

**Development:**

Remediation of former Petrol Station

**Client:**



**Consultant:**



### Site Overview

The E-Clay remediation technology was utilised to remediate contaminated soils at a site in Lisburn, Northern Ireland.

Plate 1 – Post remediation development.



The site approximately 640m<sup>2</sup> was previously occupied by a petrol filling station and vehicle service / repair garage, with associated underground fuel storage tanks. Prior to remediation works, these were decommissioned and removed from the site.

Site investigations had identified the presence of elevated concentrations of hydrocarbons in the soil, comprising both diesel and gasoline

range organics. The soil contamination was identified to depths of 3m below ground level within the central area of the site covering approximately 160m<sup>2</sup>.

### Objective

The overall remediation strategy was designed to address source and indirectly pathway contamination issues, with the intention of protecting both human and groundwater receptors. The remedial operation involved the *ex-situ* treatment of the identified source contamination material.

Post remediation it was anticipated that the site would be development for residual development.

Plate 2 – Area of primary contamination.



### Methodology

Envirotrat employed an on site, *ex-situ* soil mixing strategy to treat around 735m<sup>3</sup> of contaminated soils at the site.

The works were conducted over a period of 3 weeks under the auspices of Envirotreat's Mobile Process Licence (MPL). Specialist technology, materials and supervision were supplied by Envirotreat, whilst RAW Consulting Ltd supplied the required plant and labour for application of the process.

The soils were mixed in 5m<sup>3</sup> batches to allow known quantities of contaminated soils to be

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combined with the E-clay<sup>®</sup> slurry until a homogenous mix was produced. The treated soils were then temporarily stockpiled before being reused on-site as a substitute for imported clean fill, thus negating the need for off site disposal.

The ex-situ treatment of contaminated soil enabled compliance with the identified Site Specific Target Levels through the immobilisation of leachable pollutants within the soils. The treatment operation was designed to fully recover the waste soils in order to produce a raw material suitable for use on site in accordance with predefined and agreed criteria. Once treated, the recovered soil were emplaced and compacted, for site levelling purposes. Validation of the recovered soil was carried out by Envirotreat whilst validation of the excavations was undertaken by RAW Consulting.

Table 1 – Agreed Site Specific Target Levels.

Determinant	Leachate Target Value (ug/l)	Leachability Intervention Value (ug/l)
TPH	N/A	600
Benzene	0.2	30
Toluene	0.2	1000
Ethyl Benzene	0.2	150
Xylene	0.2	1000

### Validation

Validation testing was initiated to evaluate the performance of the stabilisation treatment process. The sampling protocol for the treatment operation involved the analysis of treated material every 50m<sup>3</sup>. The treated samples collected were allowed to cure for a period of fourteen to twenty-eight days, following which they were leached using the NRA leaching methodology and analysed for the contaminants of concern, these being TPH and BTEX.

Plate 3- Contaminated soil being combined with E-Clay



Table 2 – Analysis results of untreated and treated soils - Results ug/l unless stated otherwise

	TPH	Benzene	Toluene	Ethyl Benzene	Xylene
Untreated (ug/kg)	670000	10	12	6.5	31
LIS001	<10	<10	<10	<10	<10
LIS002	<10	<10	<10	<10	<10
LIS003	<10	<10	<10	<10	<10
LIS004	<10	<10	<10	<10	<10
LIS005	<10	<10	<10	<10	<10
LIS006	<10	<10	<10	<10	<10
LIS007	<10	<10	<10	<10	<10
LIS008	<10	<10	<10	<10	<10
LIS009	<10	<10	<10	<10	<10
LIS010	<10	<10	<10	<10	<10
LIS011	<10	<10	<10	<10	<10
LIS012	<10	<10	<10	<10	<10
LIS013	<10	<10	<10	<10	<10
LIS014	<10	<10	<10	<10	<10
LIS015	<10	<10	<10	<10	<10

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#### Results

Following analysis of treated material, the results obtained clearly demonstrated that the main objectives of chemically and physically stabilising the excavated 'contaminated' soils from the Lisburn site had been achieved, thereby achieved the project objective of reducing the leaching potential from the identified contamination through the immobilisation of leachable pollutants within the soils.

NRA validation results showed that the contaminants of concern had been immobilised within the treated material to below analytical detection limits in all of the samples taken during the course of the treatment and recovery operation, therefore significantly surpassing the Site Specific Target Levels.