Mineworkings Consolidation at South Gilmerton Farm, Station Road, Edinburgh.

Project Profile

Client: Miller Homes

Designer: DRM Consulting Engineers

Value: £1.5m

Consolidation of shallow mine workings and treatment of mine entries for a proposed 250 unit residential development to the South East of Edinburgh. The seams to be treated (Midlothian Edge Coals) were steeply dipping and a treatment strategy was designed by DRM with input from our geotechnical staff. The extraction method was to sink a vertical shaft and then drive horizontal roadways to intercept each seam in turn at similar depth, this resulted in natural perimeters of un-worked coal being present to incorporate into the treatment design which involved blanket drilling on a 3.5m grid to prove a specified rock cover with advance drilling in some areas on a 7m grid to confirm geology.

Advance works included construction of a new site entrance off Gilmerton Station Road, haul roads, site compound area, a grout mixing compound and a materials handing area capable of taking deliveries of bulk PFA and sand in articulated lorries. Container bunkering was provided for PFA and sand storage, 30 tonne silos for cement storage and 4 large water storage tanks to supply grout mixing and drill flush requirements. The centrally established compound and site servicing concept removed the need for multiple grout mixing set-ups and gave full control over materials deliveries, storage, mixing and quality control.

Water flush was used for drilling with water piped to drilling rigs via a delivery main from the compound. The rigs are also equipped with on board water pumps to ensure optimum hole flushing.

- 5439 boreholes (147,640m) completed, average depth 27.15m, max 40m
- 9,908 tonnes of grout mixed and placed (8:4:1 PFA: SAND:OPC)
- Holes were drilled with 101mm OD rotary percussive steel casing drilled and sealed into rockhead followed by drilling a 75mm open hole allowing insertion of a 50mm MDPE grout tremmie
- Drilling & grouting was carried out by grid drilling and grouting in an agreed sequence with down-dip holes completed first.
- 70 nr grout test holes with validation of drilling & pressure testing
- Grout mixing plant included a 2.5m^3 hydraulically driven batch mixer and a 50m^3/hr continuous grout mixer, grout was held in agitators and pumped directly to treatment area grout holes.
- 3 shafts and 1 adit were also located and treated
- Continuous monitoring and recording of injected grout quantity and pressure was carried out together with extensive quality control and testing of mixed grout.

During the works up to 10 drilling rigs were resourced to site together with 2 grout mixing plants and at peak production over 40 operatives were on the site. All drilling and grouting plant and equipment was resourced from our specialist in-house plant fleet.