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Our Ref: **BRC/sp/7663**

Date visited: 9th October 2013
Date of report: 14th September 2014

ENGINEER'S SITE INVESTIGATION REPORT

INCEPTION DATE OF POLICY:	Not advised
POLICYHOLDER(S):	**Mr M Citron**
CORRESPONDENCE ADDRESS:	Not advised
SITUATION OF DAMAGE:	56 Parkway, London NW1 7AR
TELEPHONE NUMBERS:	For access contact tenant, Dennis & Hayes 0207 284 2888

1.0 SUMMARY

Our Engineer's Preliminary Report dated 19th October 2013 referred to this matter relating to cracking up to 3mm in width indicative of foundation movement of the rear single storey projection relative to the main house.

Since our preliminary visit on 19th October 2013 we have had the opportunity to view the first and second floor residential accommodation above the shop unit. In addition there have been continued problems with binding of the front entrance door to the shop front.

At the present time the damage to the property can be summarised as follows:-

1. Cracking up to 3mm to the rear of the property indicative of foundation movement of both the rear single storey projection and the rear elevation of the main three storey terrace.

2. Foundation movement to the front of the property causing slight cracking to the front elevation and the party walls where they abut the front elevation together with distortion of the shop front and entrance dir.

Results of trial pit/borehole investigations and testing of the underground drainage to the rear of the property have been received. This report summarises the scope of such investigations and gives recommendations for progressing this matter.

2.0 SITE INVESTIGATIONS

A copy of the factual Site Investigation Report is attached.

2.1 Trial Pits and Boreholes

Three trial pits were progressed to the rear of the property.

The first trial pit (TPBH1) was progressed to the rear right-hand corner of the single storey projection and confirmed a foundation depth of 700mm bearing onto MADE GROUND comprising medium compact sandy, very silty CLAY with brick fragments. The trial pit was extended to depth by hand auger. This confirmed the made ground extended to 0.9m at which depth the virgin ground comprising stiff silty CLAY with partings of silt and fine sand was encountered which extended to termination of the borehole at 3.0m below ground level.

Roots were noted in the borehole to a depth of 2.2m. Two root samples were recovered both of which, based on iodine testing for starch, appeared to be dead. The roots were identified as Plane.

The second trial pit (TPBH2) was progressed to the rear elevation of the main terrace and confirmed a foundation depth of 700mm bearing onto virgin ground comprising firm silty CLAY with partings of silt and fine sand which continued to termination of the borehole at 3.0m below ground level.

Roots were noted in the borehole to a depth of 1.6m. Two root samples were recovered and confirmed to have been alive recently, both of which were identified as Plane.

The third trial pit (TPBH3) was progressed to the foundation to the fire escape and confirmed a foundation depth to the fire escape of 700mm bearing onto virgin ground comprising stiff silty CLAY with partings of silt and fine sand which continued to termination of the borehole at 3.0m below ground level.

Roots were noted in the borehole to a depth of 1.4m. Two root samples were recovered and confirmed to have been alive recently, both of which were identified as Plane.

2.2 Soil Testing

Laboratory testing of soil samples was undertaken which confirmed the following:-

1. The substrata within all boreholes was confirmed to be of very high plasticity.

   The very high plasticity confirms the substrata has significant potential for shrinkage on the abstraction of moisture.

2. The moisture content profiles do not appear to indicate desiccation for the depth of the roots.

3. The application of Driscoll's relationships do not appear to indicate desiccation for the depth of the roots.

2.3 In-Situ Shear Vane Strength Testing

As the boreholes were progressed in-situ shear vane strength testing was undertaken.

This confirmed the soil to be a good bearing medium. There was increasing strength with depth which would be anticipated.

The results of the in-situ strength testing does not indicate desiccation for the depth of the roots.

2.3 Drainage Testing

Full details of the drainage testing are contained within the enclosed factual site investigation report. These can be summarised as follows:-

1. MH1 to SVP – The CCTV survey confirmed radial cracking to the pipework. It is recommended that the pipework be repaired by use of a flexible liner to address the cracking.

2. MH1 to "B" – This drainage run is redundant and requires to be capped.

3. MH1 to CG1 – The length of underground drainage at this location is very short (0.3m). As per the enclosed report however there was an open pipe from the rainwater downpipe/waste pipes that connect into the gulleys at back-inlet. This is in very poor condition and requires to be replaced.

4. MH1 to downstream – The CCTV survey confirmed cracking to the pipework. It is recommended that this pipework be broken out and replaced.

3.0 DISCUSSION

Regarding the two areas of damage we would confirm the following regarding causation and measures to return long term stability to the property as follows:-

Rear of Property

Based on the site investigations it is our opinion that the cause of the foundation movement to the rear of the property is the influence of the Plane tree(s) to the rear. Our conclusion in this respect is based on the following:-

1. The site investigations confirmed a good quality foundation to the rear single storey projection, the rear elevation of the main terrace and to the fire escape bearing at a depth of 700mm below ground level. The depth of the foundations at all three locations is sufficient to prevent movement happening as a result of seasonal moisture variation.

2. The soil beneath the foundations was confirmed to be a highly shrinkable clay substrata. Such a soil will suffer significant volumetric change on the abstraction of moisture by roots.

3. Roots were noted in the boreholes to a depth of 2.2m below ground level.

4. The soil was confirmed to be a good bearing medium. There was no evidence that the soil was being influenced by leakage from underground drainage.

5. No other issues in the ground were noted likely to cause foundation movement.

There are three options for returning long term stability to the rear of the property as follows:-

a) Fell the tree(s) to remove their influence.

b) Install a root barrier to remove the influence of the tree(s) on the property.

c) Install underpinning.

There is no rear access to the property and therefore if a root barrier or underpinning were to be installed this would mean that the shop unit would become uninhabitable for a relatively significant period of time. As a consequence progressing either a root barrier or underpinning is therefore not an option.

The correct procedure therefore in the circumstances to return long term stability to the property is to remove the influence of the Plane trees(s) to the property.

Front of Property

The previous problem of subsidence to the front of the property was drawn to conclusion in 2011 following removal of a tree situated in the footpath.

The works undertaken in 2011 to address the damage caused by the tree to the front included undertaking structural repairs to cracks together with localised redecoration.

The cracking therefore noted to the front of the property and the continued problems of distortion to the shop front (in particular the entrance door to the shop front) have therefore happened as a result of continued foundation movement since that tree was removed.

It is unclear why there should be a problem of continued movement at this location.

The cracking to the property has not worsened since our previous visits on 29th October 2013 and 7th January 2014. There has however been a continued problem of the door to the shop front binding and on one occasion the door could not be opened. The door has been adjusted on several occasions.

The entrance to the habitable accommodation above has been modified. Other properties in the terrace have intermediate support in the form of a door opening to the front elevation at ground floor level. This intermediate support at this property has been removed and it appears that a post has been installed.

Initially we were going to undertake an internal trial pit to this post but this would been disruptive to the tenants of the retail unit.

We have previously contemplated undertaking external trial pits in the footpath but based on our most recent return visit on 15th August 2014, see no alternative other than to progress an internal trial pit.

Arrangements are being made to progress the internal trial pit on a Saturday afternoon/Sunday when the tenant is not trading. The purpose of the trial pit is to clarify if the post is load bearing and if so, whether or not foundation movement of this is happening causing distortion to the shop front.

4.0 RECOMMENDATIONS

Considering each area of damage in turn we would make the following recommendations:-

Rear of Property

As per item 3 above we consider the correct solution to return long term stability to the rear of the property is to fell the offending tree(s).

Accordingly we have today appointed arboriculturalists to report regarding the extent of tree works to be undertaken. The arboriculturalists will liaise with neighbours as appropriate to progress the tree works.

During the summer period the tenants have advised that cracking and distortions have occurred. The shop unit doors have had to be adjusted to the rear. We returned to the property on 15th August 2014 to review the situation.

Record photographs taken 9th October 2013, 7th January 2014 and 15th August 2014 are enclosed which confirm slight worsening of the damage to the rear.

To clarify the extent of movement that is happening to the rear of the property and to confirm that such movement is being caused by the trees we have commenced both accurate level and crack width monitoring. If the monitoring confirms recovery at the rear as anticipated then this is confirmation that the Plane trees are the sole cause of the damage and the correct procedure is to remove their influence.

Front of Property

At the present time it is not clear why there should have been a return of cracking to the front of the property following removal of the trees in the footpath and a continued problem of distortion of the shop front and in particular the front entrance door.

To clarify if the post to the front elevation is load bearing and if foundation movement of this post is happening a trial pit will be progressed within the shop unit out of hours (i.e. during a Saturday afternoon/Sunday morning).

5.0 REVISED PROGRAMME

6.1 Address cause: January 2015

6.2 Complete monitoring: January 2015

6.3 Complete repairs: May 2015

[redacted]

BRET CHAMPION
PYLE CONSULTING