are perished bricks to the house rear wall at low eave levels. See comments and recommendations.
- The rear wing flank wall is out of vertical by 1% at ground level and by 20mm at roof level.
- There is a 3mm to 5mm diagonal crack to the rear wing flank wall above and below the kitchen window. See comments and recommendations.
- There are several perished bricks to the rear wing flank and rear walls at ground level. See comments and recommendations.
- The mortar joints to the rear wing flank wall are badly weathered in places. See comments and recommendations.
- There are lose bricks to the rear wing flank wall of the rear wing at eave level.
- New concrete lintel has been installed to the kitchen window.
- There is diagonal crack 2-3mm in width and significant moment to the kitchen brick arch lintel. See Figure 5, together with comments and recommendations.
- The rear gulley is full of debris and appears blocked. See Figure 6, together with comments and recommendations.
- The rear wing rear wall is out of vertical by 2% at ground level and by 30mm at roof level.
- There are numerous perished bricks at low and high levels to the rear wing rear wall. See comments and recommendations.
- There is no sign of Damp Proof Course and material within the gable wall.
- There is poor pointing to the rear wing chimney stack. See comments and recommendations.
- The rear wing chimney stack flaunching appears cracked and loose in places. See comments and recommendations.

- There are numerous perished bricks within the chimney stack. See comments and recommendations.
- The manhole cover was lifted to the left-hand side of the rear wing, with an invert level of approximately 1.5m below ground level. Some debris was noted within the manhole and the cast iron cover is severely damaged. See Figure 7, together with comments and recommendations.
- There is a tree some 6m tall located some 3.5m away from the rear wing left-hand corner. See comments and recommendations.

INTERNALLY

BASEMENT

Front Cellar:

- The cellar sits in a dilapidated condition and appears to be severely damp. See Figure 8, together with comments and recommendations.
- The lounge floor joists are in a good condition.
- The fuse box located within the cellar is recent. See Figure 3.

GROUND LEVEL

Entrance Porch:

- The solid floor to the porch slope slightly towards the front.
- The party wall within the porch is fairly vertical.
- The front sitting room partition wall within the porch is fairly vertical.
- There is a ceiling crack 2mm width to the front porch.

Hallway:

- The suspended floor of the hallway drops towards the rear by some 10mm.
- The right-hand party wall is fairly vertical.
- The lounge partition wall is fairly vertical.
- There are hairline ceiling cracks within the hallway.

Lounge:

- The suspended floor of the lounge drops towards the left-hand gable wall by some 30mm.
- The front wall of the lounge is fairly vertical.
- The right-hand gable wall in the lounge is fairly vertical.
- The partition walls are fairly vertical.
- There are hairline cracks within the lounge ceiling to the hallway partition wall.
- There is a sign of damp affecting the gable wall of the lounge and the chimney breast at a low level. See comments and recommendations.

Dining Room:

- The suspended floor of the dining room drops towards the rear by some 40mm.
- The lounge partition wall within the dining room is fairly vertical.
- The rear wall of the dining room is fairly vertical.
- There is a diagonal hairline crack to the right-hand partition wall.
- There are hairline cracks within the lounge ceiling to the right-hand partition wall.
- There is a diagonal crack 2mm - 3mm in width above and below the rear window. See comments and recommendations.

- There is a sign of damp affecting the gable wall of the dining room and the chimney breast at a low level. See comments and recommendations, together with Figure 9.

Kitchen:

- The solid floor of the kitchen drops towards the rear by some 10mm.
- The right-hand party wall within the kitchen is fairly vertical.
- There is a diagonal crack 10mm in width to the right-hand /party wall of the house to the cellar entrance. See Figure 10, together with comments and recommendations.
- There is no external extractor fan within the kitchen. See comments and recommendations.
- There is a sign of damp affecting the left-hand wall of the kitchen at ceiling level. See comments and recommendations.
- The boiler located within the kitchen is some 12 years old. See comments and recommendations, together with Figure 4.

FIRST FLOOR

Stairs and Landing:

- The suspended timber floor of the landing drops towards the rear by some 45mm.
- The right-hand/party wall within the stairs is at a vertical of 1%.
- The rear wall/toilet partition is at a vertical of 2%.
- The door frame to the toilet was found to be out of square by some 15mm.
- There are diagonal cracks 2mm in width to the rear bedroom partition. See comments and recommendations.
- There is a diagonal crack 2mm in width above the door frames to the toilet area. See comments and recommendations.
- There are vertical cracks 2mm – 3mm in width to the party wall. See Figure 12, together with comments and recommendations

Front Bedroom:

- The suspended timber floor of this bedroom drops towards the rear by some 20mm - 30mm.
- The front wall of the bedroom is fairly vertical.
- The right-hand wall is fairly vertical.
- The left-hand / gable wall is fairly vertical.
- There are hairline ceiling cracks within this room.
- There is a vertical hairline crack above the door lintel.
- There are damp and roof leakage evident within the ceiling to the left-hand corner. See Figure 11, together with comments and recommendations

Rear Bedroom:

- The suspended timber floor of this bedroom drops towards the rear by some 30mm.
- The rear wall of the bedroom is at a vertical of 2%.
- The front partition wall is fairly vertical.
- The right-hand partition wall within this room is at a vertical of 1%.
- There is a long diagonal crack 2mm in width the right-hand partition and above the door frame. See comments and recommendations.
- There is a diagonal crack 2mm - 3mm in width above and below the rear window. See comments and recommendations.
- There is a sign of damp affecting the chimney breast at ceiling level. See comments and recommendations.

Toilet:

- The suspended timber floor of the toilet drops towards the rear by 20mm.
- The front partition wall of the toilet is at a vertical of 2%.
- The left-hand wall within the toilet is at a vertical of 1%.

Bathroom:

- The suspended timber floor of the bathroom drops towards the rear by some 30mm - 40mm.
- The front partition wall of the bathroom is at a vertical of 2%.
- The rear wall of the bathroom is at a vertical of 1%.
- The party wall of the bathroom is at a vertical of 1%.
- The left-hand wall is at a vertical of 1%.
- There is no external extractor fan within the bathroom. See comments and recommendations.
- There is a sign of damp affecting the rear wall at ceiling level. See comments and recommendations.
- This is a vertical diagonal crack 1mm in width above the rear window.

Loft Space (Access via Loft Hatch):

- The roof ridge beam within the loft space is poorly supported. See comments and recommendations.
- The ridge board sags significantly in the central area. See comments and recommendations.
- The front roof purlin sags significantly in the central area.
- The front and rear roof purlins are poorly supported. See comments and recommendations.
- There are loose bricks also next to the front and rear high-level roof purlins against the right-hand party wall. See comments and recommendations.
- There is poor packing to the high-level roof purlins against the party wall. See comments and recommendations.
- There is evidence of water penetrating to the house through the flashing of the chimney stacks. See comments and recommendations.
- There are several displaced tiles within the roof. See comments and recommendations.

FIGURE 3
Dated fuse box.

FIGURE 4
Boiler some 10 - 12 years old.

FIGURE 5
Lintel failure within the rear wing wall

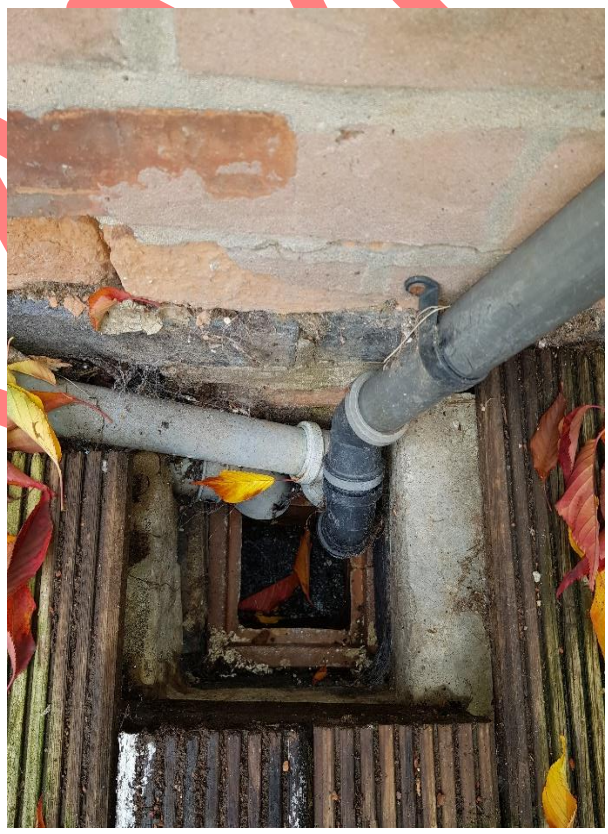

FIGURE 6
The blocked gully to the rear of the property

FIGURE 7
Debris on foul sewer which runs parallel to the rear and gable wall of the house.

FIGURE 8
Severe dampness within the cellar.

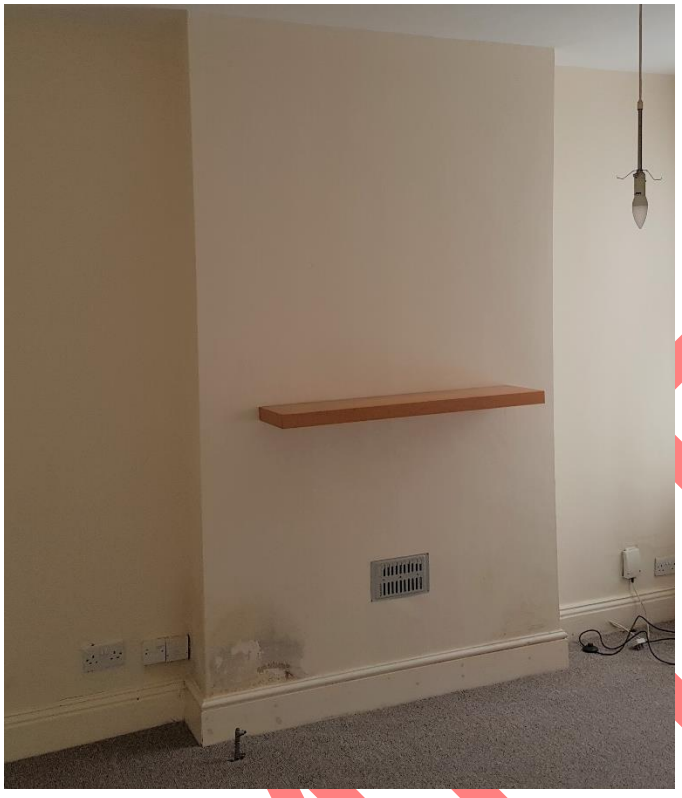

FIGURE 9
Damping to the dining room and chimney breast.

FIGURE 10
Significant cracking to the party wall at ground level

FIGURE 11
Discolouration of the front bedroom ceiling.

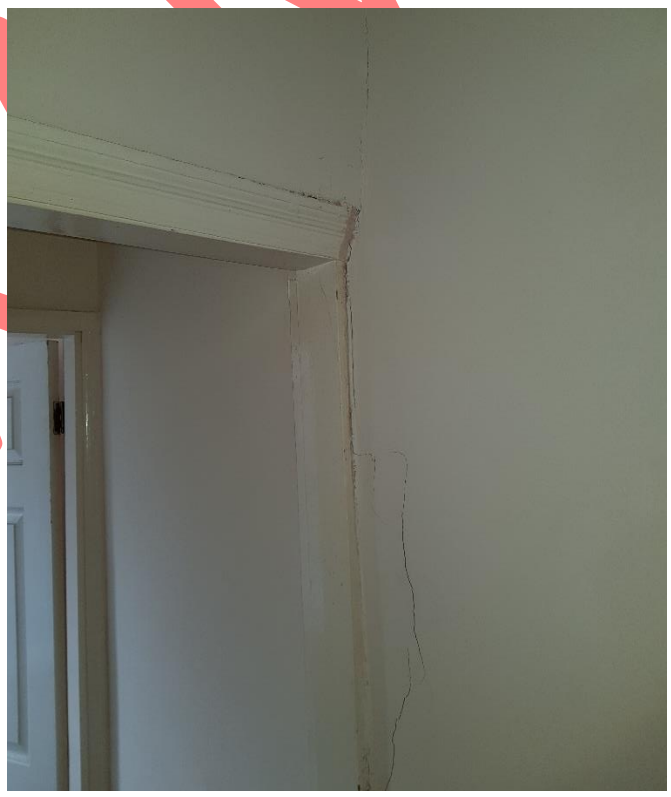

FIGURE 12
Cracking to the party wall at first-floor level.

DRAINS

There are no signs that the foul drainage system of this property is affecting the damage noted within my report. However, the gully to the rear of the property is blocked up. The guttering, rainwater downpipes and gullies of the property are to be inspected for blockage and leakage.

CATEGORY

It is common practice to categorise the structural significance of the damage in accordance with the classification given in Table 1 of Digest 251 produced by the Building Research Establishment. In this instance, the damage falls into Category 2-3.

Category 0	"aesthetic damage"	< 0.1mm
Category 1	"aesthetic damage"	0.1 - 1mm
Category 2	"aesthetic damage"	>1 but < 5mm
Category 3	"serviceability damage"	>5 but < 15mm
Category 4	"serviceability damage"	>15 but < 25mm
Category 5	"stability damage"	>25 mm

Extract from Table 1, B.R.E. Digest 251
Classification of damage based on crack widths.
Note: Actual categorisation can vary due to 'local' effects

DISCUSSIONS/ CAUSE OF DAMAGE

It is common in older properties which have been built with only a partial cellar (i.e. with a cellar under only part of the property) to suffer distortion and damage due to differential settlement of the foundations. This occurs due to the different foundation depths and the varying nature of the supporting subsoil. Generally, the deeper the foundations the greater is the loadbearing capacity of the subsoil. Therefore, the cellared part of the property would normally be supported on firmer ground than the rest of the property. Also, there tends to be infill material around the cellar and the adjacent shallow foundations are then supported on this material. The fill material is rarely placed in a controlled (compacted) manner and it is therefore prone to settlement and is unsuitable for supporting the building foundation.

The greater settlement of the non-cellared areas of the property tends to result in these areas of the building settling and rotating away from the cellared area and for this reason, fractures occur close to the junction between the cellared and non-cellared parts of the property.

Movement of this nature generally occurs mainly in the early life of a building and tends to slow down as time passes and most properties do stabilise although they remain distorted. In a property of this age, we would expect this to be the case. There are instances when the historic movement of this type does re-occur and this is usually due to an external factor such as a leaking underground drain and clay shrinkage due to nearby trees.

The blocked gully to the rear wing is located close to the house rear wall area. When excess water is discharged close to a building it can have an adverse effect on the subsoil which provides support for the building foundations. My observations and the results of the level survey carried out on the walls and floors of the house confirmed the evidence of both historic and progressive differential settlement of the foundation.

My clients' solicitor needs to ensure that there is a right-of-way access agreement for accessing the rear garden of this and other properties via the shared passageway to the left-hand side of the gable wall.
A Gas Safe Report is needed on the boiler which appears dated. A Damp and Timber Report is

recommended as there is severer damp internally within the basement walls and floors and localised damp within the front and rear ground level living area. There is dampness to the chimney breast in the lounge and dining room. This will require further investigation. I would recommend that disused flues should be adequately capped and ventilated.

A roofer's report is essential at this property. There are severe roof leakage and missing tiles to the roof of the house. Severe roof sagging noted to the front and rear roof tiles. I suspect that a roofer will recommend that the roof tiles and felt to this property are replaced in their entirety. All the chimney stacks of the property need localise re-pointing above roof level.

Cracking noted above the rear dining room window and rear wing flank wall is a characteristic sign of lintel failure. I recommend that Helibars are installed within these areas of brickwork to strengthen brickwork, and areas affected by a significant movement/distortion to brickwork panel and lintel to be rebuilt. There are also numerous perished bricks to the gable and rear walls of the house. I recommend that the perished bricks be replaced.

Within the loft space, vertical supports are needed to the roof ridge board and front and rear roof purlins. The front and rear roof purlins are poorly packed against the party wall. Also, there is missing brickwork to the surrounding areas of the party wall against each of the purlins.

INSURANCE

A subsidence claim can be submitted by the current owners. However, the damage is both long-standing and progressive.

RECOMMENDATIONS

My client's solicitor needs to ensure that right-of-way arrangements are in place for accessing the rear garden of this and other properties by a shared passageway to the left-hand side of the gable wall. A Gas Safe Report is needed on the condition of the boiler. An electrical report is needed, and Damp and Timber Report are recommended at this property. An extractor fan is needed within the bathroom and kitchen.

A roofer's report is essential at this property. I suspect that new roof tiles and felt will be required to the house, and the rear wing roof requires further investigation. The front guttering appears defective and needs to be repaired as necessary.

The chimney stacks above the roof tiles need to be re-pointed and all perished bricks need to be reinstated. The flaunching should be checked when repair work is undertaken. All unused flues should be covered and ventilated to reduce any risk of rain penetration and internal condensation which could result in serious damp and decay.

The mortar joints to the house gable, rear wall and rear wing building walls are badly weathered in places and repainting is required. There are also numerous perished/ spalling bricks which will require repair or replacement, and repointed as required.

This house is suffering from significant distortions due to a possible settlement of the rear wall and rear wing. That damage appears to be both long-standing and progressive. The distortions are significant at ground level and first-floor level. My client needs to be aware that the distortions to the property are significant and is likely to affect future re-sale of this property.

The guttering, rainwater downpipes and gullies of the property are to be inspected for blockage and leakage. Any defective guttering and blocked gulley to the rear of the property need to be repaired and reinstated as necessary.

A 4m long Helibeam will need to be installed at first-floor level to the left-hand flank wall of the rear wing. A 2m HeliBar should be installed to the rear wall above and below the dining room lintel and first-floor bedroom. A significant number of bricks need to be reinstated from the rear wing rear wall and house rear wall. There are approximately twenty bricks to the flank wall of the rear wing which are perished and should be replaced. A further sixty bricks should be replaced as they have perished against the house gable wall.

All the cracks within the external walls and internal party wall to be stitched using Helifix reinforcement bars. Cracks to the internal walls and ceilings should be repaired with Expamet mesh/lath and re-plastered as necessary. All loose brickwork and eroded mortar should be re-pointed.

Within the loft space, two vertical supports should be installed to the house roof ridge board. Two vertical supports should be installed to the house loft space to the front and rear purlins. Missing or loose brickwork needs to be reinstated to the party wall adjacent to both the front and rear roof purlins. The roof purlins need to be slate packed within the loft space to the party wall.

CONCLUSION

In conclusion, significant distortions have been caused to this property due to a settlement to the rear of the property. That damage is deemed to be both longstanding and progressive. My clients' solicitor needs to ensure that right-of-way arrangements are in place for accessing the rear garden by a shared passageway. A Gas Safe and Electrical Reports are needed. A Damp and Timber Report is needed. The cellar needs to be inspected, ventilated and made watertight as necessary. The guttering rainwater downpipes and gullies of the property to be inspected for blockage and leakage. Debris needs to be cleared from the rear gulley. Helibars need to be installed to stabilise the external walls of the property as listed within my report. The cracking affecting the internal walls and ceiling are to be stitched, filled and replastered. There are numerous perished bricks to the rear and gable walls of the house, and rear wing that needs to be reinstated. The house and rear wing chimney stacks need repointing and make watertight. A roofer's report is essential at this property. Within my report, I made a number of recommendations which are of lesser structural significance.

Report prepared by:

An Engineer

Director and Structural Engineer
For and on behalf of IKT Consulting Ltd

Checked by:

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