



Site Background & History

The site, located in the West Midlands, north west of Walsall near Brownhills, is a former engineering works, which occupies an area of circa 0.5 hectare. The site had been purchased by our client who was looking to develop the site for residential purposes.

Figure 1 – Site prior to remediation.



GIP Ltd had undertaken a site investigation of the site and identified hydrocarbon contamination (TPH and PAH) in the soils around the foundations of one of the former buildings that occupied the site. In addition

hydrocarbon contamination was identified in the groundwater beneath the site.

GIP reported ground conditions as made ground overlying sands & gravels over bedrock. The nearest watercourse was an unlabelled stream that flows through the site. A pond is located 50 m to the north east of the site. The site is situated upon a 'Principal Aquifer' as classified by the Environment Agency.

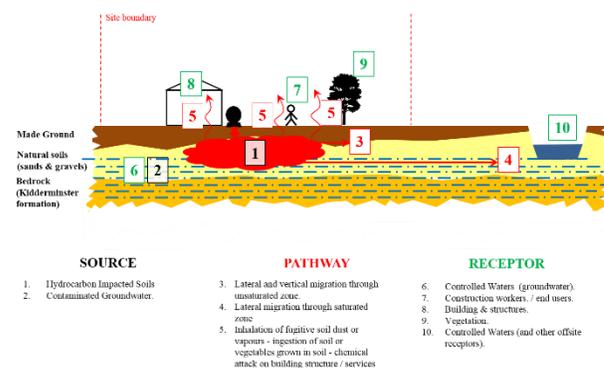
The proposed remediation strategy was developed by Envirotreat from the initial outline remediation scheme proposed by GIP. The overall remediation strategy was designed to protect both human health and controlled water receptors.

GIP proposed the following mitigation measures for the protection of human health:

- Capping layer - 'Clean' growing media should be imported and placed to a thickness of 300 mm in private gardens and to a thickness of 300 mm in any gardens / landscaped areas.
- Remediation of soils with obvious visual or olfactory evidence of hydrocarbon contamination in the vicinity of WS4.
- Gas protection measures comprising vented floor and provision of suitable gas membrane.

Groundwater protection would be achieved through source removal (treatment).

Figure 2- Conceptual Site Model.

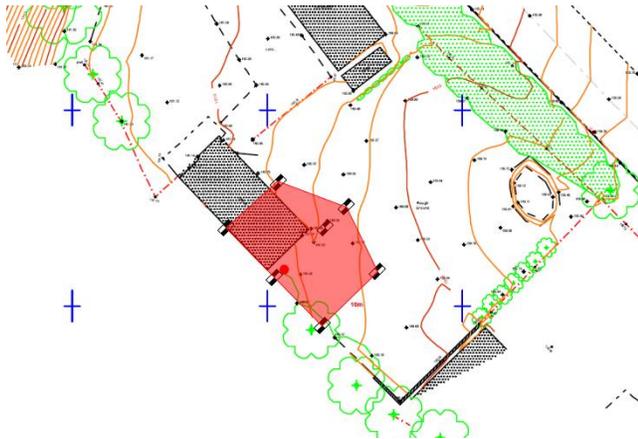


Methodology

The extent of hydrocarbon contamination within the vicinity of WS4 was fully delineated by Envirotreat through the excavation of a series of trial pits excavations around the periphery of the area to confirm the lateral / vertical extent of the contamination.

Based on visual and olfactory observations, an area of approximately 20 m x 10 m with an impacted depth of general down to 4.0 m bgl was confirmed.

Figure 3 – Lateral extent of hydrocarbon source contamination (indicated red).



Based on the anticipated depth of the contamination and its close proximity to a steep embankment it was considered that the most practical approach would be to carry out *in-situ* E-Clay stabilisation.

Figure 3 – Reduced Level Excavation and introduction of E-Clay Slurry.



The delineated area was reduced in depth to above the contamination, the area was subdivided into sections to enable assessment of required volumes. Within each section pre-determined volumes of E-Clay slurry were added and soil mixed to the required depth. Each section was treated in turn until the whole delineated area had been treated with E-Clay treatment slurry.

Figure 4 – Soil mixing within the Contaminated Area.



Previously set aside un-contaminated soils (reduced dig) were reinstated.

Validation

A number of composite samples were prepared from samples taken from the respective treated batches. These were leached and analysed for TPH and PAH. The results were compared to the agreed remediation target criteria. All samples tested were shown to be compliant with the remediation target criteria. The treated material was therefore considered suitable for reuse onsite in accordance with the agreed Remediation Strategy.

Conclusions

Envirotreat was able to demonstrate through a comprehensive Validation Report that the remediation strategy had been successfully implemented. The prime drivers for the remediation works were the protection of human health and controlled waters.

The works were completed in one week.