CASE STUDY

Remediation Works

Warehouse Extension
Castings PLC, Brownhills

Client

Seddon

Environmental Consultant

Sladen Associates
Environmental & Geotechnical Consultants

Introduction

Castings PLC is a market leading UK iron casting and machining group based in Lichfield Road, Brownhills, West Midlands. The company is undertaking site improvement works including the construction of a warehouse extension. Envirotreat was contracted by Seddon Construction Limited to design and implement the required remediation works in the area of the warehouse extension building footprint – these works included the cost-effective management of soils / materials on-site and off-site disposal of surplus soils and materials.

Site History and Background

In the mid 1880's the main site area was already developed for industrial use as a chemical works. Lichfield Road was already an established thoroughfare but much of the surrounding land was still in agricultural use.

By 1902 many of the previous small structures on site had been removed suggesting that operations had been scaled back. In 1919 the site was known as Brownhills Chemical Works - further structures had been removed. Some redevelopment of the site had been undertaken by the 1960's with new rectangular structures in the north eastern site area.

The current site is operated by Castings PLC for the manufacture of castings for the automotive and other industries. The existing warehouse and the area designated for the warehouse extension is shown in Figure 1 below (prior to remediation).

Figure 1 - The Site Prior to Remediation

Site Investigative Works

Sladen Associates carried out site investigative works during February 2009 and June 2015 and identified made ground overlying natural sands and gravels - the site is shown on maps published by the British Geological Survey to be underlain by solid strata of the Pebble Beds of the Bunter Sandstone, now known as the Kidderminster Formation of the Sherwood Sandstone Group of Triassic Age. The bedrock in the site area is shown to be overlain by drift deposits comprising Boulder Clay (Glacial Till).

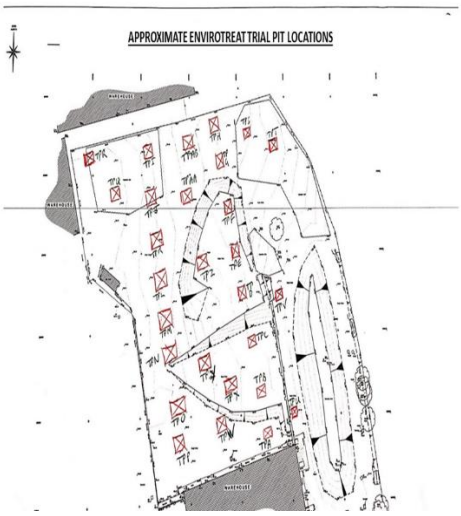
The proposed enabling works for the warehouse extension comprised of a significant cut and fill operation to achieve the required site levels – there was also a requirement to remove soils contaminated with Japanese Knotweed rhizomes.

The previous site investigations had identified contamination within the made ground – the prime contaminants of concern were metals (copper, lead and zinc) and petroleum hydrocarbons. The underlying natural sands and gravels were shown to be inert.

The intention was to maximise the reuse of made ground soils on site and to prioritise inert sands and gravels for off-site disposal – this provided the most cost-effective remediation solution for the site.

It was considered necessary to carry out a structured trial pitting exercise to provide a robust assessment of the made ground contamination (primarily to determine / confirm certainty of reuse for the made ground soils) and to establish the relative depths of the made ground in the footprint area. The approximate trial pit locations are shown in Figure 2 below.

Figure 2 – Approximate Trial Pit Locations



The assessment confirmed that it would be possible to retain all the made ground soils on-site (notwithstanding that the estimated 'cut' was initially estimated to be circa 11,000m^3 primarily due to the requirement to create an undercroft car park).

Site Remediation Works

The on-site management of soils was carried out utilising the CL:AIRE Definition of Waste Code of Practice [DoWCoP]. Envirotreat produced a Materials Management Plan [MMP] in accordance with the previously agreed Remediation Strategy produced by Sladen Associates [Sladen] to effectively manage the cut and fill element of the enabling works.

The MMP was approved by a Qualified Person [QP] as required by DoWCoP.

It was a requirement of the approved MMP that all soils intending to be reused on-site must be compliant with the soil reuse criteria determined by Sladen – this was essential to ensure that the soils were not considered to be waste materials.

The soil reuse criteria were based on acceptable soil contamination levels only – there was no requirement to consider the potential impact on groundwater (as the identified groundwater levels underlying the site were at a significant depth and not considered to be a receptor of concern).

Envirotreat were required to provide a treatment capability (in the event that any made ground soils were deemed to be non-compliant with the reuse criteria and required treatment to achieve compliance).

The on-site remediation works were undertaken by our specialist sub-contractor, Mayer Plant Hire Limited. Envirotreat maintained a supervisory and watching brief role throughout the works including the assessment and validation of all site wide excavations (thereby ensuring that made ground soils were reused beneath the new building footprint in accordance with the agreed MMP and reuse criteria). The excavated soils were stockpiled on site prior to reuse and managed using a Soil Tracking Spreadsheet.

The inert soils (natural soils and gravels) were disposed of at a local inert landfill repository – these soils were tested to confirm compliance with inert WAC criteria. The stockpiling of soils and loading of lorries with inert soils is shown in Figure 3 below.

The re-emplacement of made ground soils is shown in Figure 4 below. The soils were compacted and re-engineered to provide the required upper and lower levels for the warehouse extension footprint – the lower level was required to accommodate the undercroft car park.

Figure 3 – Stockpiling and Loading of Inert Soils for Offsite Disposal

Figure 4 – Re-emplacement of Made Ground Soils

Envirotreat provided a piling mat at both the upper and lower levels to enable the requisite piling works to be undertaken by Van Elle. The piling mats were constructed using imported stone materials (6F2 and 6F5 respectively).

Excavated sands and gravels were used to construct a temporary batter wall to support the required piling mat platform at the lower level – these sands and gravels were subsequently excavated / removed once the piles were fully cured (exposing the constructed piles) – the temporary use of sands and gravels for this purpose negated any requirements to import additional materials to site.

The movement and reuse of these materials was again managed under the agreed MMP for the site.

The finished surface prior to construction of the piling mat is shown in Figure 5 below - the batter construction is also shown in Figure 5 (seen from the upper level). The constructed upper level piling mat is shown in Figure 6 below.

Figure 5 – Relaid Soils (Including Batter Construction)

Figure 6 – Completed Upper Level Piling Mat

The constructed lower level piling mat is shown in Figures 7 and 8 below. The exposed piles at the lower level are shown in Figure 9 below.

Figure 7 – Completed Lower Level Piling Mat (Looking North)

Figure 8 – Completed Lower Level Piling Mat (Looking South)

Figure 9 – Exposed Piles at Lower Level

The surplus sands and gravels utilised for the construction of the temporary batter wall were subsequently disposed of at the local inert landfill repository (on completion of the piling operations on the lower level of the site),

The soils contaminated with Japanese Knotweed rhizomes were excavated and removed from site in full accordance with the Environment Agency Code of Practice. The removal works are shown in Figure 10 below.

Figure 10 – Removal of Soils Contaminated with Japanese Knotweed Rhizomes

In total 8,790m^3 of inert soils / rhizome contaminated soils were removed from site. There was no requirement to remove any hazardous or non-hazardous soils from site.

Conclusions

The remedial works were completed within the required timeframe and carried out in full accordance with the approved remediation strategy. All material movements on site were managed effectively using the MMP. A Validation Report (incorporating the MMP) was produced upon completion of the works enabling discharge of the relevant planning conditions.

The remediation strategy as implemented provided a very cost effective remediation solution.