The Coal Authority

Planning Application Supporting Information (incorporating Design and Access Statement)

Proposed Resin Trials at the Coal Authority's Strafford Mine Water Treatment Scheme, Dodworth, Barnsley

December 2013

Site Summary

The application site comprises part of the existing Strafford Mine Water Treatment Scheme owned and operated by the Coal Authority at the former Strafford Colliery site, south of Dodworth, Barnsley. The application site is located at NGR Easting 431926, Northing 403966 and is approximately 0.21ha in size. The site is accessed from Gilroyd Lane, via Smithy Wood Lane and the Trans Pennine Trail.

The Mine Water Treatment Scheme was granted planning permission (Ref: 2005/1706) by the LPA in December 2005 and controls the water level in the Silkstone shaft and prevents the discharge of untreated mine water to the Stainborough Dike. The site currently comprises an aeration cascade, settlement pond and reed bed situated in the northern part of the land. The southern part of the site is vacant undeveloped land (see appended site photographs), which may be used in future should the size of the Mine Water Treatment Scheme need to be increased to deal with greater volumes of water.

It is proposed by the Coal Authority to make use of part of this land for a temporary period to undertake resin trials.

Background to the Proposed Trials

The aim of these field trials is to load test various infill materials introduced into a regular excavations that have subsequently been treated with various types of commercially available resin injection products. More specifically, from a practical perspective, the proposed field trials endeavour to replicate the potential treatment of crownhole collapses associated with past shallow coal mining.

As part of its duties under the Coal Industry Act 1994, the Coal Authority is responsible on behalf of the State for remediating and making safe land and hazards, such as mine entries (shafts and adits), associated with past coal mining activity that have collapsed. There are numerous ways of treating such collapses, and the use of inert resin material is a potential new method that could bring significant benefits to the work of the Coal Authority across the coalfields of England, Scotland and Wales, and is currently being assessed by our Research and Development Team.

Although to date, resin injection products have been used by the Coal Authority to treat and stabilise a small number of shallow mining collapses, mainly within the North East region, their use has not been supported by any engineering/scientific testing or analytical rigour.

More generally, in order to gain confidence in the future use of resin injection products – in the treatment of shallow ground collapses and other applications going forward – it is imperative that the Coal Authority improves its technical understanding

of these materials in order to ensure their appropriate use and to identify their limitations.

Fundamentally, the proposed field trials need to clearly demonstrate an improvement in the strength and settlement characteristics of the resin treated infill material and also demonstrate structural adequacy under the minimum required design loading.

In addition, it is proposed to identify any financial and site specific benefits of using resin treated fill and compare their use with the current options adopted for treating and stabilising crownhole collapses and other shallow ground collapses.

Scope of the proposed field trials

Fundamentally, the proposed field trials involve the excavation of eight 1.5m x 1.5m x 1.5m deep test pits, loosely filling the pits with various infill materials and undertaking in-situ testing of the infill material both before and after the infill material has been treated with several injection resin products. For each test pit it is proposed to carry out a Standard Penetration Test (SPT) before the resin treatment and a SPT and plate bearing test after the treatment.

In addition, a ninth pit is to be excavated and fully filled with a phenolic resin and load tested adopting an in-situ plate bearing test.

Of the eight filled test pits, each pair is to be loosely filled with one of four different infill materials prior to one pit being injected with a polyurethane resin and the other with a silicate resin.

Methodology

Method 1 – Test Pits 1 to 8

The following test procedure is to be adopted:

1. Carry out ground investigation (GI) on the trial site including in-situ and laboratory soil testing. Refer to Section 11.
2. Carryout laboratory classification testing on the various infill materials. Alternatively, obtain a product certification (certified by an independent third party) and/or material classification testing from the material supplier. Refer to Section 8.
3. Set out the trial site to accommodate a number (to be determined) of 1.5m x 1.5m x 1.5m test pits taking into account site access, plant and equipment access, existing services and the working space required to implement the test(s) in a safe manner.

4. Carefully excavate the test pits using a small 360 degrees mechanical excavator to ensure where practicable a regular cubic excavation is produced. The bottom 150mm thickness of the excavation is to remain undisturbed to protect the formation from wet weather prior to the placement of the infill material.
5. Loosely fill each test pit to ground level with the test specific infill material. The material is to be poured into the pit from an excavator bucket positioned just above ground level to try and replicate the nature of free falling materials associated with a sudden ground collapse. Under no circumstances should the infill material be compacted using the excavator bucket or by other means.
6. For each test pit, undertake in-situ Standard Penetration Tests within the untreated infill material. Refer to Section 12.
7. Inject the test specific resin into the infill material through an array of injection points – the number, spacing and configuration will vary depending on the specific resin type/infill material combination.
8. Prepare corresponding resin type/infill material test cubes/samples for testing in the laboratory for compressive and shear strength.
9. For each test pit, undertake an in-situ Standard Penetration Tests (SPT) within the treated infill material. Refer to Section 12. If possible, obtain a core of the treated infill material.
10. The holes and any localised disturbance caused by the Standard Penetration Tests (SPT) are to be locally treated with respective trial pit infill material and/or resin before carrying out the plate bearing test.
11. Carry out a plate bearing test in each test pit to determine the vertical deformation and strength characteristics of the treated infill material. Refer to Sections 12 and 13.
12. By wet rotary drilling extract an additional core of the treated infill material from each trial pit for close examination (Optional – to be advised by the Coal Authority's Project Engineer).
13. Carefully carry out intrusive excavations using a small mechanical excavator to expose a minimum of one side of each of the treated test pits to full depth (1.5m) to enable a close visual inspection of the treated matrix at the test pit/natural ground interface. To ensure site safety and safe access and egress the excavated sides are to be battered at a 1:1 slope.
14. Select a minimum of two test pits and excavate a full depth (1.5m) trench around the pit perimeter to fully expose the treated mass (Optional – to be advised by the Coal Authority's Project Engineer).

Note: The Coal Authority's Public Safety & Subsidence Engineering Section is to prepare a Design Risk Assessment for the proposed field tests identifying all residual risks to be managed on site by the appointed Contractor(s) through their site specific risk assessments and method statements.

Method 2 – Test Pit 9

The following test procedure is to be adopted:

1. Carry out ground investigation (GI) on the trial site including in-situ and laboratory soil testing.
2. Set out the trial site to accommodate a 1.5m x 1.5m x 1.5m test pit taking into account site access, plant and equipment access, existing services and the working space required to implement the test(s) in a safe manner.
3. Carefully excavate the test pit using a small 360 degrees mechanical excavator to ensure where practicable a regular cubic excavation is produced. The bottom 150mm thickness of the excavation is to remain undisturbed to protect the formation from wet weather prior to the placement of the infill material.
4. Inject the phenolic resin to fully fill the test pit to ground level.
5. Prepare test cubes/samples for testing in the laboratory for compressive and shear strength (Optional – to be advised by the Coal Authority's Project Engineer).
6. Carry out a plate bearing test in the test pit to determine the vertical deformation and strength characteristics of the phenolic resin.
7. Carefully carry out an intrusive excavation using a small mechanical excavator to expose a minimum of one side of the treated test pit to full depth (1.5m) to enable a close visual inspection of the treatment test pit/natural ground interface. To ensure site safety and safe access and egress the excavated sides are to be battered at a 1:1 slope.

Access

The site is accessed using the existing arrangements established for the Mine Water Treatment Scheme, i.e. using the metalled track from Gilroyd Lane, via Smithy Wood Lane and the Trans Pennine Trail. The site already benefits from a gated access at the junction of Smithy Wood Lane and the Trans Pennine Trail (see appended photographs).

Footpaths

It is proposed that during the works a permissive footpath across the northern part of the site will be closed. All designated footpaths around the Mine Water Treatment Scheme site will remain accessible and will be suitably partitioned from the site works. The proposed closure can be seen on plan CA-RD-001 Rev A submitted as part of this planning application. The designated right of way that runs to the south of the application site enables east-west pedestrian movement to continue across the Mine Water Treatment Scheme.

Security

Whilst the site is in use the entire area designated for the trial will be fenced off by wooden post and rail fencing of less than 1 metre height to prevent public access. Machine movements to and from site will be very limited (during the initial excavation works and site restoration following the trials 3 months later) and will be supervised by competent banksmen.

Landscaping

There are no trees within, or close to, the application site affected by the proposals.

Timescales

The site trials would last for a period not anticipated to exceed 3 months. This would include time allocated for the resins used to set. Physical site works would be limited to one week at the beginning and one week at the end of the trials.

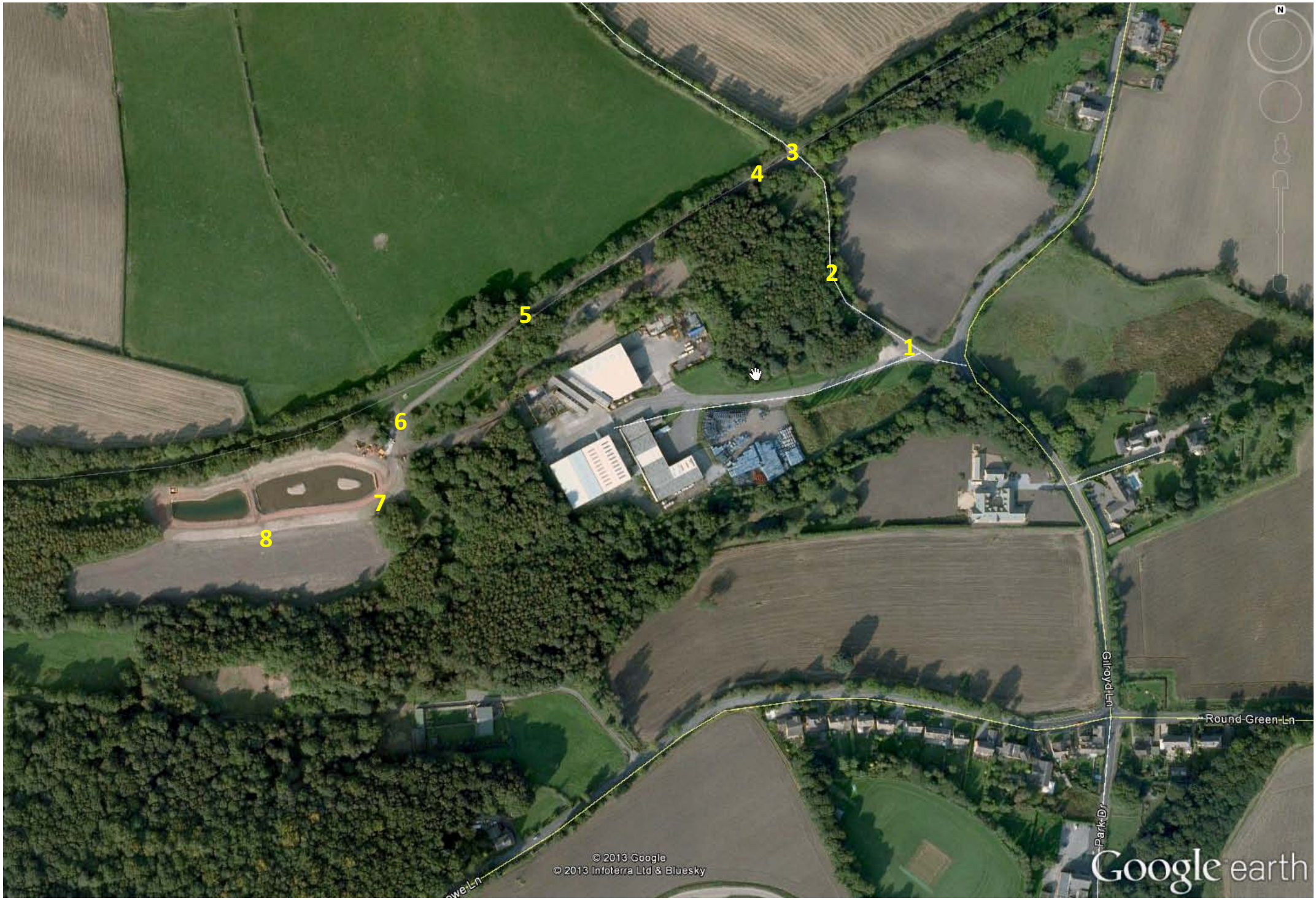
Completion of trials

Upon completion the site would be restored to its initial condition. The fill material used during the trials would be taken off site and disposed off appropriately. The trial pits would then be filled using the previously excavated material and the surface levelled in keeping with the rest of the site.

All fencing and plant would be removed from the site upon completion.

Appendix A

Site Photographs


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4
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8
Round Green Ln
Gilroyd Ln
Park Dr
© 2013 Google
© 2013 Infoterra Ltd & Bluesky
Google earth



Site entrance off Gilroyd Lane (Point 1 looking North East)



Parking Area near site entrance off Gilroyd Lane (Point 1 looking East)



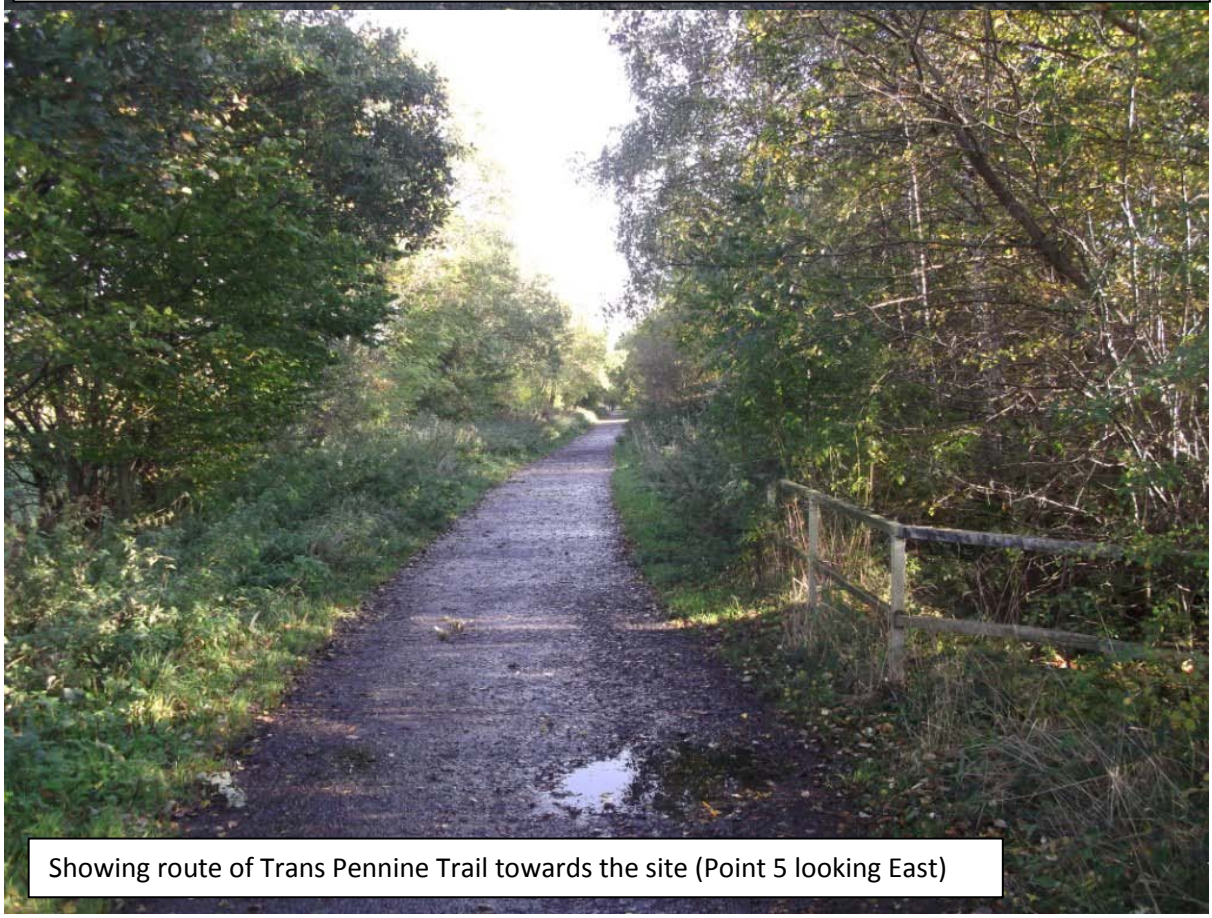
Smithy Wood Lane leading from Gilroyd Lane (Point 2 looking South)



Junction of Smithy Wood Lane and Trans Pennine Trail (Point 2 looking South)



Gated entrance from Smithy Wood Lane and showing route of Trans Pennine Trail (Point 4 looking East)



Showing route of Trans Pennine Trail towards the site (Point 5 looking East)



View over existing Mine Water Treatment scheme (Point 6 looking West)



Access to Mine Water Treatment scheme and to proposed site (Point 6 looking South)



Access track to Mine Water Treatment scheme (Point 7 looking West)



View over proposed site (Point 7 looking West)



View over site area showing permissive footpath (Point 8 looking West)



View over site area showing permissive footpath (Point 8 looking East)



Existing fence line between proposed site area and Mine Water Treatment scheme (Point 8 looking North)