Appendix D

GROUND MOVEMENT CALCULATIONS AND DAMAGE CATEGORY

Re Houses adjacent to 54 Shirlock Road

Taking height of adjacent house as H=13.6m and width of house as L=5.585m

Then L/H=0.42

Depth of basement to No 54 take as 4m.

Horizontal movementdue to installation of wall

0.05% x 4000mm = 2mm

Distance to negligible movement 1.5 x 4000mm = 6000mm

Horizontal movement due to excavation

0.15% x 4000mm = 6mm

Distance to negligible movement 4 x 4000mm = 16,000mm

Maximum horizontal movement is 8mm

Horizontal strain over 16m is 8mm /16000mm x100 = 0.05%

Horizontal Strain beneath adjacent house is 8mm-4.03mm (settlement at 5.585m)=3.97mm/5588mm*100/1000=0.071% (conservative)

Vertical movement due to installation of wall

0.05% x 4000mm = 2mm

Distance to negligible movement 1.5 x 4000mm = 6000mm

Vertical movement due to excavation

(0.10% x 4000mm = 4mm 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% x 4000mm = 2mm

Distance to negligible movement 3.5 x 4000 = 14,000mm

Maximum vertical movement is 4mm

By plotting house slope for full 5.585m distance the maximum deflection (total vert settlement minus house slope) calculated is 0.65mm at 2m distance from the wall.

House slope calculated as max vert settl at wall – settl at 5.585m/5.585*(5.585-x)+5.585, where x=distance from wall.

Therefore take 0.65mm for deflection to be conservative.

Deflection/length = 0.65/5585 = 0.0116%

Deflection/length/Elim for Category 1 = 0.0116/0.075 = 0.1555

Horizontal strain/Elim for Category 1 = 0.071/0.075 = 0.95

The above plotted on Fig 2.18b fall below the L/H = 0.5 line as required.

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