Project Case Study: Kirkstall Forge – Plot K, Leeds

Services: Remediation & Preparatory Earthworks

Demolition | Enabling Earthworks | Remediation | Drilling | Civil Engineering | Plant & Technology | Geotechnical | Environmental | Planning | Renewable Energy

The Sirius Group: Confidence you can build on

Client: Commercial Estates Group

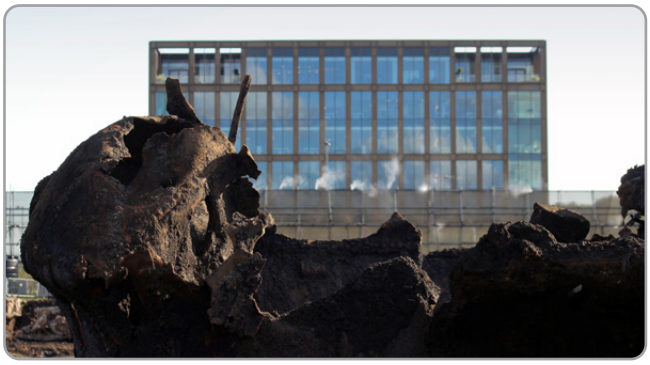
Project: Former Chemical Works and Forge Site, Kirkstall Forge, Leeds

Duration: 9 months

Services: Preparatory Earthworks & Remediation by stabilisation and solidification

Sector: Commercial

Contract value: £1.2m



Rusty old tar tanks buried beneath the ground at Kirkstall Forge

Site Summary

Kirkstall Forge has been of industrial importance since the 12th century after Cistercian Monks built Kirkstall Abbey in 1152 on the wooded banks of the River Aire. The same monks then built Kirkstall Forge ironworks and it became one of the longest continually used industrial sites in Europe. More recently the Forge manufactured vehicle axles and steel bars until its closure in 2003.

The site is bisected by the River Aire and this area (Plot K) was historically occupied by a gasworks, a chemical works and was latterly used for product despatch from the forge. Because of these previous uses the underlying ground was significantly contaminated, hence the need to remediate/clean-up the site.

Sirius has implemented successful remediation solutions to a challenging site and is proud to be part of a project which is breathing new life back into this historic setting.

Project Brief

The Sirius team were tasked with developing a remediation strategy which would satisfy planning permission by addressing the identified contamination and delivering an engineered platform to suit the future commercial development of the site.

Sirius were appointed as the design and build contractor. The delivery of the works was also validated by Consulting Engineers WYG.

Aerial view of the Kirkstall Forge Site, Plot K area bottom right

Project Description

Engineered earthworks involving removal of relic structures, treatment of grossly contaminated soils and groundwater to enable future redevelopment of the site to include basement parking.

Site Features

Plot K was one of the most contaminated parts of the new development. The contaminants (tar distillates) were highly odorous and the nearby railway station and busy office block were sensitive receptors. In addition, the contaminants had to be treated to ensure they no longer posed a risk to the adjacent River Aire.properties.

Amazing history dug up on site – an old sign find

The 'wet screen' created to diffuse odour and dust from the site

Kirkstall Forge – Plot K, excavation area

Excavation area:

- Wet screen (odour and dust mitigation system)
- Confirmed clean material awaiting reuse
- Redeposited treated material
- Contaminated ground in the process of being excavated
- Contaminated material being taken to the soil treatment area for processing
- Excavated tar tanks ready for recycling
- Excavated material deemed suitable for reuse without treatment undergoing confirmatory testing
- Water treatment system on site

Excavations revealing the sites previous industrial use that had polluted many of the soils on site

Contaminated soils being excavated in readiness for treatment

Remediation Design

Whilst an overarching Remediation Strategy existed for the Kirkstall Forge development, Sirius were required to develop a site-specific Remediation Strategy for Plot K. Remedial Targets were calculated through further detailed quantitative risk assessment (DQRA) and a treatability study was undertaken to demonstrate that the preferred remedial technique (Stabilisation/Solidification) would be effective in treating the contaminants within the soils.

Following regulatory approval of the Remedial Strategy, Environmental Permits were deployed to carry out the proposed soil and groundwater treatment and allow the earthworks to be undertaken adjacent a main river.

Site of the old forge where contaminated materials were buried

The Sirius STAR (Soil Treatment And Remediation) machine in action

Sirius site specific treatment area

Implementation of the Sirius site-specific Remediation Strategy and treatment area:

- Excavated concrete and brick materials awaiting crushing
- Stockpile of tested material awaiting reuse without treatment
- Treated material awaiting reuse
- Contaminated material awaiting treatment
- Tanker containing binders
- Sirius STAR machine
- Silos containing binders
- Primary mixing/treatment bays
- Contamination awaiting STAR treatment
- Oversize stockpile following screening

Dark, tar contaminated material on the left before treatment

Remediation Phase

Key aspects remediation and preparatory works:

- Specialist implementation of a double stage Stabilisation/Solidification technique developed during the design stage.
- On site treatment and retention of 13,000m^3 of significantly contaminated soil.
- Modification of geotechnically poor clays to enable reuse on site.
- Excavation, processing, and engineering of ~40,000m^3 of highly problematic soils.
- Surface and groundwater treatment compliant with the discharge consent obtained from the water authority.
- Implementation of a wide range of environmental controls to successfully protect sensitive receptors from dust, odour and Volatile Organic Compounds.

Sirius plant on site

Old tar and fuel tanks had been left buried undergound

Post Remediation Phase

A fully warranted validation report was prepared incorporating all chemical, geotechnical, environmental testing and supporting analysis to demonstrate that the objectives of the approved Remedial Strategy had been successfully achieved.

In June 2020, Leeds City Council approved detailed plans to build two large office buildings, which will provide 200,000 sq ft of space, as part of 2 Kirkstall Forge.

Excavations and remediation progressing well at the Kirkstall Forge site

Demolition, earthworks, remediation, drilling and civil engineering contractors.
Geotechnical, environmental and planning consultants. Renewable Energy.

Sirius Offices:
North East Tel: 0191 378 9972
North West Tel: 01942 718 551
Central Tel: 0113 264 9960
Wales Tel: 01554 780 544

Email: **info@thesiriusgroup.com**
Website: **www.thesiriusgroup.com**
Follow **thesiriusgroup** on: