

Installation Options

The two installation options currently available for access to underground utility services are Open Cut and Trenchless.

For access by open cut there are four stages:-

- Excavation of the trench, removal of spoil and temporary support of other services.
- Laying and jointing the product pipe.
- Refilling the trench and compacting the selected spoil or filling material.
- Restoring above ground infrastructure.

All four stages are characterised by the amount of physical work to be undertaken. Typically, 50 times the amount of spoil to be occupied by the product pipe has to be moved once during excavation and again in refilling. Much of the work in all four stages is labour intensive, involving different skills that require co-ordination between several companies and authorities. A large project can extend over a long period and be very disruptive in social, economic and environmental terms. Access using trenchless techniques also requires surface work, but not on the scale needed for an open cut approach.

Trenchless technology projects require careful consideration of the existing condition of the underground pipes and ground conditions in order to select the most appropriate technique. The technology and approach must be determined and the surface work must be conducted using an existing access or by digging access pits.

The determination of the technique, location of the access pits and the route for a new pipe requires an initial survey. This is often viewed as

an additional expense in comparison to open cut techniques. However, the cost of the initial survey stage of a trenchless project is usually offset by a shorter time on site.

Trenchless technologies present a number of unique advantages. With new installations, engineers can install pipe in the most favourable stratum, irrespective of depth. For gravity sewers, significant savings can be realised by retaining gravity flow and avoiding pumping stations.

Site assessment

Whichever construction technique is used to install underground service utilities, the project is greatly improved by an understanding of the existing services and the ground in which they are to be installed before work commences. This is particularly important for trenchless projects, where the project design is based on a site investigation report. In open cut projects, the trench itself is often “the investigation” and the plan usually involves solving problems as they occur. Advances in the design and use of CCTV have considerably reduced the cost of surveying water and sewage networks, and information on conditions below the water level can be obtained by the use of ground penetrating radar. A traditional rule for most underground projects is that cost usually rises in direct relationship to the depth of work below the surface. As a result, the first consideration has been to make any new installation as shallow as practical, and any access to an existing service as short and direct as possible.

For trenchless projects, experience has shown that there is little relationship between cost and depth. For work on existing services,



CLAY TUNNEL PIPE

the access points already provided could be used and work can be planned to reduce disruption.

For new projects, the nature of the ground and depth of the water table can influence the chosen technology and process to be used. By using trenchless technologies, project designers can take advantage of the most favourable ground conditions, irrespective of depth, allowing for the installation of new services in areas where open cut methods were previously impossible. The ability to install pipe at great depths can help to simplify designs by allowing longer pipe runs with shallow gradients, thus avoiding the need for pumping stations and sumps. This facilitates pipe installation below already congested underground areas close to the surface in towns and cities.