GRAHAM

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Beaulieu Parkway Project

Enhancing connectivity in Chelmsford

£20m
/ Project value

November 2021
/ The project commenced

November 2023
/ The project was completed

The £20 million Beaulieu Parkway Bridge project demonstrated a highly complex feat of civil engineering, with the GRAHAM team constructing a curved bridge superstructure using innovative methodologies. The bridge, weighing in at over 2400 tonnes and 161 metres long, is one of the longest bridge structures ever installed in the UK using SPMTs and was successfully installed over two weekends in September and October 2022. The project is a testament to innovation, collaboration, and excellence in key infrastructure development, and creates an important strategic link that will bring long-term benefits for the people of Chelmsford.

The brief

As Principal Contractor and Principal Designer, GRAHAM led the project constructing the 161m long three span road bridge connecting Chelmsford's new relief road at the Beaulieu development with the realigned Boreham interchange to provide a convenient new link between the A12 and A130.

"A fantastic moment for Chelmsford, as it will significantly reduce congestion from local roads in Springfield and provide easy access to the new Beaulieu Park station. He lauded the successful completion of Beaulieu Parkway Bridge as being "the result of a long-term collaborative partnership".

Martin Leach
Managing Director,
Major Projects, Countryside

"This 161m long, three-span highways bridge has an extraordinary construction story. The structure, which spans a road and live railway, is curved in plan and section. Built on the ground, complete with much of its deck, the structure was then driven into position on multiple specialist propelled moveable transporters."

The Structural Steel Design Awards judge

The challenges

The use of Self-Propelled Modular Transporters (SPMTs) for installation represented a ground-breaking approach to transportation and installation of the bridge, reducing disruption and railway possessions, and ensuring greater programme certainty. Due to limitations on the availability of suitable disruptive possessions which would have been required to construct the Beaulieu Parkway Bridge using conventional construction techniques, GRAHAM decided to construct the bridge superstructure off-line, on temporary supports. This involved the construction of temporary supports to mirror the relative height and position of the permanent abutments and piers. Once the temporary supports were constructed, the bridge girders were assembled.

The solution

GRAHAM utilised off-site fabrication techniques and fabricated the bridge's steel girders in sections, which were up to 3 metres deep and 30 metres long with flange thicknesses of up to 75mm. These sections were then transported to site and assembled on the temporary trestles before the permanent site welds were undertaken to join the sections together. In a UK first, the SPMT installation design involved the use of eight different SPMT support configurations during the installation, with the bridge always being supported by a minimum of 4 SPMTs. At predetermined stages in the installation process, SPMTs along with secondary steelwork/jackings systems were added in to support the bridge in different configurations. The highly complex SPMT installation strategy was developed in conjunction with supply chain partners.

Outputs & Benefits

- **Cost Savings:** The use of site won gravels in the approach embankments to the bridge resulted in savings in excess of £500,000. £400K cost saving in not utilising 1 of 4 rail possessions by innovative methodology, ensuring operational continuity
- **Award-Winning:** Project shortlisted for National Rail Awards 2024 – Nominated for "Infrastructure Achievement of the Year", NCE Bridges Awards 2024 – Nominated for "Road bridge project of the year", and the Structural Steel Design Awards (SSDA) – Nominated for "Project of the Year"
- **Health and Safety:** Zero reportable incidents, achieving an 'excellent' safety rating
- **Sustainable solutions:** Material optimisation and reduced environmental footprint, aligning with sustainability goals. We also modified approximately 10,000m^3 of existing Class 2 material with lime and cement that would have been disposed of off-site, for construction of platform to assemble bridge off-line

For more information on how we're delivering lasting impact:

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