132kV Grid Connection

Belvedere, Dartford, UK

Power

Value	Multi-million
Diameter	160mm to 89mm ducts (Fibre & DTS)
Distance	10.6k
Client	Undisclosed
Date	July 2023

Pre-construction

Before construction, thorough planning and environmental assessments were undertaken. Approvals were secured to ensure the structure remained above projected flood levels, and ecological surveys were completed to protect local wildlife. Trial holes were also carried out to locate existing services and enable safe, non-invasive anchoring.

Construction

Construction was completed under managed lane closures with approved traffic controls to minimise disruption. Scaffold towers provided safe access for core drilling and bracket installation, while a crane was used to position structural components. Environmental safeguards were in place to prevent contamination. The installation included fixing brackets, placing sliding saddles, installing the main pipe, and securing high-voltage ducts. Security features like anti-climb mesh and signage were also added.

Post-construction

After installation, the structure met all design and environmental standards. It was built for long-term durability, with features to handle flooding, thermal movement, and structural loads. Ongoing inspections and ecological coordination are recommended to maintain performance and ensure reliable 132kV transmission.

- Design
- Supply
- Testing
- Installation
- Commissioning of high-voltage route

- Civils
- Bridge crossings
- HDD (Horizontal Directional Drilling)
- Diamond coring
- 3.6k cable route

PROJECT CHALLENGES

CHALLENGE	SOLUTION
Tidal location The river's tidal nature posed a significant risk of flooding and required careful planning to avoid environmental disruption.	Tidal Approval was obtained from the Environment Agency (EA), and a Flood Risk Assessment (FRA) confirmed that the pipe bridge would be positioned above the 1:100+ climate change fluvial event level. This ensured the structure remained outside the flood risk zone under defended conditions.
Special Engineering Difficulties (SED) Multiple complex signal structures on constrained bridge crossings required Development Consent Order (DCO) and local authority approvals.	JSM delivered compliant solutions including precast parapet-mounted containment with insulated stainless steel ducts, Ø610mm Circular Hollow Section (CHS) pipe bridges on piled plinths, and Horizontal Directional Drilling (HDD) beneath Norman Road to avoid utilities and maintain traffic flow. Each method ensured safety, environmental protection, and structural integrity within strict regulatory limits.
Traffic management The project's proximity to the dual carriageway required strict safety protocols and minimal traffic disruption.	Approved traffic management plans and lane closures were implemented. All works were conducted from PASMA-certified scaffold towers, ensuring safe access while maintaining traffic flow.
Flood risk The potential for flooding due to the river's tidal nature and climate change projections required mitigation.	The design placed the pipe bridge above the bridge soffit and within the protection of the Thames Estuary flood defenses. Polytetrafluoroethylene (PTFE) sliding bearings and expansion joints were included to accommodate thermal and structural movement without compromising flood resilience.
Environmental conditions The site's ecological sensitivity, including nesting birds and protected wildlife, restricted ground disturbance.	Pre-clearance ecological surveys were conducted to ensure compliance with environmental regulations. Construction activities were scheduled to avoid nesting seasons and minimise ecological impact.
Structural load and expansion The bridge needed to accommodate thermal expansion and structural loads without compromising integrity.	PTFE/PTFE sliding saddle clamps and bellows were integrated at expansion joints. These components allowed for controlled movement and stress distribution across the structure.
Vandalism and security The exposed nature of the installation made it vulnerable to vandalism and unauthorised access.	Anti-climb mesh and other security features were incorporated throughout the design to deter tampering and ensure the safety and integrity of the cable containment system.