



### Site Background & History

The site is located on Village Farm Industrial Estate in Pyle, South Wales. The site is used as a storage yard for vehicles / trailers and recovered materials (old electrical transformers, wires, etc.). The client operates a recycling business.

The client had been granted planning consent for the Phase 1 redevelopment of part of the site comprising the construction of a single storey office block and associated car parking area and for the Phase 2 redevelopment of the service yard to enable recycling to be undertaken at a later date.

Earth Science Partnership [ESP] has been working with the client to enable the consolidation of a number of satellite operations into the Pyle Site.

The site plan is shown in Figure 1 below. The previous occupants of the site had levelled the site / raised the levels of the site using made ground. The site levels were previously much lower in the south and west of the site.

ESP had developed an overarching remediation strategy to satisfy the requirements of Bridgend County Borough Planning Department and Natural Resources Wales.

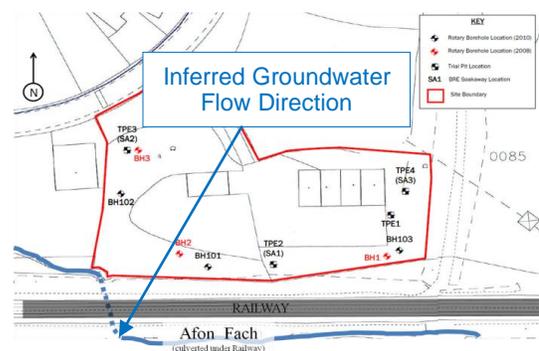
The prime concerns of the regulators were the protection of human health and controlled waters (based on site investigative information and the historical use of the site as a scrap yard).

ESP had previously identified predominantly hydrocarbon and metallic contamination within the soils and groundwater – the source contamination was localised within the made ground.

Contaminated groundwater was shown to be migrating through the made ground in a south westerly direction (as shown in Figure 1 below) – there was clearly an identified risk to the controlled water receptor located in close proximity to the site (the Afon Fach)

It was acknowledged that the impermeable Glacial Tills underlying the made ground are protecting the underlying Penarth Group Bedrock from the risk of contamination – the bedrock is regarded as a major aquifer - secondary A.

Figure 1 – Site Plan



The bulk of the identified source contamination was excavated and removed from site for offsite disposal (supervised by ESP).

Envirotrat was engaged by ESP to develop an integrated remediation strategy to address the residual source contamination and to protect controlled water receptors (particularly the Afon Fach).

Enviro-treat proposed an integrated treatment strategy comprising source treatment by E-Clay Stabilisation in combination with the installation of an E-Clay Permeable Reactive Barrier to protect groundwater receptors. ESP obtained the necessary regulatory approvals to implement the proposed remediation scheme.

#### Methodology

Enviro-treat were employed by ESP to undertake the requisite remediation works.

The initial remediation works involved the installation of the permeable reactive barrier system. The barrier was installed along both the southern and western boundaries of the site (60m and 30m in length respectively). The barrier was designed to intercept and treat the shallow contaminated groundwater within the made ground.

The barrier installation involved *in-situ* mixing of the soils located along the barrier alignment with the designated pillared E-Clay in slurry form. The soil mixing was carried out to the required depth to ensure that the groundwater plume was fully addressed (maximum depth 2.7m bgl) – the barrier was keyed into the underlying impermeable Glacial Till. The *in-situ* installation is shown in Figure 2 below.

Figure 2 – *In-Situ* Installation of E-Clay Permeable Reactive Barrier



The residual source contamination was located under a large concrete slab – this contamination was considered to be potentially problematic as the groundwater monitoring in this area of the site indicated the presence of contamination potentially arising from this source. The slab was vital to the ongoing operation of the site and the removal of the slab (temporary or permanent) would have created major operational difficulties for the client. It was therefore decided to excavate a trench along the southern edge of the slab to the full depth of the made ground - the shallower soils and groundwater exhibited a slight hydrocarbon odour – there was no evidence however of any significant source contamination associated with the soils underlying the slab.

The excavated soils (and associated groundwater) were treated with E-Clay before being reinstated - the reinstated yard was subsequently returned back to operational use.

The trench excavations are shown in Figure 3 below.

Figure 3 – Source Investigation



The remediation works were completed within a one week timescale (including reinstatement). The client was pleased with the brevity of the works, the subsequent reinstatement process and the minimal impact of the remediation works on site operations.

The reinstated site is shown in Figure 4 below.

Figure 4 – Reinstated Site (Western Side)



### Environmental Monitoring

Environmental monitoring was undertaken by Envirotreat in accordance with the requirements of the environmental risk assessment. Dust, odours, noise and VOC's were monitored around the site during the remediation works. The water quality of the Afon Fach was monitored by ESP.

### Conclusions

Envirotreat were 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 remediation works undertaken by Envirotreat are summarised in Figure 5 below.

Figure 5 – Summary of Remediation Works

