

Projects

Precise Earth Impedance Testing for a 400kV onshore substation to support an offshore wind farm expansion

PROJECT AT A GLANCE

Project:

Earth Impedance Testing

Location:

Lancashire

Client:

Amey

Duration:

1 Day on Site, report issued shortly after

PROJECT BRIEF

As part of a vital offshore wind farm expansion, a new onshore substation was constructed to facilitate the transmission of up to 750MW of power from the offshore facility via high-voltage subsea cables. At this key node, the energy is integrated into the national transmission network.

LSTC Group was commissioned to conduct critical earth impedance testing on the 400kV onshore substation's earthing system. This involved verifying both the installation and the CDEGS model used during the design phase, ensuring optimal safety and operational compliance.

OUR APPROACH

LSTC Group's adept handling of highly complex field testing was vital in the successful delivery of this project. Our team applied specialised knowledge in high-voltage earthing measurement to ensure precision and reliability throughout the process. We collaborated closely with the client and landowners to identify a route that was both technically sound and logistically viable, aligning with the project's broader objectives.

In line with LSTC Group's stringent field testing protocols, we instated pedestrian-only access, ensuring that no lasting trace was left on third-party land. Furthermore, we delivered a streamlined testing process designed to require minimal planning input from the client, while upholding the highest standards of safety and quality.

CHALLENGES

Executing a precise earth impedance test on such a large-scale site presented a number of technical and logistical challenges:

- Acquiring accurate data for buried utilities (cables and pipelines) and overhead lines.
- Designing a 1.3km test route to suit the extensive earthing system.
- Securing landowner permissions for route access.
- Ensuring safety for contractors and the public within an active 400kV substation.
- Conducting tests via A.C. current injection, not using typical battery-powered devices.
- Cable route scanning to prevent accidental interference.
- Post-test data analysis to mitigate signal coupling effects.
- Ensuring zero environmental footprint post-testing.

PROJECT OUTCOME / DELIVERABLES

- We delivered a bespoke, well-planned testing route, avoiding interference from subsurface and overhead infrastructure.
- We ensured consistent safety protocols and left no environmental impact.
- We obtained precise impedance results, validating the CDEGS model, EPR (Earth Potential Rise) calculations, and the overall safety strategy.
- We provided a comprehensive and timely report, fulfilling all client requirements.
- We received commendable feedback from the client, highlighting the quality and professionalism of the delivery.

SERVICES USED

- Route feasibility and optioneering
- Detailed cable design (thermal and bonding)
- Stakeholder and landowner liaison
- Interface with DNO standards
- Project management and reporting