

Appendix C



Ground Movements for 5 Westbere Road, London

Taking height of adjacent house as H=11m and width of terrace as L=11m

Then L/H=1

Depth of basement excavation to No 5 take as 2.75m. Depth of walls 3.05m.

Horizontal movement due to installation of wall

$$0.05\% \times 3050\text{mm} = 1.525\text{mm}$$

$$\text{Distance to negligible movement } 1.5 \times 3050\text{mm} = 4575\text{mm}$$

Horizontal movement due to excavation

$$0.15\% \times 2750\text{mm} = 4.125\text{mm}$$

$$\text{Distance to negligible movement } 4 \times 2750\text{mm} = 11,000\text{mm}$$

Maximum horizontal movement is 5.65mm (1.525+4.125mm)

$$\text{Horizontal strain over 11.0m is } 5.65\text{mm} / 11,000\text{mm} \times 100 = 0.051\%$$

Vertical movement due to installation of wall

$$0.05\% \times 3050\text{mm} = 1.52\text{mm}$$

$$\text{Distance to negligible movement } 1.5 \times 3050\text{mm} = 4575\text{mm}$$

Vertical movement due to excavation

$$(0.10\% \times 2750\text{mm} = 2.75\text{mm from Table 2.4})$$

Instead use Fig 2.11(b) which is more accurate and shows 0.05% at the wall, 0.1% is never reached by the curve or the measured ground movements, so 0.05% is conservative.

$$0.05\% \times 2750\text{mm} = 1.37\text{mm}$$

$$\text{Distance to negligible movement } 3.5 \times 2750 = 9625\text{mm}$$

Maximum vertical movement is 4.12mm

House slope calculated as (max vert settl at wall – settl at 5.5m/11m*(5.5-x))+settl at 5.5m, where x=distance from wall.

By plotting house slope for full 11.0m distance of strain the maximum deflection (total vert settlement minus house slope) calculated is 1.55mm at 0m distance from the party wall. Therefore take- 1.55mm for deflection to be conservative.

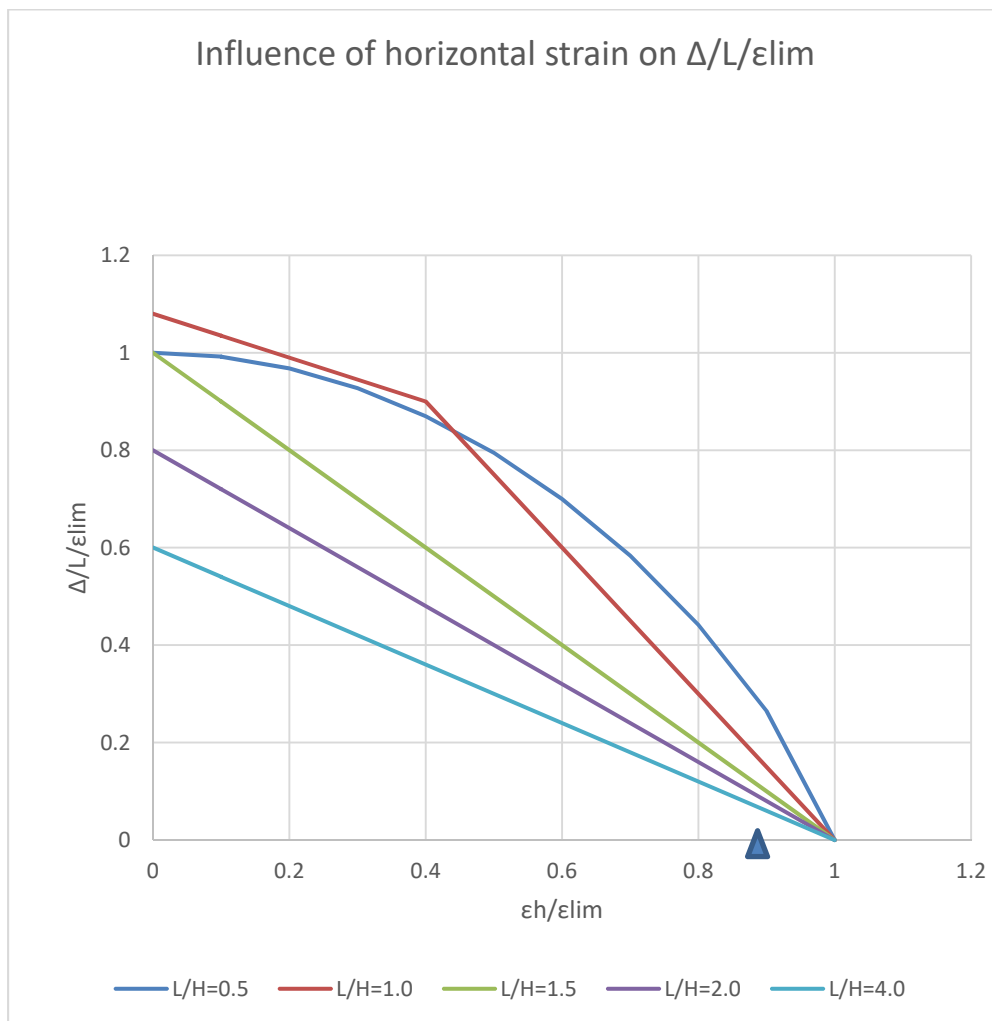
$$\text{Deflection/length} = -1.55/11000 = -1.41\text{E-}04$$

$$\text{Deflection/length/Elim for Category 1} = -1.41\text{E-}04 / 0.075 = 0.00187878 = 1.879\text{E-}03$$

Horizontal strain/ ϵ_{lim} for Category 1 = $0.068636 / 0.075 = 0.91514667$

The above plotted on CIRIA 580 Fig 2.18b fall below the $L/H = 1$ (as required).

Therefore anticipated Damage Category according to C580 Table 2.5 is negligible to very slight.



Monitoring Strategy

Groundworks for construction of a basement pose a risk of movement and damage to adjacent properties. The construction at No 5 Westbere is for a basement extension and lightwell only, as the basement already exists. Temporary works and the inclusion of a Party Wall Agreement in line with the Party Wall Act, including condition surveys of adjacent properties, will ensure that risks can be controlled.

The following mitigating measures are proposed to reduce the risk of damage to neighbouring properties.

- Record and monitor the neighbouring properties, by a condition survey under the Party Wall Act before and after the works are completed.
- Employ suitably qualified structural engineers.
- Provide detailed Method Statement to Contractors.
- Use Contractors experienced in construction of basements and lightwells.
- Allow for unforeseen ground conditions, including loose soil, ingress of groundwater following heavy rainfall and other considerations.
- Undertake Risk Assessment.
- Specify monitoring instrumentation.

Monitoring during the works should include:

- Inspection of party walls and foundations by Party Wall Surveyor during the work.
- Lateral and vertical monitoring if considered necessary by Party Wall Surveyor.
- If damage is recorded on a neighbouring property, install tell tale monitors to check movement.
- Stop work if movement is recorded on tell tales in excess of Party Wall Agreement or red risk in table below.

MOVEMENT			
Vertical	Lateral	Risk	Action
0mm to 4mm	0mm to 6mm	Green	No Action
4mm to 8mm	6mm to 10mm	Amber	Structural survey of Party walls
>8mm	>10mm	Red	Structural survey, cease works if necessary except for making site and party walls safe. Revise method of working.

