PROJECT PROFILE
UK19-132

mainmark

Teretek® Used to Strengthen Foundations at Historic End of Terrace Retail Building

INDUSTRY
Commercial

STRUCTURE
Three-storey heritage retail building

PROBLEM
Ground strengthening to support extra load

LOCATION
Ampthill, Bedfordshire

DURATION / YEAR
8 Days, September 2019

TECHNOLOGY
Teretek®

BUSINESS UNIT
Mainmark UK

JOB NUMBER
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Summary

A three-storey end of terrace building located in the town centre of Amptill, Bedfordshire was being refurbished and extended. Previously a Natwest bank, the end of terrace was being converted into a four-storey building, with the addition of a mansard roof. The building was to provide retail and office space on the ground and first floors with two upper floors providing residential accommodation.

To support the additional load created by the additional storey, general load from new beams and the roof structure, there was a requirement to underpin the building. To do this, the 45m of existing concrete strip foundations located around the perimeter of the building needed to receive treatment and five new pads were required on the ground floor to underpin former party walls, which remained from when the building was two separate structures. These underpinning pads allowed load for the new columns to be taken onto existing masonry at second floor level and avoided a requirement to bring extra columns into the ground floor, aside from one column which was put in place to bear directly onto the enhanced ground.

With scaffolding surrounding the whole building, access to the site was very limited, making concrete underpinning very difficult, particularly as the remediation work would need to reach a depth of 2.4m.

To complicate matters further, the existing building housed a large immovable object which restricted access to the key locations that required treatment, again making a traditional underpin of this section extremely difficult. The Mainmark solution was chosen as the work could be carried out around the object, safely and efficiently. The project had strict time constraints and needed a non-disruptive solution and so Mainmark's solution was perfect.

Objectives

The primary objective was to provide ground improvement on the treated soils to strengthen the foundations and achieve a specific weight bearing capacity to allow for the extension work to be completed.

Solution

To meet the budget and time requirements of the client and the site access issues, Mainmark's engineered resin injection solution, Teretek®, was ideal. This solution avoided the need for site excavation and did not require large plant or machinery. In addition to the complications associated with the immovable object, the end of terrace was located in a busy town centre, meaning there was minimal parking and machinery access.

Teretek® is a two-in-one engineered resin injection solution that can increase ground bearing capacity while also re-levelling structures, in a process that is likened to keyhole surgery. On entering the ground, the polymer resin solution mixes together and quickly expands, strengthening the soil and re-levelling buildings quickly and efficiently.

An external engineer working on behalf of the client, calculated the loading requirements of the foundations. Throughout the project, Mainmark verified the improvement of the treated soils by completing both pre and post project Pagani testing; a dynamic cone penetrometer test, which measures the strength of soil. The data collected from this test was calculated into an allowable bearing capacity to prove that the treated soils had been adequately improved, to achieve the specified bearing pressures on the foundations. The Mainmark team reviewed the results through site investigations in order to determine the treatment depths beneath the foundations and to verify that the soil could be improved from its existing strength to those specified by the engineer.

The work was completed within eight days, which was on time and within the client budget. The resin injection solution achieved the high load requirements the project required, and the client was very pleased with the outcome.

Jon Friend, Managing Director at jaf Contracts Ltd., said: *"Mainmark's approach to the project and the restrictive nature of the site and works, together with the very helpful site team ensured the project was completed on time and within budget. The works they completed allowed for a far less intrusive and disruptive solution, with time saving and had the added advantage that the remainder of the site could remain operational."*

Injection points underneath foundation at front wall

General internal working area

Trial pits exposing existing foundations and ground conditions of site