envirotreat®

Delivering land you can develop

CASE STUDY

E-Clay Stabilisation

Cluster Site - Llanelli

Client

Grŵp Gwalia

Main Contractor

Hale

Environmental Consultants

EARTH SCIENCE PARTNERSHIP ESP

Site Background & History

The Donor Site was a residential development known as Dolau Court in Llanelli, South Wales. The Receptor Site was a derelict parcel of land in close proximity to the Donor Site with a requirement for fill material to raise levels in readiness for a subsequent development. Both the Dolau Court Site and the proposed development are being managed by Gwalia henceforth the remediation and reuse of treated material was regarded as a 'Cluster Project'.

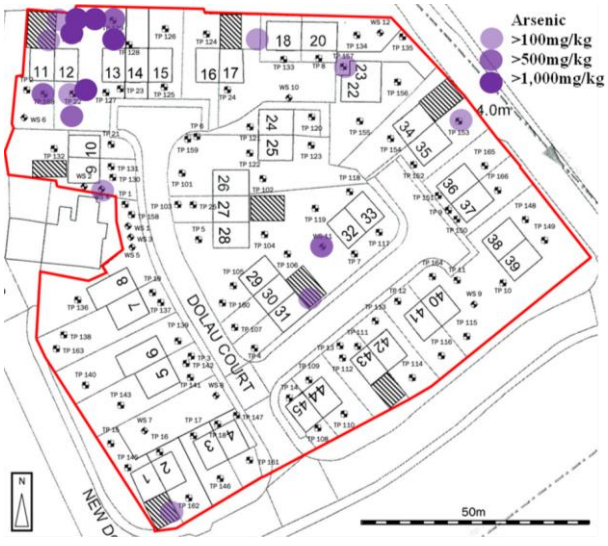
The residential development was built in the early 1990's on a brownfield site. The area formed part of the former dock area of Llanelli which has now been infilled and reclaimed. The development was built on land which was raised and leveled prior to development by the importation of contaminated fill material. The site was previously occupied by a former saw mill and a timber yard (which were potential sources of contamination).

Gwalia commissioned Earth Science Partnership [ESP] to undertake a thorough site investigation to assess the nature and degree of contamination on the Dolau Court Site and to identify the potential risks to the residents through the presence of contamination in accessible garden and landscaping areas.

ESP identified the presence of Arsenic, Lead, Benzo(a)Pyrene [BaP], Polycyclic Aromatic Hydrocarbons [PAH) and Total Petroleum Hydrocarbons (TPH) within the soils contained within garden and landscaping areas. Statistical analysis showed that the recorded levels of Arsenic, Lead and BaP created the potential for Significant Potential of Significant Harm [SPOSH] to the residents. There was no evidence to suggest that any remediation had been previously carried out to address the historic contamination associated with the site.

There were numerous exceedances of guideline values – the Arsenic and Lead exceedances are shown in Figures 1 and 2 below.

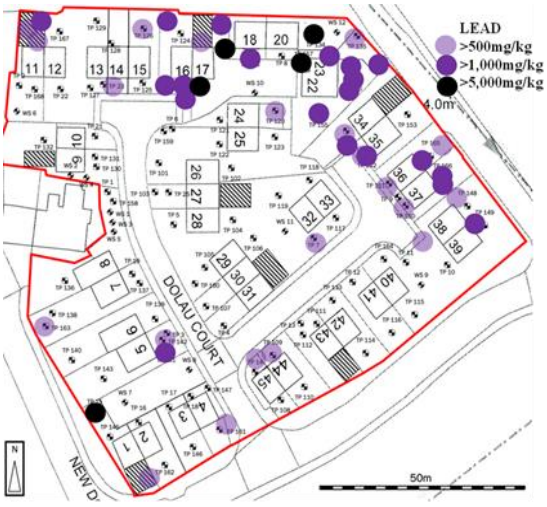
Figure 1- Arsenic Exceedances



Sole Providers of E-CLAY® Technology

Stabilisation • Bioremediation • Reactive Barriers • In-situ / Ex situ Remediation

Figure 2 - Lead Exceedances



ESP therefore concluded that remedial action was necessary to address the identified SPOSH concerns. The proposed remedial action comprised the removal of the 600mm upper soil horizon from front and rear garden and landscaping areas followed by subsequent reinstatement with an underlying geotextile layer and clean soils to return the garden / landscaping areas to previous levels. The shared landscaping areas were also capped. Additional aesthetic improvements were carried out as part of the reinstatement works.

The remedial action generated a significant volume of contaminated material. It was not considered feasible to treat any of the material for reuse in garden / landscaping areas.

ESP considered a number of remediation options to address the contaminated material generated from the remedial works. These options included:

- Offsite disposal - this was not considered to be a viable option due to extremely high cost and the need to transport the predominantly hazardous soils to the nearest hazardous landfill site at Swindon
- Treatment for offsite disposal at a local inert landfill site - this was ESP's preferred option initially. The proposed treatment process was E-Clay Stabilisation designed to achieve compliance with inert WAC criteria
- Treatment utilising E-Clay Stabilisation to enable reuse at a 'Cluster Receptor Site'. Envirotreat were made aware that Gwalia were in the process of purchasing an adjacent parcel of land for development purposes and that there was an identified need to raise site levels prior to development due to flooding concerns. It was considered that treated material from Dolau Court could be utilised as a substitute for imported fill (the E-clay Stabilisation Process is licensed as a waste recovery operation) – reuse criteria were developed to enable the treated [recovered] material to be utilised at the Receptor Site for this purpose.

  This was the preferred remediation option as it was considered the most cost effective and sustainable remediation solution with the added benefit of providing a fill material for the proposed development (negating the requirement for imported fill).

It was not considered possible to carry out the treatment operation on the Dolau Court Site due to limited space and safety concerns (the residents remained on-site during the remediation works). It was therefore decided to set up a treatment operation / area on land directly adjacent to the Dolau Court Site (across a roadway). It was also possible to link the treatment area directly to the Receptor Site by means of a service corridor which negated any requirement to transport materials by road. It was necessary to obtain permission from Carmarthenshire County Council [CCC] to utilise the land a 'Cluster Treatment Site' as both the treatment area and service corridor were sited on land owned by CCC.

envirotreat®

Delivering land you can develop

CASE STUDY

E-Clay Stabilisation

Cluster Site - Llanelli

The relative locations of the Donor Site, the Treatment Area, the Service Corridor and the Receptor Site are shown in Figure 3 below.

Figure 3 – Cluster Operation - Relative Locations

Remediation Objectives

Envirotreat were engaged by the Main Contractor, J G Hale Construction Limited [Hale] to undertake the following:

1. Deployment of Envirotreat's Mobile Treatment Licence
2. Construction and operation of a Treatment Facility
3. Construction and management of a suitable Service Corridor linking the Treatment and Receptor Areas
4. Construction and management of the Receptor Area
5. Acceptance and management of contaminated soils excavated and transferred from the residential development by Hale
6. Treatment, stockpiling and validation
7. Transfer of validated soils to the Receptor Site
8. Demobilisation from the Treatment Area on completion and reinstatement of the land occupied by the Treatment Area to pre-use condition. It was a requirement to demonstrate that the treatment operation had not adversely affected the site – this was confirmed by comparison with a comprehensive Precondition Survey undertaken by ESP prior to use of the site for the treatment operation

Methodology

ESP had previously produced a Remediation Method Statement and a Detailed Risk Assessment for the project (focusing primarily on the remediation works required at the Dolau Court Site).

Envirotreat deployed the company's Mobile Treatment Licence focusing on the treatment element of the remediation works. Envirotreat produced supporting documentation for the treatment process – this primarily comprised of a Method Statement and Remediation Strategy summarising the identified contamination issues, the proposed treatment process and technical rationale, the requisite environmental protection measures and the necessary validation protocol.

The deployment process included the need to consider biodiversity concerns. The proposed treatment and service corridor areas were considered to be potential habitats for protected reptile species (due to the wet and marshy nature of the land). It was therefore necessary to undertake a reptile clearance programme in accordance with HGBI Best Practice and Lawful Standards and to the satisfaction of the Biodiversity Officer at CCC prior to commencement of remediation works. This was carried out by qualified ecologists over a three month time period and successfully completed – the reptiles were collected and relocated in a suitable environment.

Envirotreat implemented strict protocols to control the acceptance of contaminated soils / materials into the Treatment Area and to control the treatment, validation and subsequent reuse of 'recovered' soils at the Receptor Site. These activities were monitored by ESP.

Contaminated soils were stockpiled in the Treatment Area and subsequently treated *ex-situ* in batches of known volume. The E-Clay Stabilisation treatment process involved the addition of an appropriate volume of the designated E-Clay in slurry form and the addition of cementitious materials in dry form. The *ex-situ* treatment process is shown in Figure 4 below.

Figure 4 – *Ex-Situ* Treatment Process

A total volume of 3,789m^3 of soils were treated over a 19 week period. A Quarantine Process was implemented for any contaminated soils / materials not considered to be compliant with predetermined criteria for the treatment process – these soils / materials were transferred to a designated quarantine area pending a decision on a suitable course of action. It was decided that quarantined soils / materials containing Asbestos and Japanese Knotweed would be disposed of offsite – the Japanese Knotweed containing soils were treated prior to disposal to lower the waste classification and associated disposal cost.

Oversize materials were screened out (where practically possible) and recycled locally – this reduced the volume requiring treatment.

A robust programme of environmental monitoring was implemented throughout the remediation works (due to the proximity of sensitive environmental receptors) – the prime focus was on VOC, noise and dust monitoring.

Validation

The works were undertaken in accordance with the approved Method Statement and Remediation Strategy.

It was agreed that the suitability of treated material for reuse at the Receptor Site would be determined by compliance with designated EQS leachate target values.

Following a suitable period of "curing" representative samples of treated soils were leach tested and compared with the EQS leachate target criteria for the identified contaminants of concern. In total 30 composite samples were tested to demonstrate compliance of the treated material with the pre-agreed remediation criteria for the Receptor Site.

The validated and treated [recovered] material was deposited at the Receptor Site as shown in Figure 5 below.

Figure 5 – Treated [Recovered] Soils Deposited at the Receptor Site

The reinstatement of the land utilised for the Treatment Area is shown in Figure 6 below.

Figure 6 – Reinstated Area of the Site Previously Utilised as the Treatment Area

The reinstated gardens at the Dolau Court Site are shown in Figure 7 below.

A comprehensive Material Management Plan was implemented for the Cluster Project.

Gwalia secured a temporary planning consent for the storage of treated soils on the Receptor Site pending the granting of the full planning permission for the proposed development. It was necessary to extend the mobile treatment licence deployment period to support the process.

Conclusions

Envirotreat were able to demonstrate through a comprehensive Validation Report that the overall remediation strategy had been successfully implemented.

Figure 7 – Reinstated Front Gardens at the Dolau Court Site