

Harburn Head Wind Farm, West Lothian

Project Overview

The development of a renewable energy generation facility was proposed on a 7km² area of remote moorland, which was occupied by Commercial Forestry plantations, former Limestone Quarries and partially drained Peat Bog. Planned for this area were 22 Wind Turbine Generator locations, a new sub station and approximately 8km of access roads.



Van Elle's Geotechnical Division were selected to carry out Ground Investigation to enable the design of foundations, earthworks and roadways, and to also investigate for the presence of former mine workings and any issues with ground stability near to mine workings. Major pipeline routes also passed close to the work areas, therefore utility clearance searches were done to ensure that they were clear of known services prior to breaking ground.

The division was on site for 14 weeks and during this time the following was undertaken:

- 22 no. boreholes drilled using cable percussive techniques and extended by rotary coring up to 60m depth.
- 10 no. boreholes drilled up to 90m depth by rotary open hole to rock head, then cored to the 90m in order to investigate for the impact of historical mining.
- 60 no. machine excavated trial pits.
- Full time supervision of the site work and liaison with the engineer to redefine the scope of works based on the initial findings of the first few weeks work.
- Laboratory testing of rock core samples.
- All information provided in a factual report.



4 drilling rigs and 2 excavators were used on site

Client

Enel Viento SL / Arcus Consulting Ltd

Consulting Engineer

Mason Evans Ltd

Services Provided

Ground Investigation

Value to Van Elle

£284k

Year Completed

2015



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Key Challenges and Solutions

- A significant area of the proposed development was known to be blighted by former Limestone Quarries and extensive shallow mines in the Burdiehouse Limestone. Historical documents recorded underground mine galleries up to 35ft (11m) high to have been extracted, at depths of up to 80m below ground level which presented a serious risk to the proposed piled foundation solution.
- Many sinkholes were present across the work area, posing a hazard to plant and staff movements.
- Up to 8m of semi liquid, waterlogged, Peat soils were present in certain areas of the site which presented a serious hazard to plant movements. The team experienced a significant problem when the plant sank into these soil conditions.



Peat conditions presented initial challenges to plant movement

- They overcame this by using metal skids towed by low bearing pressure excavators to carry out the works. Temporary roadways were also constructed using bog mats, 'brash' from forestry operations and by felling trees to provide safe access.



Tripod rig towed safely on a metal skid

- Van Elle site engineers worked with the consulting engineer to revise the scope of the ground investigation during the fieldworks to ensure the site works satisfied the designer's requirements.



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