SUPPLEMENTARY INVESTIGATION REPORT

ON

CRACK DAMAGE

Name of Insured: Mr B Romeo

Address of Insured: 13A Mornington Place

London NW1 7RW

Situation of Damage: Rear Extension

IAS Ref:

Date of Investigation: 4 September 2019

Weather Conditions: Showers clearing, warm

Engineer: Geoff Shoebridge

Engineer's Ref:

Date of Report: 17 September 2019

Relevant Damage to the Property

Refer to previous Site Investigation Report dated 7 August 2019 for details of the damage present.

BRE Digest 251 Classification: Category 3 (moderate)

Outbuildings/Garage:

N/A

Patio/Pavings:

N/A

2. General Comments

Record drawings of the foundations for the rear extension were made available by the Insured and copies of the Consulting Engineers' drawings (DMC Consulting Engineers Ltd) are included herewith. The relevant sketches are SK01 & SK02 which show that the rear wall of the existing garages at the front of the property was underpinned as part of the works and the sections specified a depth of 1500mm. The drawings also show that the rear wall was provided with a pad and beam foundation, consisting of mass concrete pad foundations which supported ground beams formed with cased steel beams. Additional ground beams were provided spanning between the rear of the Garage and the pad foundations to the rear of the extension to support a suspended beam and block floor. The drawings also specify a depth of 1500mm for the pad foundations, although there is a note which states that the depth of the pad bases and underpinning was to be agreed with the Local Authority Building Control.

Is Movement Recent?

First noted 18 months to 2 years ago, worsened through

the summer of 2018.

3. Site Conditions

Terrain/Topography:

Reasonably level site. General topography slopes down

gently to the east.

Subsoil Type Established by Site Investigations:

Very stiff and dry sandy clay with brick, flint gravel, concrete and glass fragments (Made ground) to 3.2m

List Trees in Vicinity:

See site plan with previous report.

Any Relevant Knowledge of Subsidence in Area:

Yes

Other Factors:

BGS Sheet indicates London Clay

4. a) Investigations Completed at Time of Inspection

Trial Pits:

Yes. 1 internal

Boreholes:

Yes. 1

Hydraulic Tests on Drainage:

No

CCTV Survey of Private

Drainage:

No

Others (Specify):

N/A

b) Laboratory Analysis Undertaken

Atterberg Limit:

Yes 4

Moisture Content Profiles:

Yes 1

Root Identification:

Yes

Others (Specify):

No

c) Water main Check

No

Survey Requested on Local

Authority Drainage:

No

5. Summary of Investigations Completed

A Trial Pit 3 (Internal)

Following the previous unsuccessful external trial pits, an internal trial pit was excavated within the Utility Room. See sketches 19088/SK2 and SK3 for details.

- (i) Foundation
- (a) Type: Concrete pad foundation with brick edging
- (b) Depth below ground level: 1300mm
- (ii) Soil
- Type: Very stiff and dry sandy clay with brick, flint gravel, concrete and glass fragments (Made ground) to 3.2m
- (b) Plasticity: Low to Medium plastic, therefore, prone to volumetric change with variations in moisture content.
- (iii) Roots
- (a) Type: Cedar and unspecified conifer
- (b) Location of tree root identified: Within risk address.

B Drainage

Refer to previous report for details of the CCTV drainage survey.

C Engineer's Conclusions

The pattern of cracking and damage within the rear extension, which includes the Lounge extension and Utility Room extension, is mostly consistent with foundation movement, with the rear left-hand corner of the extension and Utility Room having dropped.

Record drawings indicate that the rear extension is mainly supported on pad and beam foundations, and the engineers' drawings indicate mass concrete pad foundations to a depth of 1500mm with cased steel ground beams supporting the superstructure and ground floor. The drawings available only appear to show the foundations to the main Lounge extension and even then the dimensions do not correspond with the site measurements taken.

Due to site constraints and to satisfy the concerns of the Insured, permission was obtained to excavate an internal trial pit within the Utility Room. For practical reasons this was located in the rear right-hand corner where there was a recess which was not covered with floor tiles. It was expected this would expose the foundations of the Utility Room extension, but recognised that this would not reveal the foundations of the Lounge extension.

Details of the trial pit are included within Auger's report and our more detailed sketches 19088/SK2 and SK3. The trial pit revealed an unreinforced concrete slab varying between 150mm and 200mm thick, beneath which was a tarpaulin, assumed to act as a DPM (?). Adjacent to the rear wall a further 150mm concrete slab was found beneath the upper slab, although this was not present adjacent to the projection along the right-hand flank wall.

In the comer of the room the top and edges of a concrete pad foundation were uncovered. Probing indicated this extended to a depth of 1.3m below floor level.

A hand auger borehole was sunk to 3.2m depth and proved a very stiff, dry, sandy clay with scattered to abundant flint gravel and fragments of brick, concrete and glass. The soils became more clayey with depth with a reduced content of brick, concrete and glass. As such, to soils encountered would be classed as made ground.

Soils testing confirms that the sandy clay to 2.3m depth is of low plasticity, no doubt due to the greater non-clay content. From 2.3m to 3.2m the clay is of medium plasticity. Comparison of moister contents with Atterberg Limits indicates desiccated conditions for the full depth of the borehole.

Roots were found for the full depth of the borehole and have been identified as Cedar and unspecified conifer. It is safe to assume these roots emanate from the conifer trees along the adjacent boundary within the risk address.

It is therefore concluded that the damage to the property is due to foundation subsidence caused by desiccation of the underlying sandy clay soil by the adjacent conifer trees.

D Engineer's Recommendations

- 1. It is recommended that the cedar, pine and cypress trees growing along the left-hand boundary should be removed. However, given that the Utility Room flank wall steps in to avoid one of the trees, we suspect that these may have Preservation Orders on them and as such the Local Authority may object to their removal. The property is also thought to be in a Conservation Area. Consideration should therefore be given to obtaining an arboricultural report in this respect.
- Assuming permission is obtained to remove the trees, then monitoring should continue until the property stabilises. Once stability is confirmed then superstructure repairs can be undertaken.
- If it is not possible to remove the trees then consideration may need to be given to foundation stabilisation works.



B.Eng. (Tech) (Hons.), C.Eng., M.I.Struct.E., MRICS, MCABE





Site Investigation Report

Auger Ref:



| Job Information | |
|-----------------|-----------------------|
| Client | PBA Consulting - Subs |
| Client ref | |
| Visit date | 04/09/2019 |
| Report date | 04/09/2019 |











A. Salament of the base by the second of the

Job Information

Overview

Brief

Auger were commissioned by PBA Consulting - Subs to undertake a site investigation within the area of concern at the property.

Previous Visit (16/07/2019) We previously attended site on 16/07/2019 and attempted to complete two external trial holes at the rear of the property. However, we were unable to locate the foundations within either trial hole as there were multiple services running directly through the area. Following this, we carried out a borehole within the open trial hole 1 excavation but this was terminated at 1.5m due to encountering hard made ground.

We returned to site on 04/09/2019 to undertake one internal trial hole as per the new instruction received from the loss adjuster.

Findings

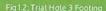
Trial Hole Findings η Please note that due to depth, the foundation was not necessarily exposed. However, foundation depth and profile have been assured via probing techniques.

2) Please note that the loss adjuster attended site to collect all of the soil and root samples.

Photographs

rial Hole 3

Fig 1.1: Trial Hole 3 Location







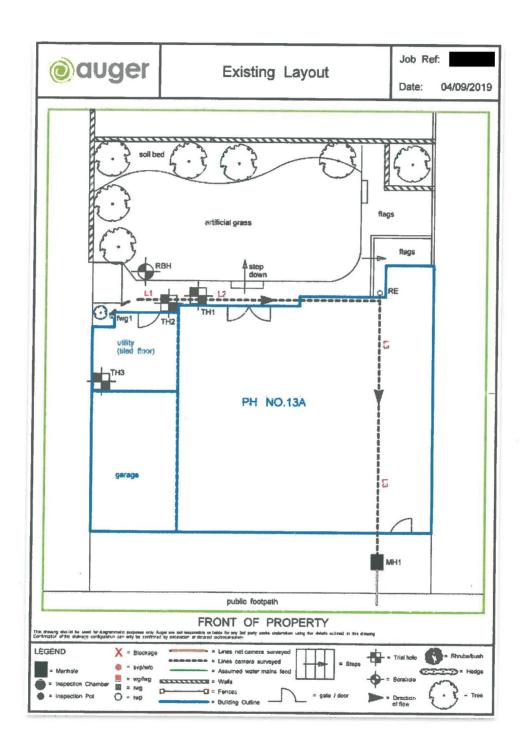
Other Photos

Fig 2.1: Soil sample collected

Fig 2.2: Root samples collected





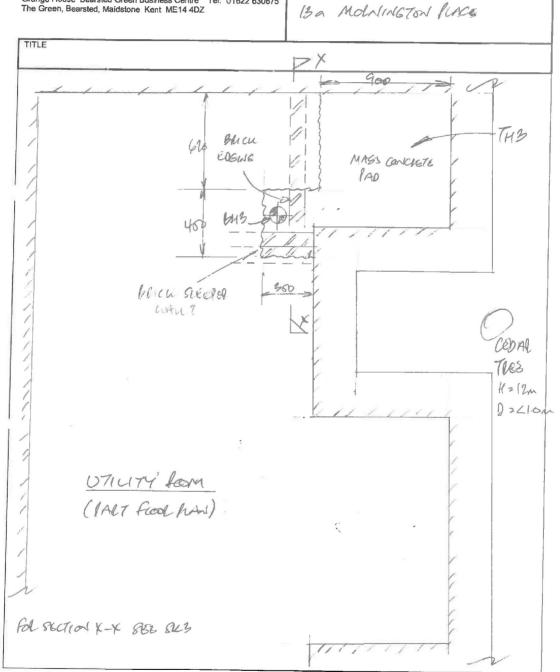


| © CI | ger | Trial Hole Log No Location: Internal in utility | | Job Ref | | |
|--------------|---------------------------------|---|------------------|------------------------|------------------------------|----------------------------------|
| Depth (m) | Symbolic Log Strata Description | | | Insitu Tests SV(19) Of | | Root Sample |
| 0.0 | 150mm | Ground Level Tites Brickwork Single Step | 884;58 | | Soil | Root |
| .5 | | Dry very stiff brown CLAY with occasional stone inclusions | 98kpa | | © 1.3m Soil © 1.8m | @ 1.3m Root @ 1.8m |
| 5 | | | 130kpa 130kpa | 300 - 440 | Soil 2.3m Soil 2.8m | Root @ 2.3m Root @ 2.8m |
| 0 | | TRIAL HOLE TERMINATED | 130kpa | | | |

| PBA | Consulting |
|-------------------|--------------|
| the second Ed the | en indicting |

Grange House Bearsted Green Business Centre Tel: 01622 630675 The Green, Bearsted, Maidstone Kent ME14 4DZ

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DATE JOB / SHEET No. Eng SOLT ROIG 60

13a Mobilial Ton PLACE TITLE 88CT(0) X-X = TH/6013 GALAGE WALL SITE TOP ON CONCRETE WAR ON SLAG. 18AD) FOUNDATION 150 conschits scory loo the conclute slab 80m. SANO TARPAULIN DAM? ALL PACK SLEEPER WAR ? 150 CONCRETE blica Suas BOGING MANY LARGE ROOTS AT MALLOW DEFTH (10-20 BIAMETON). MADE GLOWID BOTTOM OF FOUNDATION (AS PLOBED) VERY BRY FRAGIE SANDY CINY WITH SMAN FUNTS, BLICK & GLASS FOREMENTS + DOUTC (MADE GLOUND) AS 1.3-1.8 m (MADE GROWN) + lests -2.3m VOLY STIFF BRYCHY WITH FILLTS, below, concerté & GLASS (MADE GROUND PRESTS / PP = 300+, 444 Klar). AS 9.3-2-8m (MADE GROWD) +loo(s (18 = 1504). Bol To 3.2m -



LABORATORY REPORT

Date: 11th September 2019

Client: PBA Consulting



Site/Subject:

13A Mornington Place London NW1 7RW

This report details the results of geotechnical laboratory testing on soil samples from the above site and submitted for test on the $4^{\rm th}$ September 2019.

- 4 Nr. Atterberg Limits Tests
- 4 Nr. Natural Moisture Content determinations
- 4 Nr. Sample Preparations (Wash over 425micron sieve)

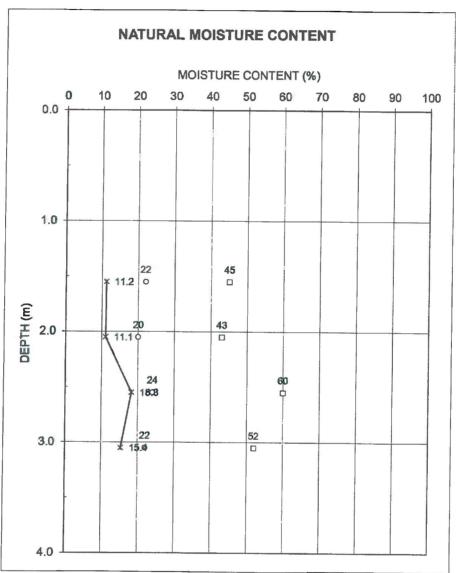
All tests have been carried out in accordance with BS 1377: 1999



For and on behalf of

Soiltec Laboratories Limited



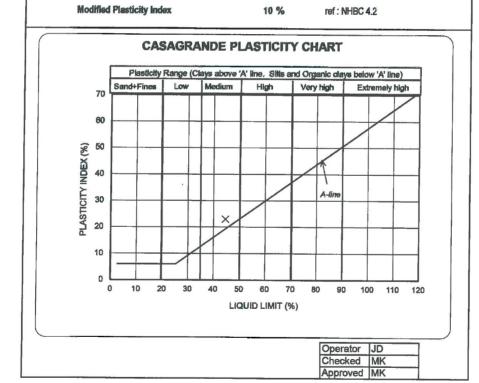


o - n indicates PL and LL results

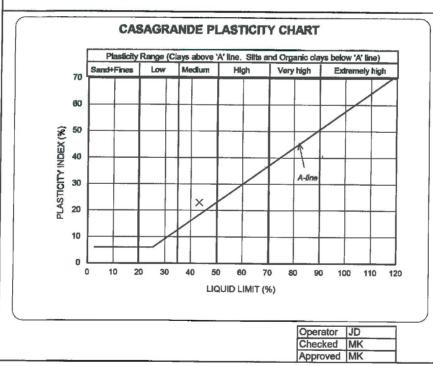
◆ - indicates 0.4 LL and should only be applied to London Clay

| Location: | 13A Mornington Place, Lond | on NW1 7RW Job ref: | |
|-----------|----------------------------|---------------------|-----------|
| | | BH/TP no: | TH 1 |
| Checked | AH | | |
| Approved | MK | Date | 11-Sep-19 |

| SO | Itec | PLA | STICITY INDEX | | | |
|----------|------------------------|---------|---|------------------|----------------|-----------|
| Client : | PBA Consulting | | | | Rep No: | |
| Site: | 13A Mornington Place | e, Lond | ion NW1 7RW | Boreh | ole/Trial Pit: | TH 1 |
| | | | | | Sample No: | 1 |
| | | | | Sampl | e Depth (m) | 1.30-1.80 |
| | | | | | Date: | 11/09/19 |
| | Sample description | i | Dark brown sandy clay with brick and glass fragments | | • | |
| | Test Method | ; | BS1377:Part2:1990:4.3 Mu | Itiple point met | thod | |
| | Sample preparation | 1 | washed on 425 micron siev | е | | |
| | Material passing 425µm | : | 43.09 % | | | |
| | | | | | | |
| | Natural Water Content | : | 11.2 % DES | (CCATED | | |
| | Liquid Limit | : | 45 % | 0.4LC, | 18% | |
| | Plastic Limit | : | 22 % | B~C 2 | 13.02 | |
| | Plasticity Index | ; | 23 % | | | |



| 201 | | PLAS | TICITY INDEX | | | |
|----------|--------------------------------|-------|--|----------------|-------------|-----------|
| Client : | PBA Consulting | | | | Rep No: | |
| Site: | 13A Mornington Pla | Boreh | ole/Trial Pit: | TH 1 | | |
| 1 | | | | | Sample No: | 2 |
| 1 | | | | Sampl | e Depth (m) | 1.80-2.30 |
| | | | | | Date: | 11/09/19 |
| | Sample description Test Method | ; | Dark brown sandy clay with brick, concrete and glass fr BS1377:Part2:1990:4.3 Mu | agments | | |
| | Sample preparation | ; | washed on 425 micron siev | | | |
| | Material passing 425µm | : | 47.00 % | | | |
| | Natural Water Content | : | 11.1 % | ESICCATON |) | |
| | Liquid Limit | : | 43 % | | | |
| | Plastic Limit | * | 20 % | | | |
| | Plasticity Index | : | 23 % | | | |
| | Modified Plasticity Index | | 11 % | ref : NHBC 4,2 | | |



| Soi | | PLASTICITY | INDEX | | |
|-------------|----------------|----------------------------|----------------------|---------------------|-----------|
| Client: | PBA Cons | ulting | | Rep No: | |
| Site: | 13A Morni | ngton Place, London NW1 7F | SW | Borehole/Trial Pit: | TH 1 |
| 7500 157500 | | | | Sample No: | 3 |
| | | | | Sample Depth (m) | 2.30-2.80 |
| | | | | Date: | 11/09/19 |
| | Sample descrip | tion : Dark brown | sandy clay with abun | lant small flints, | |

brick, concrete and glass fragments

Test Method

BS1377:Part2:1990:4.3 Multiple point method

Sample preparation

washed on 425 micron sieve

Material passing 425µm

81.72 %

Natural Water Content

18.3 %

DESICCATOD

Liquid Limit

60 %

Plastic Limit

24 %

Plasticity Index

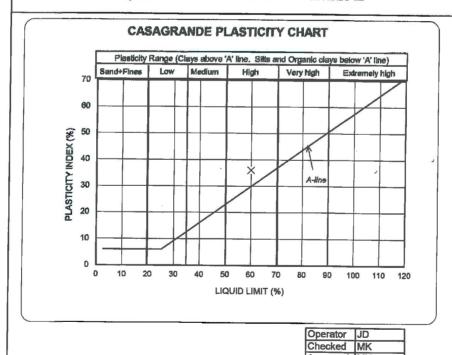
36 %

Modified Plasticity Index

29 %

ref: NHBC 4.2

Approved MK



| So | | PLA | STICITY INDEX | | | |
|---------|--------------------|-------------|--|-------|-----------------|-----------|
| Client: | PBA Consulting | | | | Rep No: | |
| Site: | 13A Mornington F | Place, Lond | lon NW1 7RW | Boreh | ole/Trial Pit : | TH 1 |
| | | | | | Sample No: | 4 |
| la . | | | | Samp | le Depth (m) | 2.80-3.30 |
| | | | | | Date: | 11/09/19 |
| | Sample description | : | Dark brown mottled orange scattered brick, glass fragm | | | |
| | Test Method | : | BS1377:Part2:1990:4.3 Mult | | | |
| | Sample preparation | : | washed on 425 micron sieve | ı | | |

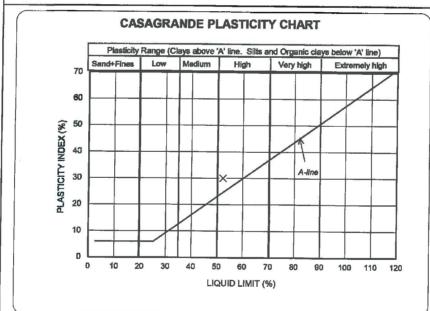
Material passing 425µm ; 71.79 %

Natural Water Content : 15.4 % NES ICCATED

Liquid Limit : 52 %
Plastic Limit : 22 %

Plasticity Index : 30 %

Modified Plasticity Index 22 %



ref: NHBC 4.2

Operator JD Checked MK Approved MK



P B A Consulting

BSc, MSc, PhD, MRSB, FLS James Richardson BSc (Hons, Biology)

Enterprise House

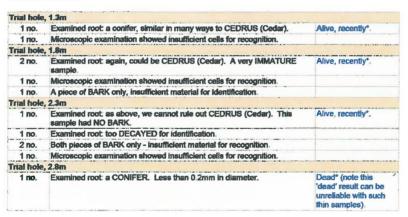


16/09/2019

Dear Sirs

13a Mornington Place

The samples you sent in relation to the above on 04/09/2019 have been examined. Their structures were referable as follows:



Click here for more information: CEDRUS

I trust this is of help. Please call us if you have any queries; our invoice is enclosed.



Based mainly on the lodine test for starch. Starch is present in some cells of a living woody root, but is more or less rapidly broken down by soil micro-organisms on death of the root, sometimes before decay is evident. This result need not reflect the state of the parent tree.

identified with no information on vegetation, on or off site.

