Vertical Borehole Information and Factsheet

Drilling vertical boreholes in the ground/rock to get energy for heating or cooling from to power your ground source heat pump is the most efficient and effective method but the operations involved to install the boreholes and their associated works can be disruptive. Here's what to expect:

Preparation

Before we drill any boreholes it is recommended that checks are made to see if planning consent is required from your local planning authority. In the majority of cases planning consent will already exist under permitted development provisions. Sometimes however, local restrictions may apply if, for example, the site is in a Conservation Area, a Site of Special Scientific Interest (SSSI) or in a National Park.

The start of drilling

When the drilling team arrive they will be in one or two crew vehicles and will bring the drilling rig on a lorry transporter together with a large compressor and various other smaller items of equipment. The drilling rig is on rubber tracks but it weighs around the same as five standard cars so it will create some marks and ruts on soft surfaces such as grass – especially in wet conditions. The compressor is about the size of a small caravan and weighs the same as a small car. It needs to be parked as close to the drilling rig as possible.

Drilling boreholes is a quite a significant civil engineering project and there will be disruption to the area.

As the drill works into the ground it will pass through the soil and into the rock below. To stop the borehole sides from collapsing, we insert metal casing into the hole down as far as required, our quote includes for the first 15m (50ft). If metal casing is still required below this depth it will be added as an additional charge. Unfortunately it is not possible to know how much casing is required until we start drilling but generally 15m is sufficient.

Water

We use water during the drilling process (we do need you to have a good water supply for our use) and we will almost always hit water whilst drilling at some depth. The volumes involved can be considerable and as the water includes soil and aggregates from the borehole, legislation dictates it must be treated as foul rather than clean water. Ideally we try to discharge the water to a nearby area of ground where it can safely soak away. However where this is not possible we will try to divert the flow to a foul drain (discharge license required) or in extreme cases arrange for it to be contained and transported from site. Where additional permissions or costs are incurred for water disposal these will be charged as an extra to our original quote.

Spoil and sand

In addition to water, the drilling will produce a wet aggregate of broken rock and soil from the borehole – generally about 1.5 tonnes of aggregate per 100m of depth. Unless otherwise stated, disposal of this spoil is the responsibility of the customer. In practice most customers find the spoil is a useful backfill for the trenches needed to connect to pipework to the manifold and heat exchanger or the ground worker removes at the same time as digging the trenches to connect to the manifold.

When drilling is completed, geothermal loops are inserted down the boreholes. In order to ensure they attract as much warmth from the ground as possible, the spaces around the loops are then filled with a grout mixture of sand and bentonite clay to prevent any air gaps in the borehole.

The sand is delivered in 1 tonne bags and if any sand is left over after filling the boreholes this is left on site for the customer. Normally any surplus sand is used to bed the pipes connecting the boreholes to the manifold and heat exchanger and protect the pipes from damage by sharp rocks etc.

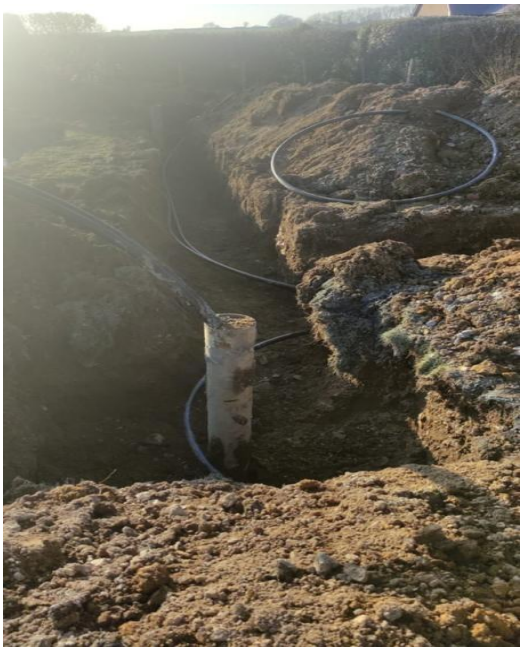
After drilling

Once the boreholes are completed, the geothermal loops have been inserted and the boreholes packed to exclude air gaps, the pipework will be left protruding above ground level. *This is just a temporary measure*. Your installer will excavate a 600mm deep (2ft deep) hole and 1m wide around each borehole, we will cut off the outer metal casing and attach pipes to the geothermal loops. These pipes will be laid underground to the manifold and the site of the borehole can then be filled in, leaving no sign above ground of its existence.

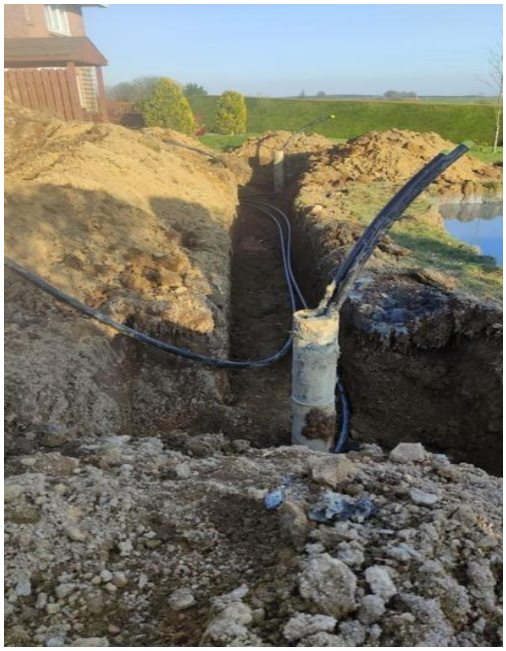
The manifold collects the pipes from the boreholes and routes them to the heat exchanger. It is covered by a lid similar in size to a drain cover. Many customers disguise this lid with, for example, pots of flowers or shrubs or hide it under garden furniture.

Unless otherwise agreed, your installer is responsible for laying the pipes from the boreholes to the manifold, installing the manifold and installing the pipes from the manifold to the heat exchanger. We can supply a drawing and specification of the requirements. We need two access points to the plant room, 500mm apart and long radius sweeping bends to enable us to get pipe work into the plant room. Your installer/ground worker is responsible for providing the access points and for all remedial works afterwards including re-instatement of the bore hole area.

After drilling in the area, its inevitable there will be a mess, tracks from the drilling machine, compressor, sand, grout and spoil from the boreholes, don't worry though, any good ground worker will put it right very quickly, below are images of before and after of a typical borehole installation.



Boreholes with clearance prepared for cutting and fusion welding.



Boreholes with connecting trench, please note the amount of spoil and this is well drained ground in good weather conditions.

Borehole after cutting of casing and welding.

Borehole connection manifold in position.

Customer prepared a sump to take water from the boreholes preventing running into adjoining property, this will gradually empty.

Area after re-instatement by the ground work contractor for a large 5 borehole system.

An example of fractured ground with a substantial water strike, very rare but does occur.

If you have a site that requires extra measures to handle the above, we can add measures such as silt filtration, water filtration, skips and disposal but these are chargeable.

Should you have any questions or queries please do not hesitate to contact us.