



The Old Convent
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Effluent Pipeline Installation: Directional Drilling

At its Avonmouth works near Bristol, Albright & Wilson manufacture flame-retardant chemicals for the treatment of textiles, plastics, polyurethane foams and timber.

SubTerra Engineering was appointed to design and supervise the installation of a new 500m long, 150mm diameter pipeline for the transfer of treated effluent water to the public sewer system, as the existing cast iron pipe had reached the end of its working life.

The site is located adjacent to the A403, a major route for HGVs accessing the M5 motorway, consequently both the Client and Bristol City Council were interested in a scheme that ensured minimal impact on neighbouring sites and traffic flow during construction.

The alignment involved crossing the A403, several industrial estate access roads, a railway siding, two large culverts, as well as avoiding major services including; gas, water, telecoms, and electricity. Within the plant, disruption was to be kept to an absolute minimum, with the existing pipeline remaining operational throughout.

Site Investigation

The maximum depth of the proposed pipeline was anticipated to be 3.0m below ground level. A window sampler rig was used to acquire a continuous profile of the ground conditions for soil and chemical testing. The same rig was adapted to carry out dynamic probing to produce a continuous strength profile over the same interval.

The ground was found to consist of a layer of made ground, overlying a soft to firm silty clay, of recent alluvial origin, with the water table 0.5m below ground level.

Design and Route Selection

Following corrosion trials with various pipe materials the Client specified 10bar MDPE pipe. With all of the constraints on open-cut excavation, and considering the ground conditions, SubTerra Engineering proposed the use of trenchless techniques throughout the contract, with the alignment following a 1.0m wide corridor to avoid other services.

The main benefit of using directional drilling was that only six small excavations were required; two

in the plant (one for the terminal adjacent to the existing pumping station, and one for a pre-formed 90 degree bend), three rodding point manholes in the verge adjacent to the A403 at approximately 100m intervals, and a new manhole connection to the public sewer.

One of the stipulations was that access for emergency vehicles within the plant had to be maintained at all times, consequently with directional drilling, the rig could be de-coupled from the drill rods and moved to a safe location at very short notice.

Construction

Thrustbore Contractors Ltd were awarded the lump sum contract with a value of £47,000. The work was carried out in spring 1999, over a period of four weeks. After excavation of launch pits and manholes directional drilling and pipe installation proceeded rapidly, with up to 150m of pipe installed in one day. Drilling within the plant was completed in 3 days as opposed to the 10 days estimated for open-cut excavation.

After completing each run the drill head was removed and the pipe pulled back through the hole, the ground being sufficiently soft to not require reaming to a larger diameter. Joints were made using electrofusion couplers and upon completion the pipeline was pressure tested in accordance with WRC regulations.

The new pipeline was connected to the pumping station in the plant over a three hour period, after which the old line was sealed off and abandoned.

The Contract was completed ahead of programme and on budget.



Drilling within the plant