

ENVIRONMENTAL SETTING AND SITE
DESIGN


FORMER CRESWELL COLLIERY
LAGOONS

BOLSOVER PROPERTIES

MARCH 2019



SUMMARY TABLE:	
SITE:	Former Creswell Colliery Lagoons - ESSD
CLIENT:	Bolsover Properties
DATE:	March 2019
REFERENCE	IV.90.16
DEVELOPMENT PROPOSAL:	Importation of inert and non-biodegradable materials to facilitate the remediation of the former colliery spoil lagoons at Creswell.

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1.0 INTRODUCTION

1.1 Report Context

This section of the Environmental Permit application corresponds to Question 1, Appendix 4 of Part B4 of the Environmental Permit application form, which requires the provision of an Environmental Setting and Site Design (ESSD) report.

The aim of this report is to describe the regulated facility in relation to the environmental setting, identifying the source terms, pathways and receptors that will be used as the basis for the risk assessments, including:-

- Environmental Risk Assessment.

This risk assessment includes a more specific conceptual model.

This Environmental Permit application has been prepared on behalf of the operator, Bolsover Properties by Ivy House Limited.

1.2 Regulated Facility Details

Site Location

The waste recovery operation regulated facility is at Creswell Colliery Lagoons, which is located approximately 500m south of the Model Village, immediately south of the former mining village of Creswell and some 1500m north of Whaley Thorns. The lagoons are situated in the southern part of the site, as shown on Drawing Number IV.90.16/LOC/01

The lagoons are approximately 14Ha in size. The site is centred at approximate National Grid Reference (NGR) 452270E, 373120N.

Landfill Classification

Not applicable, the regulated facility is a waste recovery operation.

Application Boundary and Site Security

The proposed application boundary is shown on Drawing Number IV.90.16/RES/01.

Relevant/Adjacent Former Waste Management Licence Boundaries

The site subject to this permit application comprises part of the former colliery lagoons and settlement ponds. The site was granted Planning Permission by Derbyshire County Council for the completion of the restoration through the importation of inert materials (Planning Permission Reference: CW5/0218/89).

Site Context

Creswell Colliery Lagoons Site is accessed from Frithwood Lane via the site access road.

According to the 'Magic' website, there are no RAMSAR, Special Protection Areas (SPA's), Special Areas of conservation (SAC's) or local wildlife or nature reserves within 2 km of the site.

The Creswell Crag and the Hillinhill and Markland Grips which are designated as a Sites of Special Scientific Interest (SSSI), lie approximately 1.4 km to the north east and north west respectively at their closest points. A Scheduled Monument (a Palaeolithic and later prehistoric site at Creswell Gorge including Pinhole Cave, Mother Grundy's Parlour and Robin Hood's Cave) lies approximately 1 km north east of the site.

Drawing Number I.V.90.16/REC/01 shows the location of the sites of Special Scientific Interest as well as the scheduled monument.

The lagoons form part of the wider Creswell Colliery site. The site consists of nine lagoons in total, of which the six northern most lagoons have been partially backfilled and somewhat restored. To the north of the site is residential housing with a football pitch, to the east is a railway line, sewerage treatment works and undeveloped land, to the south is a railway line and agricultural land, while to the west, is Frithwood Lane and agricultural land.

The Environmental Risk Assessment (Appendix F of the main application) that has been undertaken for the proposed application shows that the restoration of the colliery lagoons does not pose a potential hazard to groundwater quality.

According to the 'magic' website the site is not located in a Groundwater Source Protection Zone, and is considered by the Environment Agency's Groundwater Protection: Principles and Practice (GP3) as a potentially suitable site, subject to planning considerations.

The Environmental Risk Assessments of the Environmental Permit application demonstrates that long-term site management will not be required due to the environmental protection measures and waste acceptance protocols proposed for the development.

2.0 SOURCE TERM CHARACTERISATION

2.1 The development of the installation

Creswell Colliery was established prior to 1898. Spoil from the colliery was deposited on five tip areas, initially to the south of the colliery and, by 1955, spoil was being deposited to the east of the railway line. The application site was formerly part of tip areas 4 and 5. Creswell Colliery closed in 1991 and following its closure, a mine water pumping system was constructed on the site of tips 4 and 5, which involved the construction of 6 new water treatment lagoons and the re-use of 3 existing ones, to protect other collieries then still operating in Nottinghamshire from rising mine water. At the time, the mine water pumping system was developed as permitted development under the provisions of Schedule 2, Part 20, Class E of the Town and Country Planning (General Permitted development) Order 1988, subject to the approval of the Mineral Planning Authority. It is understood that mine water pumping ceased prior to 2012. In 2015, the pumping equipment was removed, the remaining surface buildings were demolished and regrading works to infill the six northerly lagoons were undertaken for health and safety reasons (also as permitted development). Lagoons have been utilised for mine water treatment through a series of polishing ponds (the lagoons). The site ceased to be utilised for this purpose prior to 2012. The site benefits from an extant planning permission (Planning Permission Ref: CW5/0218/89, which was forwarded with the permit application (5.IV.90.16.PlanningPermission.08.10.18 of the permit application) which authorises the restoration of the historical lagoons

2.2 Site Infrastructure

The site access is off Frithwood Lane which will access the site from both directions. Vehicles would access Frithwood Lane via the A616, as shown on Drawing Number IV.90.16/LOC/01.

The site entrance is secured by a lockable gate. Work will only be undertaken during the agreed operational hours as stipulated by the extant planning permission which is as follows:

- 08:00 hours to 18:00 hours Monday to Friday,
- 08:00 hours to 13:00 hours Saturdays, and
- No working on Sundays or public or bank holidays.

2.3 Proposed Operational Phasing

The total quantity of waste materials required for the restoration will be approximately 144,375m³, which equates to approximately 231,000 tonnes when using a bulk density conversion factor of 1.6 tonnes/m³. It is proposed to import this waste at an approximate rate of 112,000 tonnes per annum and restore the site over a period of 3 years.

2.4 Permitted waste Types

It is proposed that the silt lagoon at Creswell Colliery Lagoons will only accept wastes suitable for restoration. The proposed waste types are as follows:

Waste Type	Description
01	WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING, AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS
01 01	wastes from mineral excavation
01 01 02	wastes from non metalliferous excavation
01 04	wastes from physical and chemical processing of non-metalliferous minerals
01 04 08	waste gravel, crushed rocks other than those containing dangerous substances
01 04 09	waste sand and clays
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)
17 01	concrete, bricks, tiles and ceramics
17 01 01	concrete
17 01 02	bricks
17 01 03	tiles and ceramics
17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 03	bituminous mixtures, coal tar and tarred products
17 03 02	road base and road planings only other than those containing coal tar
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 04	soil and stones including chalk other than those mentioned 17 05 03
17 05 06	dredging spoil other than those mentioned in 17 05 05
17 05 08	track ballast, soil and stones other than those mentioned in 17 05 07
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 09	minerals (for example sand, stones)
19 12 12	treated bottom ash including IBA and slag other than that containing dangerous substances only
20 02 02	soil and stones

The waste material to be imported by HGV will access the site via Frithwood Lane.

2.5 Final Landform and After Use

Drawing Number IV.90.16/RES/01 shows the proposed final restoration contours for the silt lagoons.

Following the completion of the waste recovery operations, the land will be restored to agricultural and nature conservation after-use. Returning the site to nature conservation will have the potential to significantly contribute to the long-term biodiversity of the site.

In accordance with Condition 39 of Planning Permission CW5/0218/89, the site will be restored and planted in accordance with the principle of the approved restoration scheme. The new restoration scheme has been carefully designed for maximum benefit and includes improvements to the original restoration plan which was approved by Derbyshire County Council.

2.6 Engineering

Groundwater Management

No groundwater management system is required at the site.

Geological Barrier

As the site is not a landfill, the Landfill Directive does not apply, therefore a geological barrier is not required at the site.

Side Slope Lining

As the site is not a landfill, the Landfill Directive does not apply, therefore side slope lining is not required at the site.

Capping

As the lagoons will be infilled with material that is considered to be suitable for restoration purposes it is not proposed to install either a clay or geotextile cap. On completion of filling to final levels, the site will be restored with 1m of restoration soils comprising not less than 0.3m of topsoil.

2.7 Restoration and Aftercare

Restoration

The land will be restored as per the Landscape and Ecological Management Plan (Appendix C of the main permit application). This will have the potential to significantly contribute to the long term biodiversity of the site. The site will be restored with 1m of restoration soils comprising not less than 0.3m of topsoil material. The waste codes that will be used for the final restoration of the site will be:-

- 17 05 04 - Soil and stones other than those mentioned in 17 05 03; and
- 20 02 02 - Soil and stones, only from garden and parks waste; excluding topsoil, peat.

Details of the final pre and post settlement restoration contours are provided in Drawing No. IV.90.16/RES/01A.

Aftercare

Following restoration of the site the soils will be cultivated and sown with a mix of grass seed designed to provide optimum cover. The restored site will be planted in accordance with a detailed planting scheme to create a mix of habitats to enable an agricultural afteruse whilst enhancing biodiversity on site. Further details are given Appendix C – Landscape and Ecological Management Plan.

2.8 Leachate Management and Monitoring

Leachate Generation

Leachate is generated by rainfall infiltrating through areas of open waste and also through areas of capped and restored waste. Due to the nature of the waste, leachate will not be produced, therefore, no leachate management or monitoring is proposed.

Leachate Management and Monitoring Infrastructure

Leachate Management and Monitoring is not required for waste recovery sites.

2.9 Gas Management and Monitoring Infrastructure

Gas Generation

A Gas Risk Assessment (GRA) has not been prepared for the infilling of the lagoons.

Surface Water Management System

There are very few surface water bodies within 2 km of the site. The only surface water in the area, the Creswell Crags is located east of the site and runs parallel to the east of the wider Creswell Colliery Site site and approximately 700m to the proposed permit boundary at its closest point. The River Poulter is located 2.73km south of the site and runs east/west. Much of the surrounding land of the application site has been restored to conservation wetlands and includes several water bodies.

The surrounding area of the Creswell Colliery Lagoons has historically been utilised for agricultural purposes and much of this agricultural land still functions as such and surrounds the Lagoons.

A search of the Environment Agency's public register indicates that the site does not benefit from an existing discharge consent for the dewatering of the lagoons. With regards to the planning, condition 31 states that within six months of the commencement of the development, a detailed design and associated management and maintenance plan of surface water drainage for the site for the restored landscape, in accordance with DEFRA non-statutory technical standards for sustainable drainage systems (March 2015), has been submitted to and approved in writing by the Waste Planning Authority. The approved drainage system shall be implemented in accordance with the approved detailed design prior to restoration works commencing.

2.10 Post Closure Controls

Post closure controls will ensure the long-term management and monitoring of the regulated facility. The LEMP provided in the application, details the monitoring schedule for the aftercare phase.

3.0 PATHWAY AND RECEPTOR TERM CHARACTERISATION

3.1 Climate

The nearest Climate Station to the Creswell Lagoons (located at the East Midlands Airport) indicates that for the climate period 1981 - 2010 the average rainfall for the area was 620.2 mm. Site specific information on rainfall and potential evapotranspiration was provided by the Met Office in the form of MORECS data. The long term average (1961-1990) annual rainfall is reported to be 834.6mm whilst the long term average (1961-1990) annual potential evaporation is recorded to be 488.7 mm per annum for bare soil and 660 mm per annum for grass. This data indicates that the effective rainfall to the operational areas of the site will be approximately 131mm per year.

3.2 Geology

Bedrock Geology

According to British Geology Survey (BGS) Geology of Britain Viewer the bedrock geology underlying the site is Cadeby Formation - Dolostone. Sedimentary Bedrock formed approximately 252 to 272 million years ago in the Permian Period. Local environment previously dominated by shallow carbonate seas.

Superficial Deposits

The BGS Geology of Britain Viewer shows that there are no superficial deposits underlying the site

3.3 Hydrology

Surface Watercourses

The River Idle runs horizontal to the east of the site boundaries and is the only surface water within a 1km distance of the site.

The site includes several lakes which have been constructed throughout the use of the site as a waste water treatment facility for the Creswell Colliery. While most of these will be infilled, the scheme will ensure that some areas of the site are restored to conversation wetlands which will include several water bodies as shown in the LEMP.

With reference to the Environment Agency's mapping website 'Flood map for Planning', the lagoons at Creswell Colliery are located within a Flood Risk Zone 1, and are therefore not located within an area at risk of flooding.

The Environment Agency operates a General Quality Assessment scheme (GQA), which is a method for nationally classifying river and canal water quality in England and Wales. The water quality is assessed using a number of criteria including the chemical and biological content of the water, the nutrient availability of the water, and the aesthetic characteristics of the water. The water quality is given grades in each of these categories and this is used to compare water quality between different rivers over periods of time.

As there are no surface water bodies within relevant distance of the site, this has not been considered further.

Surface Water Abstractions

With reference to an emapsite report which was obtained for the site (report dated 7th March 2019), there no surface water abstractions within 1km of the site, although there are 6 surface water abstractions operating within 2km of the site. All of these surface water abstractions are for farm irrigation purposes.

3.4 Hydrogeology

Regional Hydrogeology

The main body of groundwater is provided by the localised bedrock deposits (Cadeby Formation). The 'magic' aquifer designation map for the area shows the site lies on a 'Primary' aquifer. These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

The groundwater vulnerability shows that the aquifer is a 'major aquifer, high'. Major Aquifers are areas able to easily transmit pollution to groundwater. They are characterised by high leaching soils and the absence of low permeability drift deposits.

The site lies some 3.6 km west from the nearest Source Protection Zone (SPZ) which is an SPZIII from source protection zone III which is located directly east of the site boundary.

Groundwater Abstractions

There are 2 ground water abstraction points within 2km of the site, one located 770 m NE of the site boundary and one located 1,695 m SW of the site boundary. The licence numbers are 03/28/73/0050 and 03/28/73/0048 respectively. The closest licence uses the groundwater abstraction for process water purposes while the Langwith – Whaley Well uses the groundwater abstraction for transfer between sources (Pre-Water Act 2003).

Local Hydrogeology

There are 5 boreholes which surround the site, two boreholes located off the south eastern point of the site are confidential and the depth is not known. One borehole located directly south of the site is at minimum depth, as is the borehole directly north of the site. The borehole located to the southwest of the boundary is of an unknown depth.

It is considered that while there may be a pathway between the groundwater beneath the site in the bedrock geology and the nearest surface water course (the River Idle which is located some 69 m to the east), the nature of the materials to be deposited within the site are inert and non-biodegradable and will not cause pollution within the surface water course.

Groundwater Quality

The principal receptor will be the Dolostone within the Cadeby Formation. There is no groundwater information available on the site.

3.5 Off Site Gas Monitoring

A Gas Risk Assessment (GRA) has not been prepared for the infilling of the colliery lagoons, as Waste recovery operations for non-biodegradable materials do not pose a gas hazard. As a consequence of this a Gas Risk Assessment Screening Exercise has not been undertaken.

3.6 Receptors and Compliance Points

Groundwater

A Hydrogeological Risk Assessment for the proposed landfill has not been provided with this application.

As the site will accept inert and non-biodegradable waste which has shown to be geochemically suitable for use to restore the lagoons and the strict waste acceptance criteria that will be in place for incoming soils, groundwater monitoring points are not considered necessary for the site.

Surface Water

The River Idle runs horizontal to the east of the site boundaries and is the only surface water within distance of the site.

The site includes several lakes which have been constructed throughout the use of the site as a waste water treatment facility for the Creswell Colliery. While most of these will be infilled, the scheme will ensure that some areas of the site are restored to conversation wetlands which will include several water bodies as shown in the LEMP.

Environmental Risk Assessment

An Environmental Risk Assessment has been prepared to accompany this application and is presented in Appendix F. The relevant nearest relevant receptors have been produced below for clarity.

ID	Receptor	Direction from Operational Area	Minimum Distance from Site Boundary (approx. m)
Designated ecological habitats/sites of geological importance e.g. Ramsar, SAC, SPA, SSSI, LNR, NNR, LWS			
1	Creswell Crags (SSSI)	NE	1026
2	Hollinhill and Markland Grips (SSSI)	NW	1594
Other Habitats			
3	Deciduous Woodland	NW	5
4	Frith Wood	SW	400
5	The Old Hag	SE	438
6	Unknown	NW	609
7	Graves Wood	SE	1489
8	Hollinhill and Markland Grips	NW	1633
9	Scarcliffe Park	SW	1787
Domestic Dwellings / Farmhouses			
14	Marven Street	NW	533
Commercial and Industrial Premises / Shops			
14	Creswell Model Village	N	380
15	YBS Insulation	NE	148
16	Mel Davis Boat Builders	S	1002
17	Sewage Treatment Works	E	78
Parks and Open Spaces			
Schools / Hospitals			
18	Creswell Junior School	N	778
Highways / Minor Roads / Railway Lines			
19	A616	E	715
20	Railway Line	E	35
Historic Buildings / Listed Buildings / Archaeological Sites / Scheduled Monuments			
N/A			
Sensitive land uses e.g. farmland, allotments, commercial fish farms			
21	W J Blagg and Son	SW	78
Surface Water e.g. rivers and streams			
22	River Idle	E	69
Groundwater (sensitivity)			
According to the Environment Agency's website, the site is located within a Groundwater Protection Zone III.			
Surface Water (Flooding)			
According to the Environment Agency's website, the site is located in a flood zone 1 area. This means that the probability of flooding is low.			