SocEnv Soils and Stones project:
Case study demonstrating one or more of the ten principles of good soils and stones management in action

Former Oil Terminal Remediation - Bowling

Aerial image of siteworks being undertaken. Credit: DEME.

Summary:

The former Oil Terminal at Bowling operated as a fuel storage and distribution terminal between the early 1920s until closure in the early 1990s. Decommissioning of the terminal was completed in the late 1990s, further to which multiple phases of environmental investigation and assessment have been undertaken.

A number of potential environmental impacts, associated with historical storage and distribution of hydrocarbon products, were identified and remedial actions were recommended. The principal objective of the remediation works was to mitigate the risks to the water environment, such that the site was suitable for a generic commercial use to existing levels.

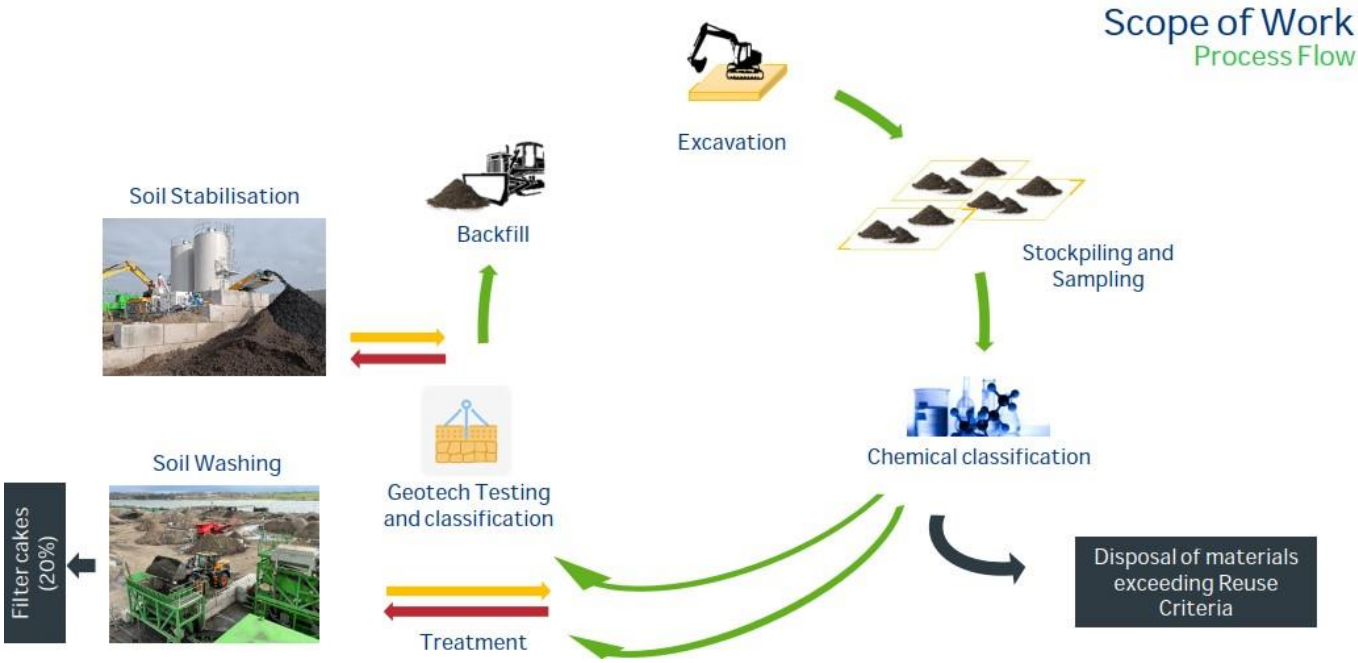
A remediation options appraisal was undertaken which determined the most suitable technique to be source removal, via bulk excavation, coupled with ex-situ soil washing treatment to mitigate the identified linkages associated with soil sources. Allied to this, product recovery from open excavations was proposed to manage free phase product where present on groundwater.

Remediation works commenced at the site in May 2021 and to date have comprised;

- Excavation of approximately 480,000 tonnes of material;
- Soil washing of approximately 140,000 tonnes of material producing approximately 27,000 tonnes of filter cake;
- Backfill of approximately 440,000 tonnes of material;
- Soil Stabilisation of approximately 90,000 tonnes of material; and
- Treatment of approximately 320,000m^3 of impacted groundwater.

The use of on site treatment undertaken on site has saved the equivalent of 6,000 trucks transporting materials for disposal or off-site treatment. A treatment efficiency of >90% has enabled the reuse of 77% of the materials treated.
The overall mass balance for the site (to date) indicates that approximately 92% of materials excavated have been re-used on site.

Works are scheduled to be completed in the spring of 2024.



Credit: DEME.

Meeting the ten principles:

Principle	How the principle was met in this project.
1. Implement soils and stones management practices to drive sustainable economic growth.	The management practices undertaken during the project have allowed a site which was offering minimal economic impact to become a key part of a £44m joint investment project between Glasgow City Deal and West Dunbartonshire Council which will deliver improved transport infrastructure and attract future investment to the area.
2. Preserve, protect, and enhance the value of all soils and stones in situ.	The effective characterisation of soils at site, both at the ground investigation and remediation phases of the project, ensured only soils which actually required to be excavated were disturbed and therefore preserved and protected the value of the insitu soils and stones.
3. Promote and enhance the inherent value of soils and stones as part of a wider integrated environmental system (e.g., for carbon sequestration, food security and biodiversity).	N/A
4. Use a common standard for soil health in relation to land-use, taking	N/A

underlying soil conditions and functions into account in the management of land.	
5. Use common quality standards for soil based on principle #4 for excavated soils, stones and dredgings to be used in specific end-uses.	N/A
6. Understand and identify site specific soil conditions at the start of project planning or change of land-use. Define the status of any excavated soils and stones according to their value as an end-use resource and avoid the intention to discard them as surplus to the needs of the project. Protect undisturbed soils to enhance soil health.	Extensive ground investigation prior to the project commencing ensured accurate characterisation of the existing soil conditions. Ongoing chemical and geotechnical classification of excavated soils throughout the project lifecycle enabled end use to be determined avoiding unnecessary disposal of soils.
7. Develop and implement a resource hierarchy for the management of land, soils and stones.	The Remediation strategy for the site was developed to clearly define a hierarchy for the management of soils and stones on the project. Material types were defined and the re-use locations determined in advance of works, enabling the contractor to effectively programme excavation and backfilling. In certain locations, to reach impacted materials, excavation of soft clay soils was required. To permit the re-use of these geotechnically poor soils, lab based and subsequent site based trials were undertaken to determine appropriate quantities of lime/cement..
8. Implement financial metrics for the life cycle of all projects based on the impact on soil value in order to drive the market for offsetting (e.g., metrics for biodiversity loss, carbon sequestration and loss of food security).	N/A
9. Implement a national policy progressively to harmonise legislation, regulation, best practice guidance and monitoring programmes to protect soils. Include the fields of planning, land contamination, forestry,	N/A

agriculture, ecological restoration, and waste management. Aim to promote integrated markets for soils and stones, offset trading and policies thereby allowing land values to reflect optimum soil health based on metrics in principle #4.	
10. Periodically benchmark the natural and economic value of UK soils against both base-line UK and international metrics, taking into account global social, economic and environmental sustainability (e.g., the supply chain impacts of ensuring UK food security, and the valuation of soils and stones).	N/A

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Lessons learned:

This project has demonstrated a number of key principles which have allowed the project to progress successfully.

Firstly, it has demonstrated the benefit of sufficient (and suitable) Ground Investigation (GI) to understand the nature of the soils/stones. Over 25 phases of GI have been undertaken at the site and this has allowed an accurate assessment and delineation of the extent of contamination present. This information then fed into the production of an effective management/treatment methodology which enabled development of an excavation and re-use plan.

Secondly, early regulatory and contractor engagement has been key. Early regulatory engagement permitted discussion, consideration of concerns whilst allowing time to satisfy any regulatory concerns before work commenced. Early contractor engagement has allowed the contractor to identify/close out aspects of the works on which they may have concerns and ultimately deliver the works as per the agreed remediation strategy.

Thirdly, the projects "open door" approach has had real benefits by ensuring the regulator has increased involvement through participation in change/decision process throughout the project, whilst also observing the works – preventing the regulator receiving a verification report at the end of the project on a site they have never visited whilst also missing opportunities to address any concerns whilst the works were being undertaken.

Find out more:

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