



Trenchless Technology Capability Statement



It is critical for the offshore energy sector to be able to bring power, oil and gas to market onshore with assets that are reliable and cost-effective. Our work in offshore renewables, oil and gas, and interconnector projects requires a comprehensive understanding of the often hazardous, constrained and high energy nearshore environment to be able to engineer solutions for key transmission assets.

Due to environmental concerns, local objections to disturbance and ground conditions, contractors and developer/operators turn to trenchless technologies (HDD, thrust boring, mini-TBM etc) but are frequently confronted with project delays and ground conditions contract claims. Such techniques can also be used offshore, where conventional crossing arrangements or routing mitigation are not effective. Cathie provide a holistic geoscience and geotechnical consultancy approach to these challenges.

Feasibility

Desk Top Study and Site Walkover

- Bespoke, site-specific geological, geotechnical and geohazard studies
- Ground risk registers specific to trenchless technologies
- Site visits to inform practical feasibility assessments, onshore construction areas and preliminary design

Preliminary Design

- Optioneering of potential trenchless techniques - geology, topography, constraints
- Design of optimal techniques, including drill trajectories and drill mud requirements
- Update of ground risk registers, develop risk management strategies

Development

Survey Design and Management

- Nearshore, intertidal and onshore geophysical and geotechnical survey design
- Novel techniques, tailored to the project and the preliminary design
- Procurement support, 24-7 management and on-site supervision

Data Management and GIS

- Manage, interrogate and visualise project data sources
- Integration of offshore and onshore survey data, development of ground models
- Online remote data and ground model hosting

Design

- Detailed design of all aspects of HDD works including entry and exit points, transition pits, drill trajectory, drill muds, duct materials and installation methods
- Integration of technical design with 3rd party and client considerations, HSE considerations and local legal regulatory frameworks
- Asset lifetime interaction with the marine environment, including nearshore seabed change

Specifications and Procurement

- Defining programmes of work, budgets
- Production of detailed specifications to form part of the client RfP to industry
- Risk analysis and assessment of contractors proposed tenders
- Ground risk allocation and control

Installation

- Employers site representative services
- Technical oversight and review of contractors' construction plans
- Management of change and maintenance of ground risk registers
- Ground risk management and contract claim support

Operation

- Risk based inspection (RBI) approaches for the marine environment
- Remedial works design, lifetime risk management
- Ground risk management and contract claim support.



Representative Track Record

We have delivered our integrated geoscience, geophysical and geotechnical services for trenchless technology projects in an expansive range of geographies and ground conditions. The track record below provides a representative sample of our experience:

Beatrice Offshore Wind Farm – HVAC Export Cable Shore Landing

Full range of services delivered over a 4 year period, commencing with landing site inspection and feasibility assessments, through detailed geophysical and geotechnical survey, ground modelling and technical support to the client through to construction. HDD length of over 1km through mixed glacial drift, gravels and rock.

Viana do Castelo – Owners Engineer for WindFloat Export Cable

Holistic geoscience and geotechnical engineering solution for export cable landing, negotiating sea defences. Engagement spanned from initial desk studies and geohazard assessment, specification and supervision of offshore geotechnical and geophysical surveys through to provision of complete EPC ITT specification and technical tender evaluation. During the planning and execution of the construction works, Cathie provided project management and technical review support, and on-site supervision for the offshore cable installation and HDD operations.

Confidential UK Offshore Wind Farm Project – Expert Witness / Forensic Assessment

Evaluation of the root cause of a HDD string failure for an export cable shore landing bore, and the subsequent failure of a cofferdam sunk to retrieve the HDD string. Cofferdam failure sited next to a live railway.

Biscay Interconnector

Broad geoscience and geotechnical owners engineer support from initial landing site visits and desk studies, through to survey consultancy, subsea cable CBRA and burial assessment, cable protection design, HDD design and installation works specification. Support continued through the construction phase for shore landing and complex offshore marine-to-marine HDD works.

Lakach Pipeline – Feasibility, Risk Assessment and Ground Risk Management

Feasibility assessment for a 2km long HDD project to bring a pipeline ashore from the Lakach Deepwater Development in the Gulf of Mexico. This project involved the interpretation and synthesis of pipeline route data, review of geological and geotechnical risks, evaluation of proposed trenchless methods and feasibility assessment.



CATHIE

Complimentary and Interfacing Cathie Solutions

As part of our complete 'expertise, seabed and below' consultancy offering, Cathie provide the following complimentary and interfacing solutions for trenchless shore landing projects:

- Geohazard studies including seismic analysis
- Geophysical and geotechnical survey consultancy
- Subsea cable CBRA, burial assessment and thermal performance assessments
- Pipeline-soil interaction and stability studies, burial assessments
- Jackup SSA/LPA studies.



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