



Case study 2: **chemically contaminated ground**



KEY FACTS

- ▶ 45 Ha mixed use development site
- ▶ Old fuel plant and chemical factory
- ▶ Contamination from organic chemicals
- ▶ Unique chemical analysis suites developed

The challenge

This 45 Ha site was acquired by our client for industrial, commercial and residential development.

There were two existing industrial features: a smokeless fuel plant and a chemical works. These facilities were developed in the 1950s and remained in production up to the time of purchase.

The production of smokeless solid fuel requires the removal of volatile and semi-volatile organic components from coal. These waste by-products were then used as the feed stock for the production of many organic chemicals. Fresh oil and coal oil were also imported and stored. Products manufactured included tar acid, creosote / pitch / coal tar, light oils, petroleum wax oil and phenols.

The client wanted to maximise the return on what was a very poor site and chose GRM because of our history of risk-assessment based remediation and development site recovery.

geoenvironmental
civil
structural

The solution

Development and investigation strategy

Our client's development proposal divided the site into six distinct areas, by proposed use.

We initially investigated the most viable areas, providing investors with information quantifying their environmental liabilities.

As the chemical plant, storage tanks, coke batteries and other industrial installations were demolished, we were able to carry out additional investigations.



Three site-specific chemical analysis suites were developed by GRM for soils and groundwater; these included a basic screening suite, a full suite including organic determinants and a full water suite.

A former effluent treatment plant that dealt with run-off from the chemical works was investigated and revealed that groundwater was contaminated with hydrocarbons and phenols. The conceptual model illustrated that the adjacent river was the most sensitive environmental receptor.

Further investigation of the risk posed to the river included 17 groundwater monitoring boreholes and over 50 trial pits, with analysis of the recovered soil and groundwater samples, pumping tests and chemical characterisation by our organic chemist.



A basic pump and treat system transferred potentially contaminated groundwater to the effluent treatment plant.

Site investigations

The initial site investigation demonstrated that at least part of the site would be suitable for residential use and that specialist remediation in and around the former industrial installations would deal with contaminated ground.

In the industrial area, the bunds and drains were excavated and impacted materials stockpiled in a containment area. These were de-watered using a system of sumps and pumps, with the resultant leachate treated in a mobile water treatment plant. Suitable soils were reused in landscaped areas.

Conclusion

GRM's approach to this site has demonstrated that no matter how poor a site may look on initial viewing, carefully targeted investigation and analysis often (but not always) removes many constraints to development.

The fact that GRM both designed and carried out all of the ground investigation in-house has enabled decisions to be taken by our client in a speedy and well informed manner.

Our approach minimises cost by enabling the majority of the contaminated material to be remediated in-situ and remain on site, minimising expensive 'dig and dump'.