

Donegal Quay Steel Intensive Permanent Sheet Pile Basement

Contract No: C533

Client: Lagan Construction

Location: Donegal Quay, Belfast

Value: Approximately £1 million

Summary: Design, supply and installation of sheet pile cofferdam and propping system to facilitate construction of a 2 storey basement for a Hotel, Apartment and Leisure complex adjacent to the river Lagan in central Belfast.

Sheet Piling (UK) Ltd were employed by Lagan Construction who were the Principal Contractor for construction of the basement to the proposed complex. The clutches of the sheet piles were welded after excavation to give a fully watertight sheet pile basement.

The design, with only one level of frame for a 7.5m excavation, required the installation of Arcelor Mittal AZ36-700 sheet piles 18m long. The sheet piles were generally supported by twin Arcelor Mittal HZ775 A walings and 927mm dia tubular props at 7m centres. The Hotel section of the basement was supported by twin 914x305mm walings and 914m dia tubular props.

The Arcelor Mittal AZ steel sheet piles were supplied directly to site from a mill rolling in loose double Z piles and in grade S355GP steel.

An initial excavation, to a depth of 3 metres, was carried out and a piling platform installed to allow construction of the CFA piles. The sheet piles acted in cantilever during this stage and were monitored for movement, owing to the presence of the tidal ground water level, and the deep layer of sileech. Old stone dock walls and hundreds of timber piles had to be removed before the concrete piles could be installed.

The soils consisted of approximately 1 metre of made ground overlying 8.5m of soft organic silty clay (known locally as Sileech) overlying 7m of glacial sands over lying glacial clay. The high tide water level was approximately 2 metres below ground level.

The sheet piles were installed using a Bauer RG18T telescopic leader rig and 1000kN vibro hammer. The piles were backdriven to level using a BSP 357 hydraulic drop hammer.

The sheet pile clutches were temporarily sealed with Beltan sealant prior to installation, and were then fully welded during the two stage excavation to give a fully watertight basement.

Project Images

