CASE STUDY

Ashley Road East, London

Client: Argent Related

Main Contractor: Galliford Try

Application: Residential

Providing protection from low frequency ground-borne noise and vibration generated from the London Underground Victoria Line at Ashley Road East, a new 183-unit mixed-use development in Tottenham Hale, London.

The Challenge

The Ashley Road East development is one of four buildings within the new Tottenham Hale scheme, which is situated close to the London Underground Victoria Line (LUVL) - running to the south and east of the site - and the Northumberland Park Spur (NPS), which runs beneath the site in close proximity. A vibration survey was undertaken by Acoustic Consultants Sandy Brown at the site to evaluate the effects of ground-borne vibration induced by the trains running within the tunnels. The results of the survey were used to predict tactile vibration and re-radiated noise within the proposed buildings, which was then presented to Farrat to design a suitable vibration control solution.

To meet the criteria for structure-borne noise levels within the building, a building vibration isolation performance specification of 8Hz was recommended.

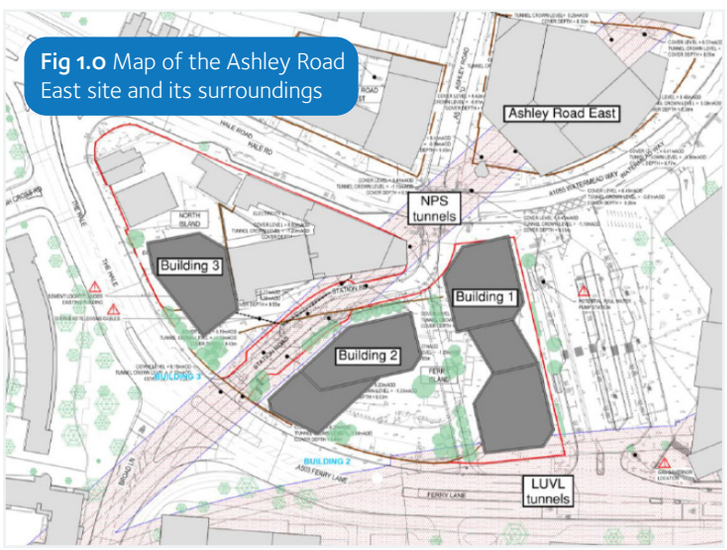

Fig 1.0 Map of the Ashley Road East site and its surroundings

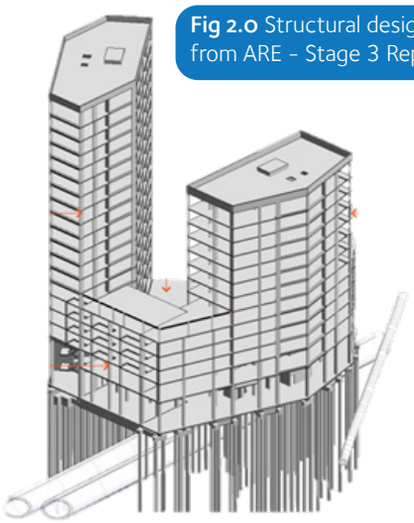

Fig 2.0 Structural design from ARE - Stage 3 Report

The Solution

It was anticipated that without isolation there would be a very low risk of disturbance from tactile (feelable) vibration, but that there would be a high risk of disturbance and complaint from structure-borne noise, therefore Farrat concluded that base vibration isolation would be the most efficient solution for this development.

The primary benefit of base vibration isolation, is that once constructed at foundation level, the rest of the construction principles can be standard and it maximises the use of space available, and flexibility of use, within the building.

Design Stage 1

With this system in mind, Stage 1 of the design and construction process began with the bearings supporting the primary structure. Farrat worked with Whitby Wood as part of this first stage to harmonise the vertical and horizontal loadings from the buildings with the stiffness' of the Farrat Laminated Natural Rubber (LNR) Bearings. This process required a number of iterations starting with loads from the structural model, where columns were designed as pin connections (rigid vertically but able to pivot). Farrat designed LNR Bearings to suit the specific load combinations and the spring constants for the LNR Bearings were then input back into the structural model, where the pin connections were converted to springs.

Once the vertical bearings were finalised, the lateral loadings through the cores / shear walls were considered and lateral spring constants (from Farrat high-capacity Acoustic Shear Keys) were used to harmonise the load transmitted through the shear wall. The conclusion of the iteration process resulted in an Ashley Road East LNR Bearing Performance Calculator.

Design Stage 2

Stage 2 of the design process involved; the detailed design of each bearing assembly for each specific location, the design of high-capacity Farrat Shear Keys to isolate cores, isolating the ground floor slab with Farrat Lateral Isolation Material and the creation of an 'isolation line' using the Farrat VFT System to consider non-structural elements such as services.

The LNR Bearings were supplied in Fail Safe Assemblies, shown adjacent for a single bearing assembly, which incorporated levelling screws to enable faster and more accurate installation. The steel support plates within the assembly were an essential requirement, to ensure an even load distribution from the bearing into the reinforced concrete supporting structure.

All Farrat systems were manufactured and supplied directly to site, supported by regular on-site installation guidance & inspection.

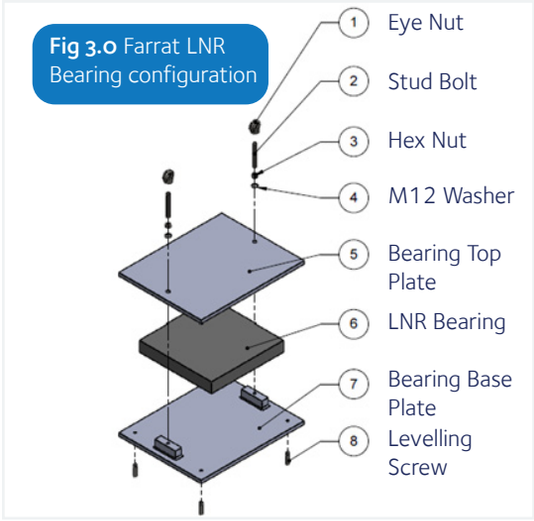

Fig 3.0 Farrat LNR Bearing configuration

Fig 4.0 Farrat LNR Bearings being assembled at Farrat's facility ahead of dispatch

Fig 5.0 Farrat LNR Bearings being installed on Ashley Road East site

Farrat Vibration Control Solutions Supplied:

130 no. Primary Vertical Support Bearings

14 no. Lateral Restraint Shear Key Bearings

1500m² of Farrat VFT

Farrat IS12-50mm Isofoam

Farrat
Engineers on a mission

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