

Ing ealtóir

CONSULTING STRUCTURAL ENGINEERS

31 OVAL ROAD
LONDON NW1 7EA
020 7267 7540

TEL

PROJECT

Nº 3 HONEYBOURNE RD
LONDON

JOB NO.

15073

SHEET NO. AD.01

DATE JAN '16.

ENGINEER D.W.

CHECKED

GROUND MOVEMENT
ANALYSIS

THE SCOPING STAGE OF THE EIA, AS SET IN CP64 (2005) IDENTIFIES STRAIN IN ADJOINING PROPERTIES AS A RESULT OF GROUND MOVEMENTS RESULTING FROM WALL INSTALLATION AND EXCAVATION FOR THE PROPOSED BASEMENT, AS A POTENTIAL IMPACT.

IN ORDER TO QUANTIFY THE LEVEL OF POTENTIAL TO ADJOINING PROPERTIES AND THE PUBLIC HIGHWAY, WE HAVE UNDERTAKEN GROUND MOVEMENT ANALYSIS BASED ON THE EMPIRICAL APPROACH DESCRIBED IN CIRIA C580 "EMBEDDED RETAINING WALLS - GUIDANCE FOR ECONOMIC DESIGN".

THIS DOCUMENT PROVIDES CHARTS FOR VERTICAL & HORIZONTAL MOVEMENTS ARISING FROM WALL INSTALLATION & EXCAVATION. IT IS ASSUMED THAT:

- i) THE 'L'-SHAPED RETAINING WALL UNDERPINNING CORRESPONDS TO 'PLANAR DIAPHRAGM' WALL CONSTRUCTION AS INDICATED IN C580
- ii) MOD. SUPPORT STIFFNESS AT TOP OF PILES - PROPPED AT HIGH & LOW LEVEL IN TEMP CONDITION & TOP & BOT IN PERM CONDITION.

⇒ INTERPOLATE MODULY BETWEEN HIGH & LOW SUPPORT STIFFNESS, TABLE 2.4. C580.

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3 HONEYBOWNE ROAD
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15073

SHEET NO. A502

DATE

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GROUND MOVEMENT
ANALYSIS

A SUMMARY OF DIMENSIONS USED IN THE C500 ANALYSIS PRESENTED IN TABLE 1 BELOW. THIS SHOULD BE READ IN CONJUNCTION WITH THE TRIAL PIT SURVEY SHOWN ON ING DJS. NO 15073 / SKD3.

TABLE 1:

ADS. STRUCTURE	EST. WALL DEPTH.	EXCAV. DEPTH.	DISTANCE TO FACE OF STRUCTURE	LENGTH OF STRUCTURE PERP. TO BASEMENT
NO 1 & 5 HONEYBOWNE RD.	3.50 m	3.50 m,	6.00 m,	8.00 m
WIDENING OF HONEYBOWNE RD.			5.50 m.	6.00 m,

DISTANCE BEHIND WALL TO NEGLIGIBLE MOVEMENT:

- i) DUE TO WALL INSTALLATION = 5.25 m (TABLE 2.2 C500)
- ii) DUE TO EXCAVATION IN FRONT OF WALL = 14.00 m (TABLE 2.4 C500)

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			SHEET NO. AD. 03
	GROUND MOVEMENT ANALYSIS	DATE	
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THE ESTIMATED GROUND MOVEMENTS AT FRONT & REAR OF THE ADJACENT STRUCTURES DUE TO WALL INSTALLATION, TABLE 2 BELOW.

TABLE 2.

ADJ. STRUCTURE	WALL TYPE	GROUND MOVEMENTS AT FRONT OF ADJ. STRUCTURE		GROUND MOVEMENTS AT REAR OF ADJ. STRUCTURE	
		HORIZ.	VERT.	HORIZ.	VERT.
NOS 1 & 5 HONEYBOURNE RD.	PLANAR DIAPHRAGM	1.75mm	1.75mm	0	0
HIGHWAY OF HONEYBOURNE RD.	PLANAR DIAPHRAGM	0.14mm	0.14mm	0	0

ESTIMATED GROUND MOVEMENTS AT FRONT / REAR OF ADJACENT PROPERTIES AS A RESULT OF EXCAVATION, SHOWN IN TABLE 3 BELOW.

ADJ. STRUCTURE	WALL TYPE	GROUND MOVEMENTS AT FRONT OF ADJ. STRUCTURE		GROUND MOVEMENTS AT REAR OF ADJ. STRUCTURE	
		HORIZ	VERT	HORIZ	VERT
NOS 1 & 5 HONEYBOURNE RD.	PLANAR DIAPHRAGM	8.50mm	7.70	4.10	3.30
HIGHWAY OF HONEYBOURNE RD.	PLANAR DIAPHRAGM	5.76mm	4.60	1.70	1.30

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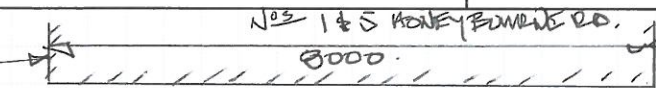
DATE

ENGINEER

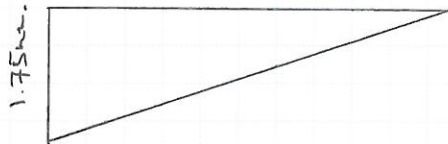
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SURFACE MOVEMENTS
DUE TO INSTALLATION
OF WALL & EXCAVATION.

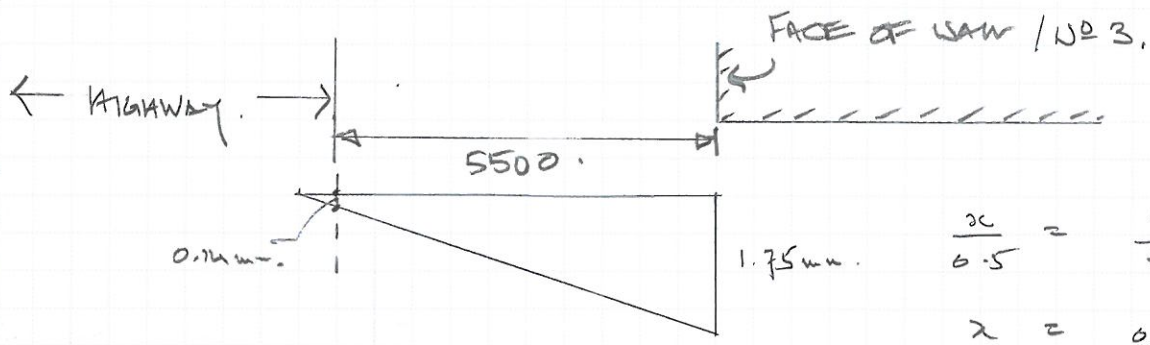
FACE
OF
WALL



WALL INSTALLATION:



VERT / HORIZ. MOVEMENT
= 0.05% OF WALL DEPTH.



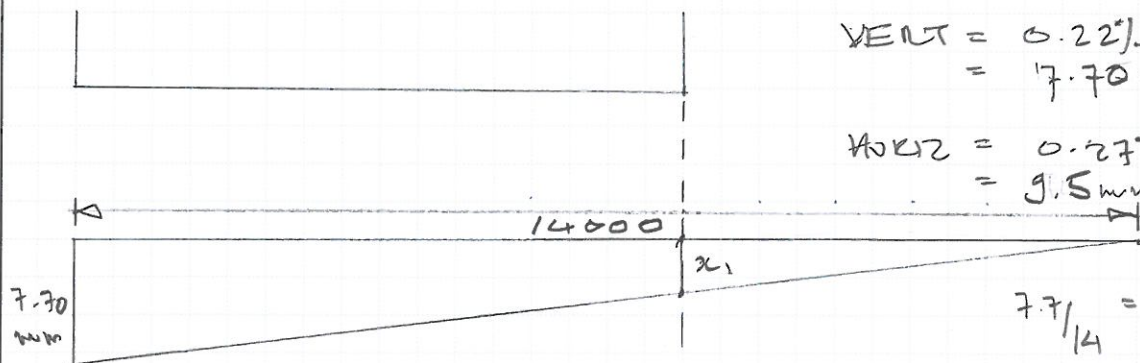
$$\frac{x_c}{0.5} = \frac{1.75}{5.00}$$

$$x = 0.14 \text{ mm}$$

EXCAVATION:

VERT = 0.22% OF DEPTH
= 7.70 mm.

HORIZ = 0.27% OF DEPTH
= 9.5 mm.



$$\frac{7.7}{14} = \frac{x_1}{6.0}$$

$$x_1 = 3.3 \text{ mm}$$

VERT. INTERPOLATION.



$$\frac{3.5}{14} = \frac{x_2}{6}$$

$$x_2 = 4.1 \text{ mm}$$

HORIZ. INTERPOLATION.

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GROUND MOVEMENT
ANALYSIS.

SURFACE MOVEMENT DUE TO EXCAVATION OF HIGHWAY:

$$y_1 = \frac{8.5 \times 7.7}{14}$$

$$= 4.6 \text{ mm}$$

$$y_2 = \frac{2.5 \times 7.7}{14}$$

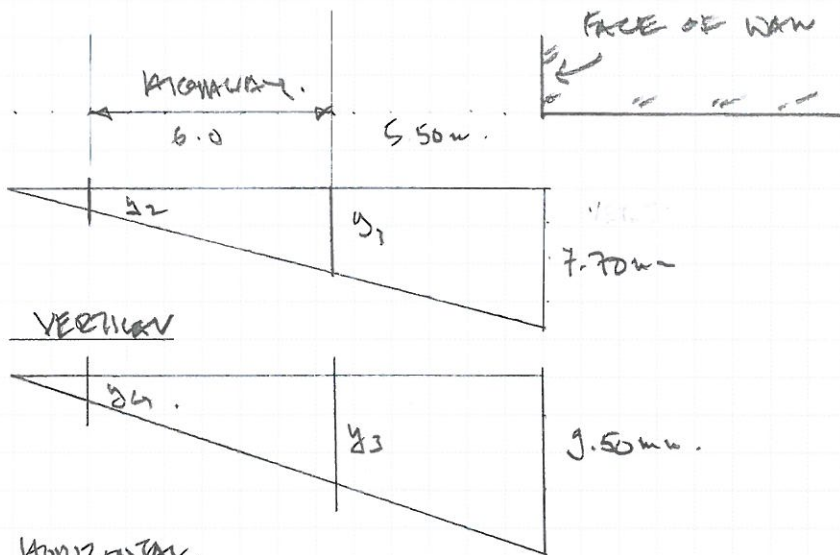
$$= 1.38 \text{ mm}$$

$$y_3 = \frac{8.5 \times 9.5}{14}$$

$$= 5.76 \text{ mm}$$

$$y_4 = \frac{2.5 \times 9.5}{14}$$

$$= 1.76 \text{ mm}$$



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ANALYSIS

TABLE 4:

COMBINED HORIZONTAL & VERTICAL MOVEMENT DUE
TO WAW INSTALLATION & EXCAVATION.

ADJ. STRUCTURE	GROUND MOVEMENTS AT FOOT OF ADJ. STRUCTURE		GROUND MOVEMENTS AT REAR OF ADJ. STRUCTURE	
	HORIZ.	VERT.	HORIZ.	VERT.
N ^o 1 & 5 HONEYBOWNE RD.	11.25	9.45	4.10	3.30
WIDENING OF HONEYBOWNE RD.	5.90	5.74	1.70	1.38

HORIZONTAL TENSILE STRAIN:

N^o 1 & 5
HONEYBOWNE RD

$\epsilon_h (\%)$

0.08%

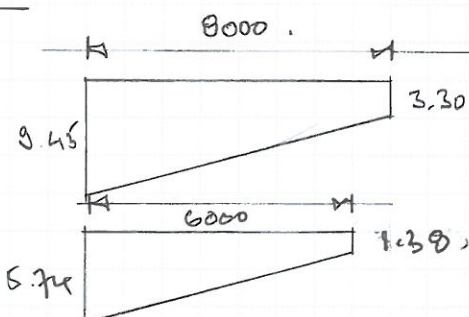
WIDENING

0.07%

DEFLECTION RATIO:

N^o 1 & 5
HONEYBOWNE ROAD

WIDENING



Δ/L

ϕ

ϕ

FIG. 2.8
C580

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GROUND MOVEMENT
ANALYSIS.

DAMAGE CATEGORY CORRESPONDING TO HORIZONTAL STRAIN
AND DEFLECTION RATIO, GRAFIA 'C' FIG. 2.18, C590

FOR NOS 1 & 5 HONEYBOWNE ROAD,

$\Delta/L = 0$, $\epsilon_A = 0.08 \Rightarrow$ CATEGORY 2 (BURLAND)
THIS IMPLIES DAMAGE WOULD BE 'SLIGHT'.

DAMAGE CATEGORY TO HIGHWAY IS SLIGHTLY LESS, BUT
RESULTS IN CATEGORY 2. THE 'BURLAND' CLASSIFICATION
HOWEVER ONLY APPLIES TO MASONRY BUILDINGS AND IS
THUS NOT APPLICABLE TO HIGHWAY PAVEMENTS.