

CASE STUDY

Barking Riverside Extension

LOCATION: Gospel Oak - Barking Line - East London
CLIENT: MSVFJV (VolkerFitzpatrick & Morgan Sindall)
DATE COMPLETED: April 2018 - June 2021



Introduction

Global Rail Construction Limited (GRCL) were awarded the E&P and Ancillary Civil Engineering works for the joint venture of Volker Fitzpatrick and Morgan Sindall (VFMS), as part of the construction of a new 4.5 km extension to the London Overground route on the Gospel Oak to Barking line for Transport for London, whilst also meeting the requirements for integration onto existing Network Rail infrastructure.

The full project scope provides a new strategic rail connection in East London and included the modification of the existing railway lines from Barking station over a stretch of 3km with a new 1.5km railway viaduct extension from Renwick Road overbridge to a new terminus. This involved constructing an embankment ramp up to the new concrete viaduct supporting a two-track railway extension into the heart of a new residential development at Barking Riverside.

The requirements also included new Overhead Line Electrification (OLE), Signalling, Signalling Power, Domestic Power and Telecoms, providing a new elevated Rail section and station close to the Thames.

In addition to their core Civils and E&P scope of works, GRCL also supplied all materials handling and logistics management for the works, RRV's as required, site haulage, HV comps and assessors and all necessary SMTH testing staff to support its works and enhance its self-delivery capability.

The Deliverables

Global Rail Construction Limited was amongst a team of specialist UK rail contractors who were engaged to build and deliver the new rail link, complete with a new Station (Barking Riverside) on the edge of the River Thames, to service a large residential redevelopment of the Barking Creekside area of East London. The specialist discipline support services that were undertaken by GRCL were for the E&P and Ancillary Civils work scopes, outlined as follows:

Ancillary Civils:

Global Rail Construction Limited's Ancillary Civils scope of works comprised of:

- ① Demolition works
- ① Construction of Distribution Network Operator (DNO) bases
- ① Installation of Points Heating Control Cubicle (PHCC) precast foundations
- ① Installation of Points Heating Transformer precast bases
- ① Installation of TCB precast bases
- ① Lighting column foundation bases
- ① Lighting Control Cubicle (LCC) foundations
- ① Alterations to LV Compound Layout
- ① Construction of bases for LV panels
- ① Alterations to hard landscaping areas
- ① Fencing works and gates
- ① Vegetation Clearance
- ① Roadways and Vehicular Access areas
- ① Troughing works – new installation
- ① Troughing works – lift and shift to refurbished and upgraded elevated route
- ① PSP bases
- ① FSP's foundation bases
- ① 9No 9-way UTX's
- ① 1No 6-way URX
- ① Safe Walkways
- ① Signage bases
- ① Construction of single location bases and hardstand areas
- ① Construction of half location bases and hardstand areas
- ① Construction of signal support structures and foundations
- ① Construction of concrete foundations for hinged single posts
- ① Installation of structural steel staging platforms including foundations
- ① Screw Piling installations for new lineside equipment housings

Interfaces

- ① Existing trackside containment in poor condition required the controlled support, removal and migration of all existing infrastructure services into new elevated and ground mounted troughing routes.

E&P:

Global Rail Construction Limited's E&P scope of works covered the following deliverables and included the completion of all NICEIC Certification, As Built record drawings, O&M's and completion and delivery of Ellipse data:

Signalling Power

- ① Installation of 39 new Class II Functional Supply Points (FSP's)
- ① Installation, Testing and Commissioning of 20km's of new 650v power
- ① Installation of a new Signalling Supply Point
- ① Modifications to three existing Signalling feeders supplied from 3 existing PSP's
- ① Installation of 9km of new Return Screen Conductor cabling
- ① Earthing & Bonding

Network Power

- ① Installation of 3 No: New DNO power supplies

LV Power Distribution and Lighting

- ① Installation of new L.V Sub main supplies for lineside equipment
- ① Installation of Buffer Stop lighting
- ① Installation of General Lighting

Points Heating

- ① Installation of new L.V Sub Distribution Cubicle
- ① Installation of 3 new Points Heating Control Cubicles (PHCC's)
- ① Installation of 18 Point heating sets
- ① Trackside L.V Submain supplies

OLE

- ① Installation of new OLE Motorised Operating Switches (MOS's)
- ① Installation of Traction Bonding and Spider Plate connections

Interfaces

- ① Temporary earthing and bonding installations to facilitate stage power installations
- ① 110v connections for signalling location cases for stage signalling commissioning
- ① Alterations to existing Network Rail signalling power infrastructure
- ① Staged decommissioning of the existing Class I Signalling power
- ① Retention of the existing Class I signalling power for the duration of the project in conjunction with new Class II installations
- ① Management of existing utility services to allow installation of support piers for the new elevated track section
- ① Controlled power isolations in coordination with Network Rail to manage and control the impact upon live infrastructure

Challenges and Solutions

Complex Staging

The first of two key project milestones covered the commissioning of the new signalling power installation prior to the commencement of a four-day Christmas blockade, in order to enable the key signalling staging works and track realignment works to be completed. To achieve this required:

- ② Installation of 4 new Class II signalling power circuits
- ② Installation and commissioning of a new SSP and SDC at Ripple Lane
- ② Installation of 6 staging platforms for the installation of the new signalling LOC's and signalling power FSP's.
- ② Installation of UTX's and new trackside containment routes to facilitate the installation of the signalling power
- ② Controlled isolations of 3 existing PSP's to facilitate the migration of new signalling feeder circuits on the Class II system

The existing Signalling power (via the legacy Signalling LOC's) was maintained fully operational until the Christmas blockade, when the existing Signalling Power installation was modified and partly decommissioned. Signalling power was migrated to the new Class II installation and existing Signalling LOC's transferred to remove internal 650v power.

The new Class II installation provided improved resilience by providing emergency reconfiguration of the Signalling power circuits, such that all signalling power could be derived from a single source under fault conditions.

Restricted Access

Limited track access provided a significant challenge for the bulk of the track side installations. A number of interface issues needed overcoming in order to accommodate the various requirements of all key rail disciplines to undertake project installation work within the limited amount of track possessions. Along with other key contractors and working closely with the client, GRCL undertook detailed deconfliction and sectional access planning in order to co-ordinate their works.

Existing Services

Diversions of existing track and rail infrastructure necessitated time-consuming tag and tracing operations on various cables and services, which including legacy utility services. GRCL's project requirements necessitated the diversion, realignment and replacement of vital services which included the management of HV services and safety critical comms systems, which was executed successfully - meeting the requirements of the contract.

Migration of Existing and New Rail Infrastructure

Existing trackside cabling routes, both buried and elevated sections needed to be replaced or migrated into new enhance cable management infrastructure. Relocation of live, rail system critical services from existing life expired infrastructure presented a significant challenge which GRCL managed effectively.

Dual Design Compliance

The complexity of the project scope required the detailed design to conform to both the requirements of Transport for London as well as Network Rail, to cover both the new rail infrastructure and the existing operational railway. GRCL undertook a key role in the verification, development and compliance of the design. This required coordination, checking and buildability aspects to ensure the Approved design was fully compliant for all Network Rail entry Into Service (EIS) stipulations.

In-House Multi-Disciplinary D&B Co-ordination

As part of the delivery for the Ancillary Civils and the E&P packages GRCL – as a multi-disciplinary contractor - were able to provide a coordinated programme of works to interact between the key structural installations required to facilitate the new lineside equipment. Predominantly covering the signalling equipment and the E&P installations.

A number of challenging ground conditions also arose which impacted upon the tight programme to install the hardstand bases and Staging platform structures required for new signalling and E&P equipment that needed to be operational for the crucial Christmas blockade. GRCL utilised its in-house design capabilities to provide additional support to our client, and to identify design solution options that were critical to meet programme deadlines.

The subsequent installation required carefully co-ordinated Civils and E&P equipment installations, which required both disciplines to work in conjunction with each other over weekend possessions. This allowed the works to be completed to meet the key programme milestones.

Signalling Know-How

Close coordination with the designated Signalling contractor was required to ensure that 110v Signalling supplies were installed and available to meet the pre-commissioning Signalling testing

Testimonial

"Thank you for all of your hard work and commitment this year on the Barking Riverside project. We have delivered a huge volume of works often with multiple challenges which we have all overcome together.

"The possession for the Christmas blockade has now been handed back to the signaller and that marks the completion of Signalling Stage 6 (650v power migration, new 2222/2223 points), de-wire Down Goods, new neutral section and ancillary civils works.

works. GRCL provided E&P support working in conjunction with the signalling installers to undertake:

- ① Modifications to existing Signalling LOC's
- ① Removal of redundant equipment within live Signalling LOC's
- ① Controlled power isolations to facilitate Signalling testing & Commissioning
- ① Coordination and staged handover of Signalling Power to N.R maintainers

"These works have been delivered with a proactive safety culture, a huge volume of close calls have been raised and closed out. Everybody has gone home safely which is a fantastic achievement to be proud of..."

Dan Smith
Senior Project Manager – Rail Systems
Barking Riverside Extension Project