

REMEDIATION OF SKARES BRICKWORKS & WHITEHILL COLLIERY

1. BACKGROUND

The former Skares Brickworks and Whitehill Colliery, occupying 12.5 hectares of Brownfield land, is located approximately 4 km west of Cumnock, between the A70 and the B7046, some 2km north of the village of Skares in East Ayrshire. Digit Resource Management purchased the land from local farmers in 2000. The site consisted of three main areas see Figure 1 below.



Figure 1: Site areas before redevelopment

- **Area 1:** The former Skares brickworks, approximately 3 hectares, was operational from the late nineteenth century until 1962.
- **Area 2:** A spoil heap arising from the dismantled Whitehill Colliery which closed in 1963.
- **Area 3:** Former agricultural land and woodland degraded by flooding from spoil heap water run-off.

In the 1960's, the manufacture of bricks and excavation of coal ceased and the site was decommissioned.

2. PURPOSE AND OBJECTIVES

The project was undertaken to reclaim the derelict Brownfield site to create a woodland for the benefit of the local community and native wildlife.

The objective was to utilise an organic waste and apply the Vertical Mixing Soil Remediation (VMSR) method to condition the

nutrient deficient soil. The process will result in the soil having more effective drainage and capable of sustaining trees and plant life.

3. SITE CHARACTERISATION

During the period 1999-2000, Digit employed Ann Nevett Landscape Architects to conduct several site investigations to determine the nature and effects of the colliery spoil heap and adjacent brickworks water run-off, and to identify appropriate remedial techniques.

The site characterisation work identified spoil heap (Area 2) water run-off had been directed to the settling lagoon prior to discharging via a ditch and outfall to Ward Burn off-site, see Figure 1. Lack of maintenance since colliery closure led to silting, and overflow. As a result a second lagoon and marshy wetland (Area 3) became established to the south.

The uncontrolled discharge had detrimental effects on the Woodland at the entrance to the West of the site. The trees substantially screen much of the dereliction; however, lagoon discharge had flooded the wood, killed most of the trees and opened up unsightly views. The water frequently overflowed on to the road, causing occasional flooding and icing, a concern to East Ayrshire Council Road Department.

Trees had colonised some parts of the spoil heap, however the lack of nitrogen and phosphorous in the soil reduced the growth rate and prevented natural seeding, see Figure 2 below.



Figure 2: Fifteen year old tree with stunted growth

4. SUMMARY PROJECT WORK

Work began with the demolition of the old brickworks building. The brick and concrete was crushed and used to form the paths and viewpoints which pedestrians will use after completion of the VMSR regeneration programme, see Figure 3. Representatives of the local communities were encouraged to visit and view the operations under proper supervision.



Figure 3: Demolition of Brickworks & Construction of Paths

The silted settling pond and outlet was excavated to the clay beds. This process increased the capacity to store surface water run-off and immediately alleviated the flooding in Area 3, shown in background of Figure 4.



Figure 4: Dredged Settling Lagoon, Drained Area 3

The Site Investigation confirmed that vegetative matter should be incorporated into the spoil heap in an effort to stabilise the loose slag and blaes material eroding into the settling lagoon. It was proposed that organic matter such as sewage sludge cake should be used to condition the nutrient deficient slag and blaes to create a growing medium capable of sustaining plant life.

Consultations with Scottish Agricultural College (SAC), Scottish Environmental Protection Agency (SEPA) and East Ayrshire Council, led to the development of field trials to establish the design mix using Digested and Undigested Sewage Sludge Filter Cake as a main soil forming material.

5. RISK ASSESSMENT

A risk assessment was developed to identify the risks associated with vertically mixing

sewage sludge filter cake with the shale and blaes. It was found that the following parameters should be monitored over time:

- Heavy Metal Release to the Soil
- Microbial Degradation
- Watercourse Biochemical Oxygen Demand (BOD)

The field trials identified that the VMSR method could be used to remediate the site with an optimum design mix of 3:1 of blaes/shale to sewage sludge cake respectively to a suitable rooting depth. Full scale soil remediation and contour formation took place from August 2000— February 2002.



Figure 5: Shaping of Contours

6. PROJECT COMPLETION

On completion of the project, 50,000 tonnes of sewage sludge filter cake was diverted from landfill and used for ecological and environmental benefit.

Flooding has also been eliminated due to the improved drainage on site. To sustain this, mixed woodland and grass was planted over the entire site thereby reducing soil run-off and lagoon silting, see Figure 6. The regenerated woodland and wetland is now a rich habitat for a range of animals and birds.



Figure 6: Tree Planting Completes the Site Regeneration.

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Scottish Water, Scottish Environmental Agency (SEPA), Scottish Enterprise Ayrshire, Ann Nevett Landscape Architects, East Ayrshire Council, East Ayrshire Woodlands, Thames Water, Forestry Commission, Scottish Agricultural College (SAC).