

M8 M73 M74 Motorway Improvements - Advance Groundworks

Project Profile

Client: Transport Scotland

Engineer: Mouchel Fairhurst JV

Value: £3.1m



Advance Groundworks contract to consolidate worked coal seams and overburden at a) the site of Scottish Gas Networks (SGN) proposed new TRS and b) on the proposed line of diverted high pressure gas mains. SGN will construct the TRS and the gas main diversions prior to the main M8 M73 M74 Motorway Improvements contract. The works were located south of the A8 at the Shawhead Junction (A8/A725), Coatbridge as shown.

The new gas pipelines were to be installed by horizontal directional drilling (HDD) within the superficial deposits overlying the Coal Measures strata. Site investigation had identified coal seams and workings at shallow depth beneath the proposed HDD alignments with a potential risk of instability to the pipeline. Fissuring or voids within the superficial deposits through which the HDDs were driven could also result in the loss of the drilling fluid from the bore and the potential for loss or delay to the HDDs. Three coal seams had been identified beneath or adjacent to the HDD alignments, the two shallowest of which were deemed to require further investigation and treatment;

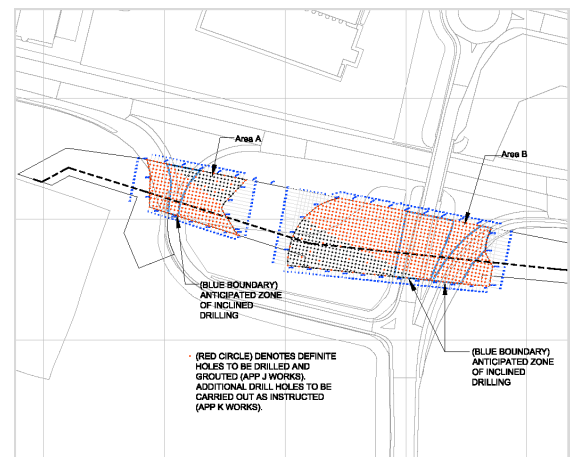
- The Ell seam, max. 1m thick, depth 20 to 25m
- The Pyotshaw seam, typically 0.8m to 1.2m thick, depth 35 to 40m

As well as the stabilisation works the Contract included construction of permanent and temporary accesses to the site areas;

- A permanent access (Shawhead access) from the Westbound A8 to Southbound A725 Link Road which was also used for the subsequent SGN diversion contract.
- As the site was split into 3 works areas by the A725 and the slip roads to/from the A8, contractor designed temporary accesses were required on the Westbound A8 Shawhead Diverge Slip and Merge Slip Roads.

Main work included;

- Establishment of the site offices and Engineers offices in a vacant industrial property adjacent to the site.
- Constructing the 3 surfaced access points to the site much of which had to be carried out at night and required extensive traffic management including lane & carriageway closures on the A8 and A725.
- A protection slab was required over the existing HP gas main on the Shawhead access which was installed under a subcontract by SGN.
- Establishment of main compound & welfare facilities at the Shawhead access. Welfare arrangements were also established in the other working areas.
- The mixing compound was also established in this location with container surrounded bulk PFA and sand storage areas, 50t horizontal cement silo, water storage tanks, water collection and treatment facilities, including SUDS lagoons and outfall arrangements.



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- The 3 treatment areas were serviced with; water feed, drill flush return and grout pipelines from the central compound location, fed through directionally drilled service pipes installed beneath the slip roads.
- Central batching/servicing removes the need for multiple set-ups and gives full control over materials deliveries, storage, mixing and quality control.
- Preparation of working areas including drill flush and surface water collection trenches & sumps, silt fencing and creation of drilling platforms.
- 52 Investigation holes were initially drilled to provide better information on workings, seam depth and dip. Information from these boreholes was used by the Engineer to confirm the treatment works designs.
- 1213 grout holes & test holes to max 40m depth, holes drilled with 101mm OD rotary percussive steel casing drilled and sealed into rockhead followed by drilling a 75mm open hole to insert a 50mm MDPE grout tremmie pipe. Use of steel casing drilled to rockhead was a specified requirement.
- A significant amount of angled drilling was required to treat under the slip road footprints with angles of up to 45° (hole lengths up to 56m) being accommodated by the versatile drilling resources on the site.
- Water flush was used for the majority of drilling with water piped to drilling rigs through a delivery main established along the treatment areas.
- Drilling & grouting along the HDD footprint was carried out from a standoff to avoid holes intersecting the proposed HDD bores
- Drilling & grouting in all treatment areas carried out in an agreed sequence, down-dip perimeter holes being completed first.
- Grout was mixed in 2.5m³ hydraulically driven grout mixers, held in agitators and pumped directly to treatment area grout holes using Gardner Denver and Evans grout pumps.
- 3239 tonnes of grout injected. Grout mixes 5:1:4 PFA/cement/sand for perimeter holes & 9:1 PFA/cement for infill holes.
- Continuous monitoring and recording of injected quantity and pressure was carried out together with extensive quality control and testing of mixed grout.
- 10 nr rotary percussive drilling rigs were resourced to the site and all drilling and grouting plant and equipment was resourced from our specialist in-house plant fleet.



During the contract continuous liaison took place with all relevant stakeholders including; Transport Scotland, BEAR, AMEY, Transerve, North Lanarkshire Council and SEPA. The combined efforts of all parties ensured that the works were completed on time, to budget and to the satisfaction of all parties.