CASE STUDY

Shenleywoods, Milton Keynes

RESIDENTIAL

CLIENT

Dandara Homes

TECHNIQUES

Driven Precast Concrete Piles
RBeam

ACHIEVEMENTS

Successful installation of precast foundation solution whilst working to tight schedules.

Project Brief

Roger Bullivant Limited (RBL) was appointed by Dandara Homes to deliver a tailored foundation solution for a new residential development in Milton Keynes. This marked the first collaboration between RBL's Central region and Dandara Homes. The design needed to address critical geotechnical challenges, including high soil heave potential and minimising soil removal, while adhering to a tight project schedule.

To meet these challenges, the team implemented an off-site manufactured foundation system, combining Driven Precast Concrete Piles and RBeam, RBL's precast concrete ground beam system. This solution provided the necessary structural capacity, met environmental goals, and allowed for efficient installation, helping the project stay on schedule and within budget.

ROGER BULLIVANT

T. 0845 838 1801 roger-bullivant.co.uk info@roger-bullivant.co.uk

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Key Issues/Requirements

- Desiccated Soils and High Heave Potential: The project site is characterised by desiccated soils to depths of up to 3 meters, therefore there is a significant risk of heave. This “High Heave” potential required a foundation design capable of mitigating the effects of ground movement to maintain the long term stability of the structures.
- Minimising Spoil Removal: In order to minimise spoil remove on site, RBL developed a driven displacement piling solution. This minimised the volume of excavated material and also the environmental and logistical impacts of spoil removal.
- Tight Programme Deadlines: The project’s critical programme deadlines meant an efficient and timely foundation solution was required. Adoption of off-site manufactured precast foundation solution allowed for flexibility in delivery and installation, ensuring that the foundation works were completed in line with the stringent handover dates.
- Structural Requirements for Four 4-Storey Apartment Blocks with Lift Shafts: The project involved the construction of four 4-storey apartment blocks with lift shafts. This required a robust and precise foundation system capable of supporting the significant load-bearing demands of multi-storey buildings.

Solutions

- Low Carbon Driven Piles for Sustainability and Efficiency: To meet both environmental and scheduling requirements, RBL implemented a low-carbon foundation solution. 50% of cement in RBL’s precast products have been substituted with Ground Granulated Bast Furnace Slag (GGBS).
- Adaptation to Varying Pile Depths and Collaborative Testing Regime: During installation, some piles reached refusal before achieving the design depth due to varying ground conditions. Therefore, the team worked with Dandara Homes’ Engineering Department and their warranty provider to agree an appropriate testing regime, consisting of both dynamic load and restrike testing on 5% of the piles. These confirmed the piles met the necessary load-bearing requirements, despite not reaching full design depth. This did not cause any delays to the client’s programme.
- Efficient Pile Installation: To date, RBL has successfully installed over 1,300 piles during phases 1 and 2 of the project, with an additional 450 piles planned for the newly awarded phase 3. In total, more than 10,000 meters of 200mm and 250mm Driven Precast Concrete Piles have been delivered and installed, significantly reducing the requirement for soil removal when compared to traditional piling solutions. This not only minimised on-site disruption but also offered cost and environmental benefits.
- Precast Beam Installation for Structural Stability: Following the successful pile installation, RBL installed over 4,500 meters of RBeam, a precast foundation system, combined with in-situ concrete beams and slabs to meet the client’s waterproofing specifications, particularly around the sensitive lift shaft bases. This approach provided both structural stability and watertight integrity for the apartment blocks.

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- Site Excavation and Preparation for Substructure Works: In addition to the piling and beam installation, RBL carried out the reduced-level excavation and backfilling of the foundations, ensuring that the site was ready for the next stage of construction—substructure brickwork. By offering a comprehensive foundation solution, RBL streamlined the process, reducing the need for additional contractors and maintaining control over the project timeline.

- Phase 3 Award and Ongoing Works: Following the successful completion of phases 1 and 2, RBL are pleased to have been awarded the contract for phase 3 of the project. This phase involves the installation of over 450 Driven Precast Concrete Piles and nearly 2,000 meters of RBeam. Work on phase 3 is currently ongoing, building on the momentum and success of the earlier phases.