WILLIAM HUNT CONSULTING

Address: 84B Bartholomew Road, London, NW5 2AS

Monitoring Review Report

WHC Reference: [redacted]

Client: Crawford & Company

Client Reference: [redacted]

Report Date: 4th September 2023

The Knowledge to Proceed

Establish Movement

Job Overview

Brief

William Hunt Consulting were commissioned by Crawford & Company to undertake a Monitoring Review Report from satellite monitoring data to provide evidence of movement towards the front section of the main property.

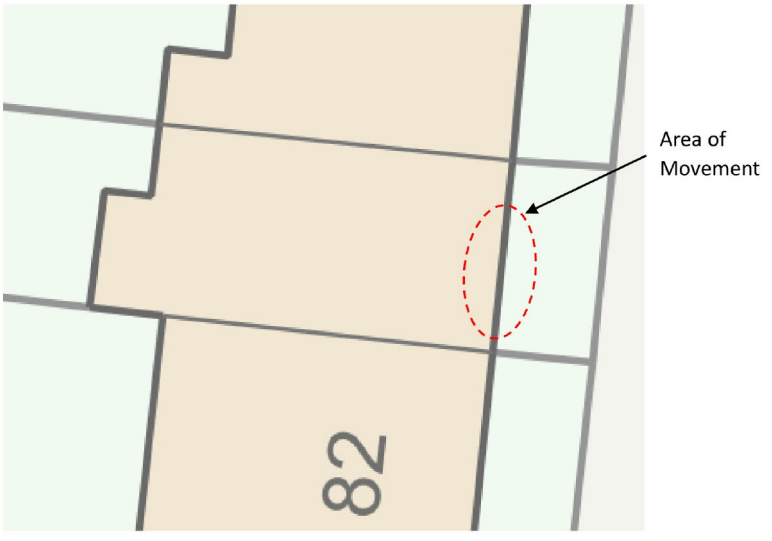
Site Information

Property Description

The property comprises of a three-storey terraced building, with traditional 9'' solid brick external wall construction surmounted by a pitched, timber / tiled roof. The property benefits from a forecourt to the front, delineated with low level brick wall. The site occupies a raised position relative to the adjacent road.

Damage Description

We understand that the main area of damage primarily concerns the front section of the property.



Index

Satellite Monitoring Data & Graphs

Figure (i) – Site plan denoting areas of varying movement
(Darker Red denoting increase in movement)

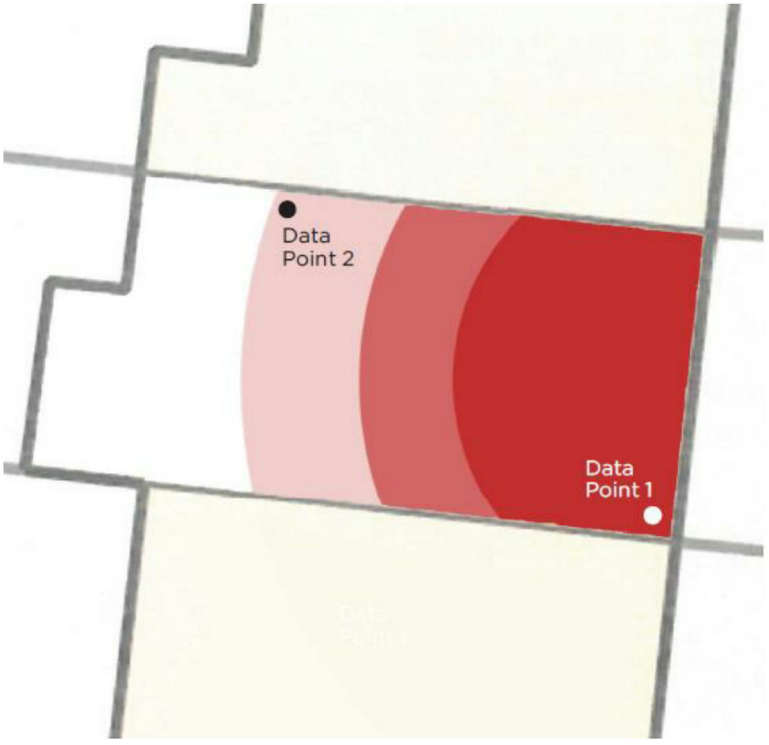


Figure (ii) – Satellite monitoring data, dated from 10th March 2021 to 30th January 2023

	Point 1	Point 2
10/03/2021	0.00	0.00
13/05/2021	1.52	-0.76
12/07/2021	-2.03	0.03
14/09/2021	-3.11	1.13
24/11/2021	1.65	0.38
27/01/2022	2.88	0.42
25/03/2022	2.75	0.51
28/05/2022	-0.05	-0.75
22/07/2022	-0.89	-0.62
25/09/2022	-4.13	-0.92
28/11/2022	2.52	-0.78
30/01/2023	3.43	0.00

Figure (iii) – Satellite monitoring data in graphical form

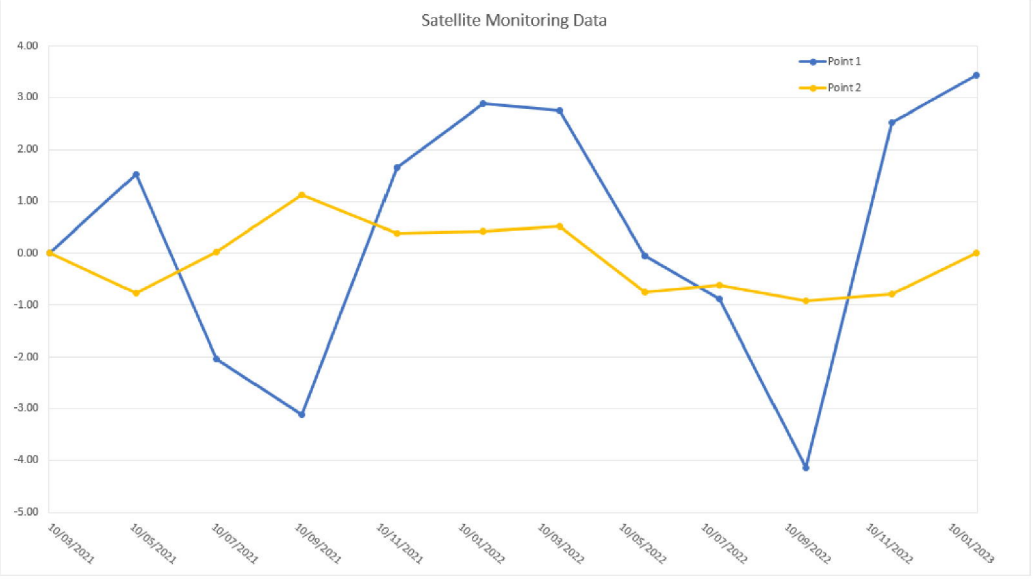


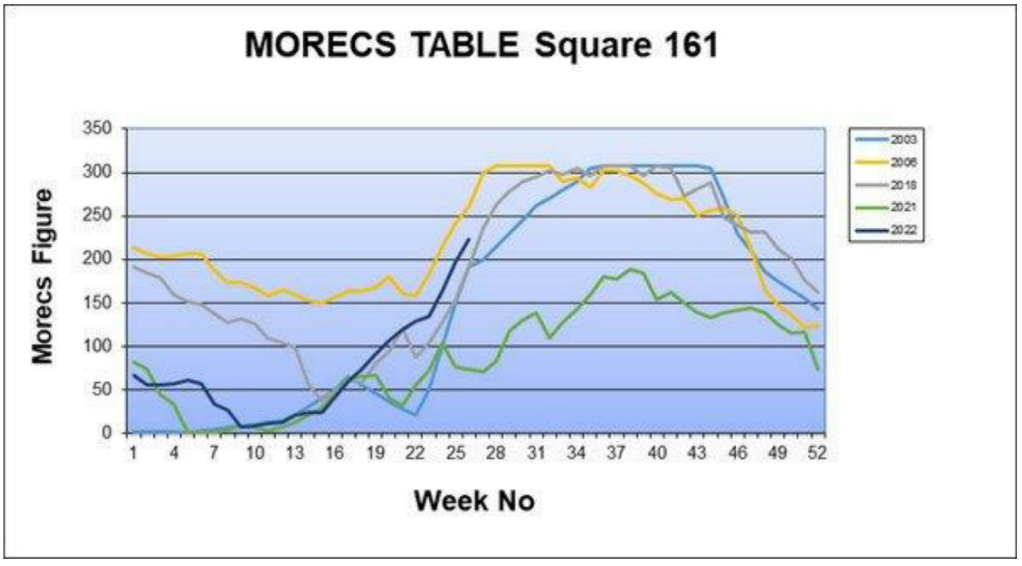
Figure (iv) – Rainfall Chart for North London - 2021 to 2022

Indicative Total Precipitation (mm) for London - 2021 to 2022

97.7	40.1	21.5	2.8	73.8	65.4	123.3	34.5	40.5	96.8	8.0	72.0
Jan-21	**Feb-21**	**Mar-21**	**Apr-21**	**May-21**	**Jun-21**	**Jul-21**	**Aug-21**	**Sep-21**	**Oct-21**	**Nov-21**	**Dec-21**
2021											

16.8	52.4	27.4	18.0	28.4	27.8	2.3	71.5	55.2	72.3	135.4	58.1
Jan-22	**Feb-22**	**Mar-22**	**Apr-22**	**May-22**	**Jun-22**	**Jul-22**	**Aug-22**	**Sep-22**	**Oct-22**	**Nov-22**	**Dec-22**
2022											

Figure (v) – MORECS Table Square 161 Including 2021 & 2022



Summary of Findings

The pattern of movement recorded at the property address of 84B Bartholomew Road, London NW5 2AS, is consistent with a building suffering from the effects of tree root induced clay shrinkage subsidence (TRICCS). Upward movement was recorded commencing September through to January 2022 which is consistent with the increase in precipitation as shown within Figure (iv) on page 6 of this report in July 2021. Further upward movement was recorded from September 2022 which is in line with the increase in rainfall commencing in August of that year.

Downward movement of the property was recorded within the satellite monitoring data from May to September, together with January to September 2022, due to a reduction in rainfall during the first quarter in both 2021 and 2022.

Note – The reflection points taken at roof level may suppress the full extent of foundation, although follow the same pattern of movement.

Satellite Monitoring – What is InSar / How Does it Work

InSAR can monitor ground movement without the need for any instruments or physical attendance at the subject property and can therefore replace terrestrial monitoring in some cases. In the context of subsidence claims, we can use InSAR to show a pattern of movement in a building in the months pre-dating an insurance claim notification.

Synthetic Aperture Radar (SAR) systems operate with a side-looking geometry and illuminate the Earth with a series of microwave pulses. As the spacecraft moves, sending pulse transmissions, the SAR detects echoes of previous pulses, scattered from the Earth. The raw data collected by the SAR is then focused to form an image. This is achieved in the direction, perpendicular to the direction of travel, through knowledge of the time delay, and in the flight direction through combinations of echoes from multiple locations to synthesize a large antenna aperture. A complex set of algorithmic calculations are then applied to the raw data to correct atmospheric distortions which provide the results, shown in figures (ii) and (iii).

Verification of the process of developing InSAR where changes in building geometry can be monitored from space and compared to terrestrial levelling measurements on an in-depth study, has been carried out by University of Leeds resulting in the production of a White Paper headed 'Monitoring Ground Movement from Space for the Property Insurance & Subsidence Industry'.

Understanding Data Comparison

The results provided by satellite monitoring data are, by design, broadly correlated to provide evidential proof of the influence of surrounding vegetation on the stability of a reflection point. Accepting that the magnitude of moment is unlikely to match exactly, that at foundation, by virtue of the buffering and latency effects of the building cracking, corbelling and finally yielding at the roof line, the pattern of timing of movement is broadly the same.

The increased frequency of results also shows the buildings response to periods of rainfall during the summer with minor upward blips, broadly mirroring the more macro indicators such as Morecs which responds similarly to periods of precipitation during a wider drought period.

Figures provided within the graph are to be read as accumulative readings and not as a direct comparison with level monitoring data, as indicated on Figure (vi) below.

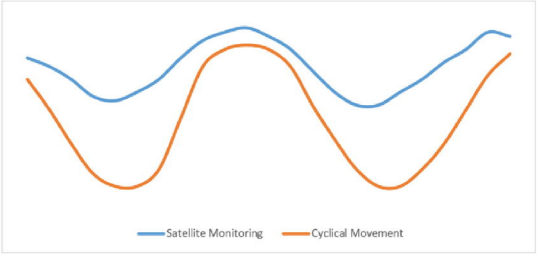


Figure (vi) – Relationship between satellite and level monitoring data

Contact us

Need further information?

William Hunt Consulting
The Barn
Oxburgh
Fosse Way
Stretton on Dunsmore
Rugby
Warwickshire
CV23 9JF

[redacted]

www.williamhuntconsulting.com