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| JDS | 12/12/14 | | 3 KIDDERPORE AVENUE | |

## EFFECTS OF CONSTRUCTION ON 5 KIDDERPORE AVENUE

Ground/structural movements may occur as a result of

1) Shallow underpinning to the boundary wall
2) Installation of bored pile wall
3) Excavation.
4) Long term effects** (Not considered to be relevant)

The underpinning will be done after the piled wall has been constructed. It is 600 mm deep and will only cause a small localised settlement to the boundary wall. For this assessment, assume the settlement is less than 2 mm.

Installation of the piled wall, which is assumed to be 10 metres deep is likely to result in a maximum settlement of less than 0.04 % H i.e. 4 mm, decreasing to zero at 20 metres from the wall (see CIRIA C580, fig 2.8). Horizontal movement is likely to be less than 0.02 % H, ie 2 mm, decreasing to zero at 20 metres.

Excavation

Taking the worst case ($E/c_u = 600$, $k_o = 1.5$)
The deflected wall shape is shown in the following figure for the three stages of construction. The envelop of deflection can be used (see CIRIA C580 fig 2.16) to derive the settlement profile behind the wall, as shown in the figure.

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This shows a deflection ratio ($\Delta/L$) of around 0.03 % assuming that the width of the building is around 145 m. The horizontal strain across the building is small because the top of the wall (which is fixed to the boundary wall) is constrained; the worst credible horizontal strain is around 1 mm / 145 m ie. < 0.01 %.

The accumulated deflections are as follows:

1 Settlements

(i) Near boundary wall

- Pile construction −4 mm. -ive = settlement
- Underpinning −2 mm
- Excavation +2 mm

probable heave during excavation

Worst case −6 mm

(ii) Maximum — at around 6 m from the boundary

- Pile construction −3 mm
- Underpinning 0
- Excavation −4 mm

(iii) Far boundary

- Pile construction −1 mm
- Underpinning 0
- Excavation −1 mm

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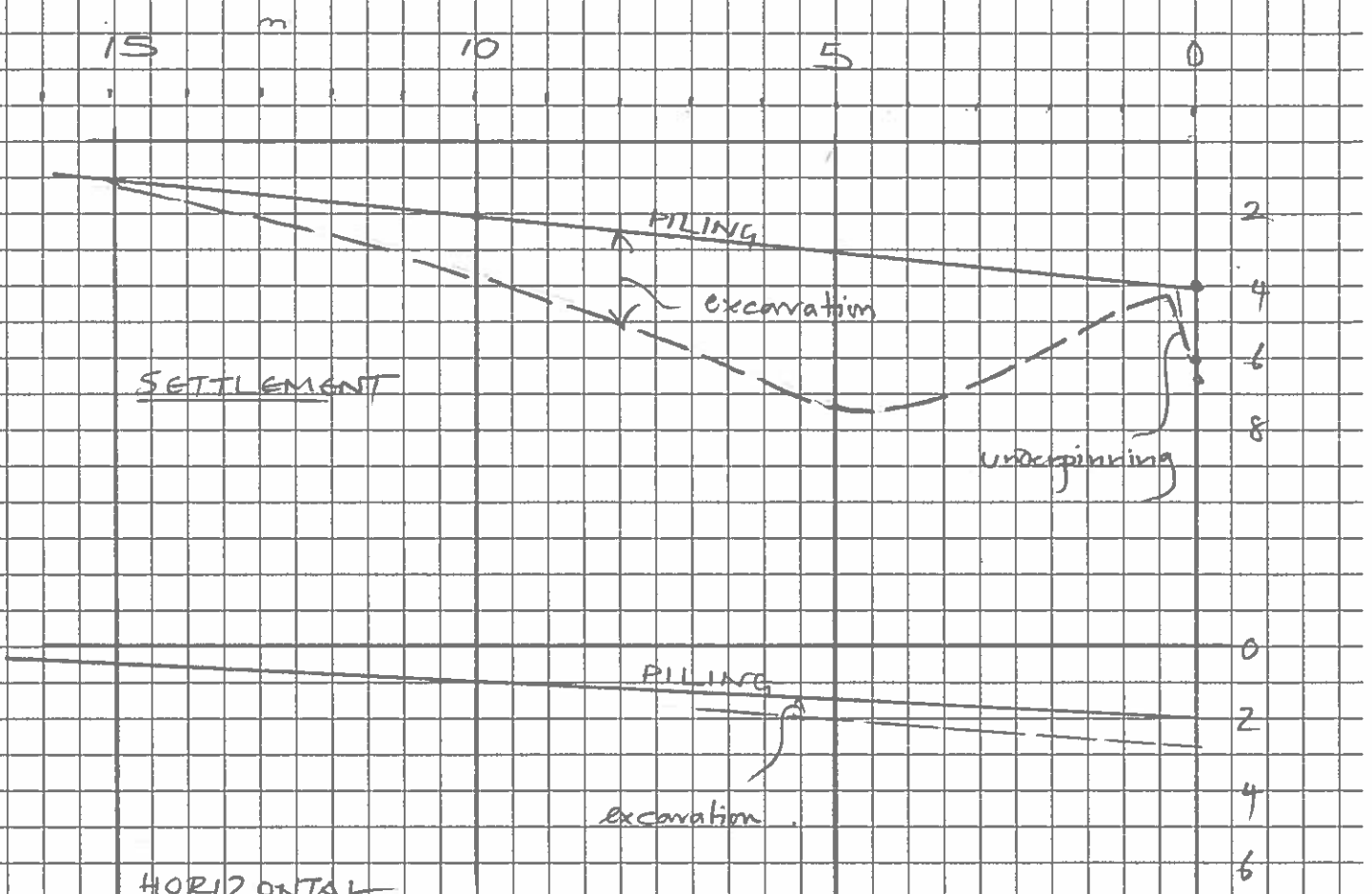
| JDB | 12/12/14 | | 3 KIDDERPORE AVENUE | |




Based on this assume $\Delta/L = 0.03\%$

$\varepsilon = 3/145 \text{ mm/m} = 0.02\%$

Based on building with $L/H = 1.0$ (CIRIA C580 fig 2.18)

This puts building in category 0.

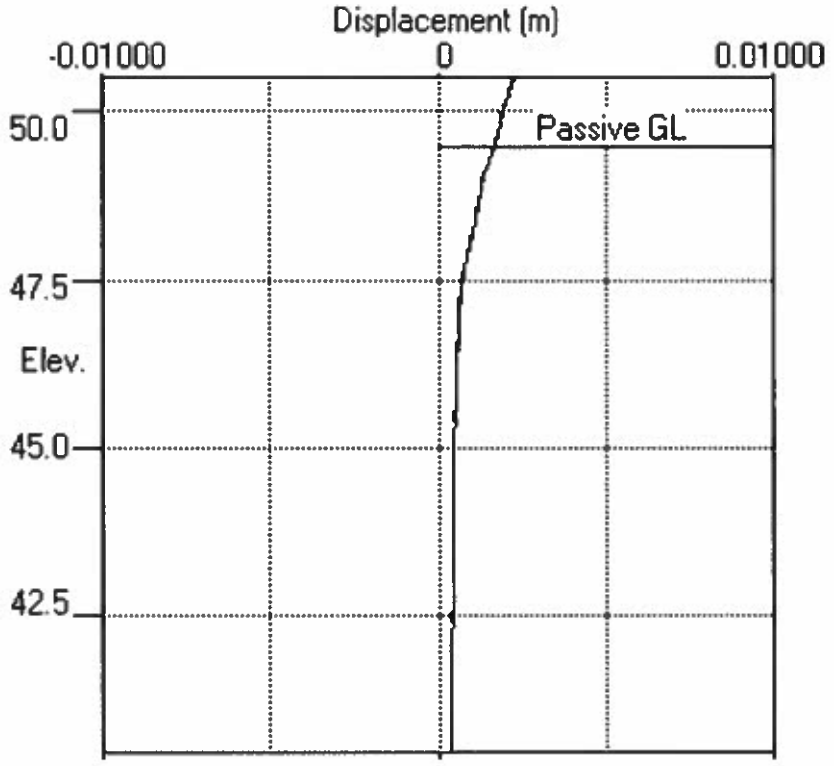
Local settlement of the boundary wall relative to the wall of the main structure could result in strains at the junction between the side extension and the original building. This would occur when underpinning was done, but reverse bowing

excavation. It is highly unlikely that a crack of greater than around 4 mm could occur (i.e. within the "slight" category

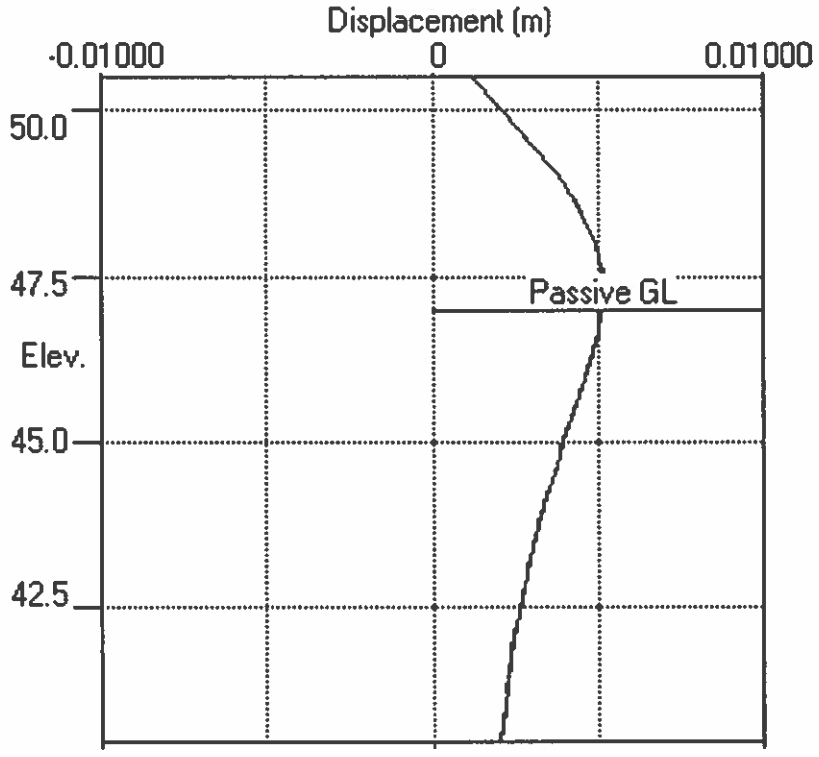
Regarding general damage, the most vulnerable part of the building is the high ceiling. As the building is "sagging" this would, theoretically be in compression

The side walls are the most likely elements to suffer any strain, and are unlikely to suffer more than negligible damage.

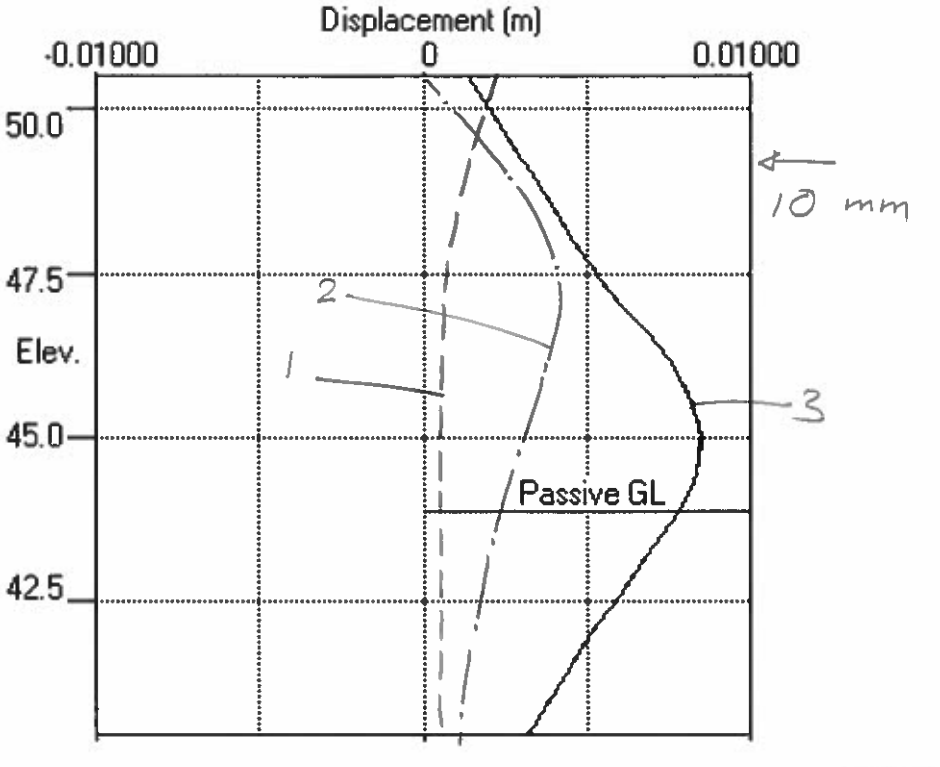
In conclusion, the worst damage is likely to be localised and will not affect the structural integrity of the structure. Generally the damage is less than "very slight".




Stage 1

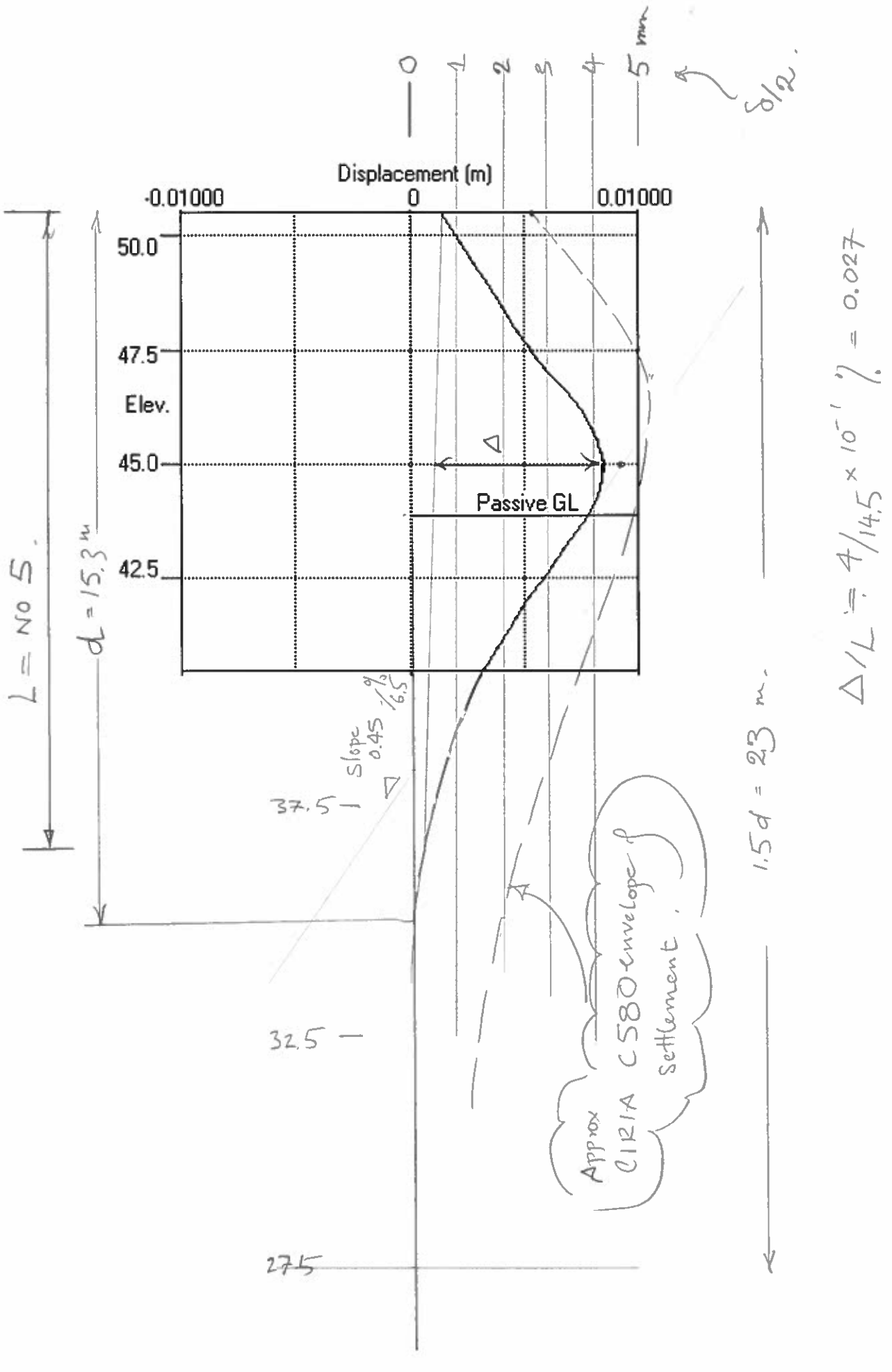



Stage 2




Stage 3

Wall deflections –adjacent to 5 Kidderpore Avenue.


0
1
2
3
4
5 mm
δ/2.
Displacement (m)
-0.01000
0
0.01000
50.0
47.5
Elev.
45.0
42.5
Passive GL
L = NO 5.
d = 15.3 m
slope 0.45 % 1/6.5
37.5
32.5
27.5
1.5d = 23 m.
Approx C1R1A C580 envelope of settlement.
Δ/L ≒ 4/14.5 × 10⁻¹ % = 0.027

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## EFFECTS OF CONSTRUCTION ON 1A KIDDERPORE AVENUE

Ground/structural movements may occur as a result of

1) Installation of steel sheet piles
2) Excavation

The walls are not underpinned.

The installation of steel steel piles, as noted in earlier reports, is likely to give rise to some heave and movement away from the excavation. This is not likely to cause except possibly where the extension at the rear of the property butts up against the main building, because the two parts behave differently. The most likely event is that the extension tilts more than the main building, resulting in a separation at foundation level. This could be manifest as slight widening of the base of door frames or possibly some cracking at low level.

The attached figures give the predicted worst case wall movements during excavation from which the settlement profile is derived. The envelope is used to estimate the deflection ratio for the main building of around 0.04%. The horizontal strain across the main building which is set back 2 m from the footway, is 0.02%. The single storey extension to the rear is similarly affected.

Based on $\Delta/H = 0.04\%$ and $\varepsilon = 0.02\%$, CIRIA C580 fig 2.18 would put the building on the border between

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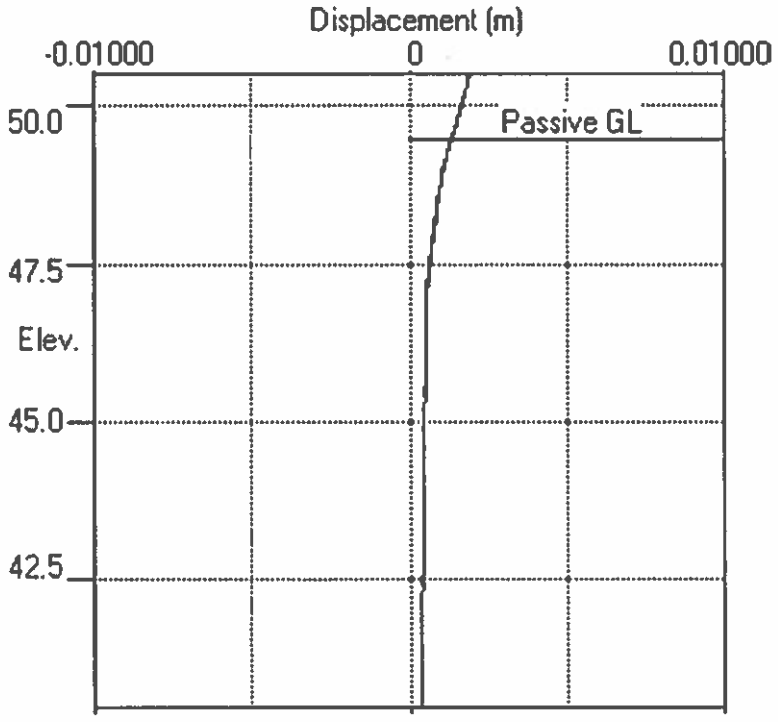
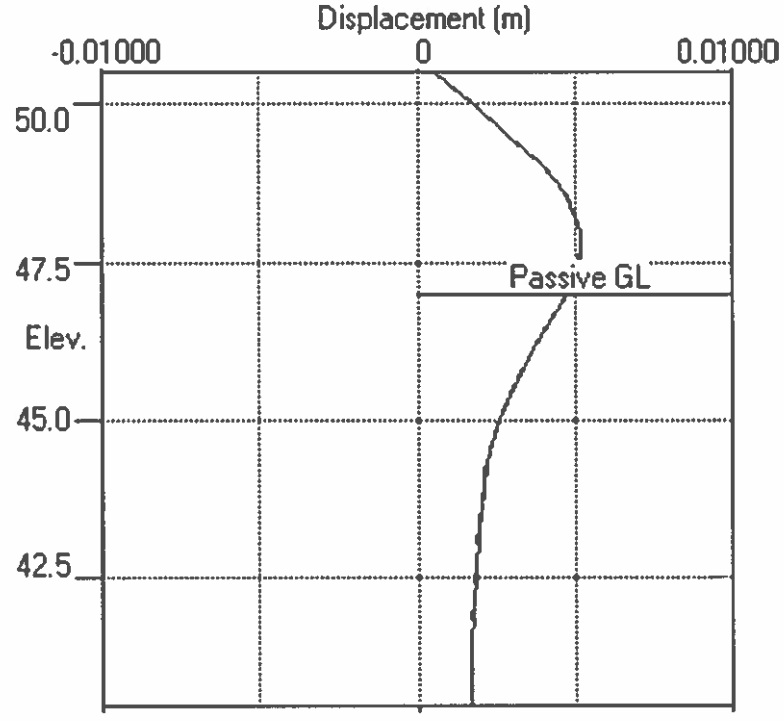
"negligible" and "very slight."

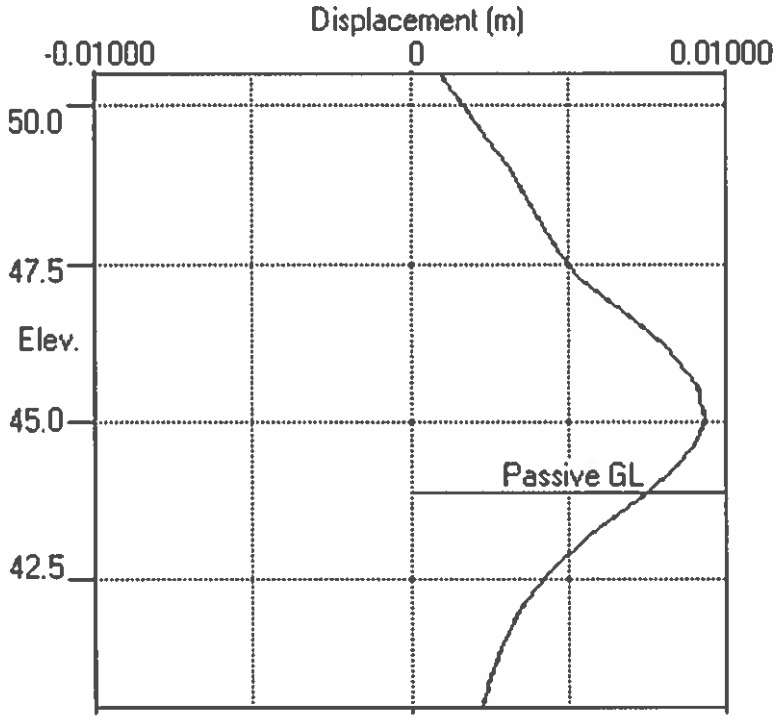
The building is in "Sagging" mode. Any pre-existing cracks in walls running perpendicular to the boundary at the top of the building will be likely to close.



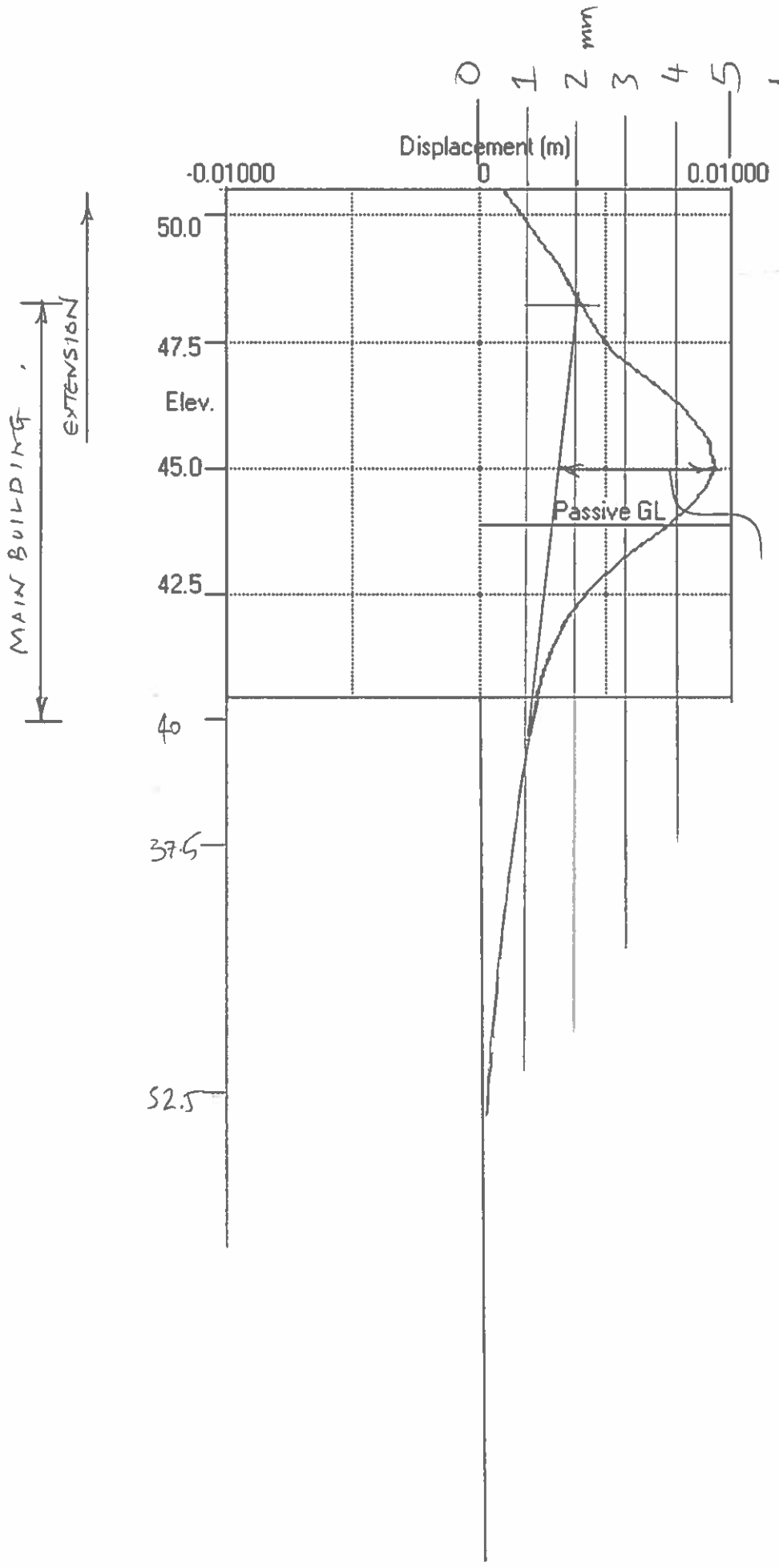

Stage 1




Stage 2


Displacement (m)
-0.01000
0
0.01000
50.0
47.5
Elev.
45.0
42.5
Passive GL

Stage 3




$\Delta/L \doteq 3/8$ mm/m $= 0.04$ %

$\varepsilon = 2/8$ mm/m $\equiv 0.01$ %

Assuming $\delta_H = 2\delta_V$