Plate 1 - The housing development at the Mansfield site (Ben Bailey Homes 2005)

Completion Date:	June 2005
Development:	Residential Development
Developer:	Ben Bailey Homes
Main Contractor:	Encia Group
Consultant:	Encia Consulting
End Value:	£8M

Site Overview

The 1.53 hectare site in Mansfield, Nottinghamshire was originally occupied by an engineering works. The site comprised of the works and office buildings, car parking and a number of oil and chemical storage tanks.

Associated with the former storage and process areas were soils contaminated with Total Petroleum Hydrocarbon (TPH).

Following remediation, the site was developed into a residential housing estate (Plate 1). The development comprised of a mixture of traditional two storey houses and flats with associated residential gardens, managed landscaping, car parking and access roads.

Plate 2 - Excavated area of contaminated soil.

Objective

The remediation strategy for the Mansfield site was designed to address the on-site source contamination and indirectly, the pathway Contamination issues with the intention of protecting Both human health and groundwater receptors. With particular regard to the underlying Lower Mottled Sandstone and Lower Magnesian Limestone beds which are both classified as major aquifers of high vulnerability.

Methodology

Envirotreat employed an *ex-situ* soil mixing remediation strategy for the treatment of over 2,475m^3 of contaminated soils.

The works were conducted over a 6 week period under the auspices of Envirotreat's Mobile Process Licence (MPL).

The contaminated soils were excavated, stockpiled and treated on-site using the Envirotreat E-clay® technology. The Envirotreat treatment plant comprised of a slurry production unit and mixing zone.

The slurry production set-up comprised of a 1000L paddle mixer in which the E-clay® reagents were combined before being pumped to the mixing zone; a conventional excavator bucket mounted on a 24T excavator was used to mix the contaminated soil and treatment slurry.

Plate 3 - Stockpiled material awaiting treatment

The soils were mixed in 10m^3 batches to allow known quantities of contaminated soils to be combined with known quantities of the E-clay® slurry. The treated soils were then temporarily stockpiled (Plate 4) before being reused on-site as a substitute for imported clean fill.

Plate 4 - Temporary stockpiling of the treated material

Validation

Validation of the treated material was carried out on 17 No. batch samples, which were leached and analysed on behalf of Envirotreat by a UKAS accredited laboratory.

Results

Site Specific Target Levels (SSTL) were calculated in the risk assessment for the treated leachate and adopted by Envirotreat Ltd for the listed contaminants of concern. The initial maximum soil concentration of contaminants found onsite prior to Envirotreat commencing treatment and recovery operations shown in Table 1.

Contaminant	Maximum Onsite Soil Conc. (mg/kg)
Aromatic C6 - C8	0.4
Aromatic C8 - C10	3.2
Aromatic C10 - C12	2.6
Aromatic C12 - C16	4,420
Aromatic C16 - C21	3,142
Aromatic C21 - C35	1,268
Aliphatic C6 - C8	0.9
Aliphatic C8 - C10	2.0
Aliphatic C10 - C12	1.7
Aliphatic C12 - C16	1,328
Aliphatic C16 - C35	90,917

Table 1 - Maximum on site contamination levels

The results of the leachate analysis, with the highest value within the leachate being 389µg/l for Aliphatic C16 -C21 demonstrated that the main objective of chemically stabilising the excavated 'contaminated' soils from the site in Mansfield had been achieved.

The results showed that the contaminants of concern had been immobilised within the treated material to below analytical detection limits in the vast majority of samples taken during the course of the treatment operation. The site-specific target levels for each contaminant had been significantly surpassed, further reducing any potential risk to the identified receptors.