Former Carlton Colliery
Barnsley

Enabling Works
Remedial Implementation Plan

Document Ref: 173367/RIP/002

June 2021

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Table of Revisions

Issue	Description of status
1	Amended following Controlled Waters Risk Assessment
2	Plan updated responding planning queries

Contents

1.0 INTRODUCTION & OVERVIEW OF WORKS

Overview

1.1 AA Environmental Limited (AAe) have been commissioned by Portward Homes Limited (PHL) to develop a Remedial Implementation Plan (RIP) for the former Carlton Colliery. The RIP has been developed in accordance with the Environment Agency Land Contamination Risk Management Guidance.

1.2 The former colliery site has been the subject of extensive decommissioning works. Process materials, including burnt shales and residual coke have been widely spread by others around the site, forming the main current formation. In addition, substantial volumes of waste, including evident asbestos impacted made ground, residual material from waste recycling operations and soils from unknown origins have been imported to the site by previous contractors. These imported materials have created substantial stockpiles across the site of unknown and potentially highly variable quality. In addition, PHL have undertaken excavation at the site extracting clinker and red shale and exposed substantial subsurface structures, foundations and contamination.

1.3 The main Made Ground (not stockpiled materials) at the site have been the subject of a number of ground investigations to identify the geological strata present and the associated quality. The site was initially investigated by Fennell, Green and Bates (FGB) in March 2006 and subsequently by Cromwell Wood in April 2006. These investigations identified elevated levels of arsenic, lead, nickel and Poly Aromatic Hydrocarbons (PAH) exceeding residential criteria. As a result of these investigation, and in advance of development, a Remedial Plan was proposed for the sites development in 2008. This plan was submitted for planning and was approved[1].

1.4 PHL intend to redevelop the site as part of a residential led land use that extends wider to north and south of the site. As part of these development works and to provide a greater understanding of the characteristics of the Made Ground, the site has been the subject of further investigation. The 2019 factual investigation report is attached in Appendix A. The 2006 and 2019 site investigation locations are overlain on the historic land use plans for the proposed development area, as presented in Drawing 173367/RIP/D/002. The investigation found consistent land contamination as in 2006, however also identified materials of high calorific value, significant presence of suspected asbestos containing materials and tar.

1.5 The data was assessed against both human health criteria and derived site specific standards for the protection of controlled waters. The Controlled Waters Risk Assessment is attached in Appendix C. The assessments are summarised in section 3.

1.6 PHL propose to develop the site in two distinct phases:

- Phase A) The Enabling Works: the construction of a stable engineered land formation for the follow-on contractor to develop upon. The Enabling Works will include the full treatment of contamination materials to approved standards protective of human health and controlled waters; and
- PHASE B) The Main Construction Works. These works will include the construction of internal roads, the proposed properties and structures; all associated foundation works and the all hard and soft landscaping.

[1] Planning Application 2007/1365. FGB 2008 Remediation Strategy was issued to discharge condition 18 of permission.

Scope of plan

1.7 This Phase A The Enabling Works RIP provides an overview of the site conditions and details the measures to be implemented to enable a stable working platform to be constructed at the site. The RIP sets out the following:

- The baseline conditions and identified land contamination;
- Remedial standards for the engineered platform;
- Assessment of the volumes of stock piled material and remedial works;
- The method of managing site derived materials and constructing the enabling works platform. This includes identifying unacceptable material, the treatment methods, tracking the material use from cradle to grave;
- Protective controls for the environment;
- The management of importing materials (as identified as required); and
- Verifying the quality of the materials used in the construction of the platform and its geotechnical properties.

1.8 A standalone Remedial Implementation Plan will be developed for Phase B 'The Main Construction Works'. This Plan will ensure the final quality of the works is suitable for future residents. This will include the following:

- A foundation risk assessment detailing the types of foundations to be used at the site and assessment and mitigation measures to ensure no significant contamination linkages are generated;
- Quality of all soft landscaping and exposed soils. The Plan will also detail the inspections and testing required following the principles set out in the Yorkshire and Lincolnshire Pollution Advisory Group (v3.3);
- The requirements for ground gas / vapour / radon mitigation within proposed structures; and
- Requirement for any protective measures for potable water pipes.

2.0 BASELINE CHARACTERSITICS

2.1 Table 2.1 summarises site environmental and baseline setting.

Table 2.1 Environmental Setting	
Site Location and Description	
Site Area	The site is approximately 9.40 ha in area including the access and egress.
Topography	The site is situated at approximately between 45 m and 50 m above Ordnance Datum (m AOD). The site slopes from south to north and west to east towards Shaw Lane.
Soils and Geology	
Topsoil	The site walkover confirmed that the site has been fully stripped of topsoil
Bedrock	BGS records show that the majority of the site is located over the solid bedrock of Coal Measures consisting of Mudstone, Siltstone and Sandstone. The south western corner of the site is over Oaks Rock Sandstone formation. Previous site investigations show that the site is predominantly underlain by the Coal Measures and consists primarily of Mudstone.
Superficial Deposits	There are no superficial deposits recorded on site.
BGS Borehole Records – Nearest record (ID and Location)	There is one historic British Geological Survey (BGS) Borehole records on the site, SE30NE2, that was recorded in the southeast corner of the site to an unknown depth and does not show evidence of superficial deposits. The nearest off-site borehole record is, SE30NE1, that is located approximately 5 m from the southeast corner boundary. The record shows that underlying 1.5 m of made ground was Oaks Rock Sandstone formation.
Hydrogeology and Hydrology	
Aquifer Status Bedrock	The underlying bedrock geology was designated as a Secondary A Aquifer. The Environment Agency define Secondary A Aquifers as: *"permeable strata capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers".*
Aquifer Status Superficial Deposits	There are no superficial deposits recorded on site.
Groundwater Source Protection Zones (GSPZ)	There are no ground water source protection zones beneath the site or within 1000 m of the site.
Flood Zone	The site lies west of the Cudworth Dike floodplain. It is within Flood Zone 1, which is defined as an area that has a low chance of flooding.
Surface Waters	The nearest water course is an unnamed water course is a surface water drain that runs along the northern boundary external to the site. The drain for the most part drains to the east and culverts under the railway line and drains into Carlton Marsh. The western part of the drain enters the access road drainage system into the public sewer. Cudworth Dike, that flows north to south, is located approximately 225 m-245 m to the east of the site.
Water Abstractions	The closest water abstraction to the site is approximately 1.6 km to the north east of the site. The abstraction is from a groundwater source. The abstraction licence (licence number 2/27/08/137/R01) for single point abstraction, was obtained by Carlton Main Brickworks Ltd for industrial, commercial and public services.
Discharge Consents	There are no active discharge consents at the site. The closest is located approximately 220 m to the east of the site. The consent was obtained by Yorkshire Water Services Ltd (NE/WRA7675/001).
Other Matters	
Ecosystems	Priority Deciduous Woodland habitat lies to the immediate south of the site. There is a local nature reserve, Carlton Marsh, located approximately 25 m east of the site. The nearest SSSI is Carlton Main Brickworks that is located approximately 3.5 km south east of the site. There is no evidence of European Protected Species, Special Area of Conservation, Special Protection Area, or Ramsar site within 1.5 km of the site.
Landfill	There are no active or historic landfills beneath the site. There is an active landfill, E J Lidster Construction Limited, that is approximately 730 m north of the site and accepts household commercial and industrial waste. There is a historic landfill, Cudworth North Junction, that was located approximately 650 m north of the site. The site operated between the years 1983 and 1995 and accepted the following wastes: inert, industrial, commercial, household, special, and liquids/ sludges. The EA has recorded leachate and gas control measures have been implemented during its lifetime.
Pollution incidents	There have been two significant and one major pollution incidents recorded at or close to the Former Carlton Colliery site. The major incident occurred in July 2004 in the north east corner of the site where sewage materials caused a major impact to water. Two further pollution incidents occurred at the site in 2005.
Mining	The site has been subject to Coal Workings and there is a known shaft at south east of the site. .
Radon	The site is recorded as having a maximum radon potential with 10-30% of properties above the action level. Therefore, all new homes and/or extensions should be fitted with suitable radon protection measures.

3.0 HISTORIC LAND USE AND IDENTIFIED CONTAMINATION

Overview

3.1 The site formed part of the former Carlton Colliery and associated coking works. The site is currently derelict and significant demolition and re-working. The ground levels at the site have been significantly raised during the operation of the colliery and by subsequent import (by others). The investigations undertaken in 2006 and 2019 show that overlying the spoil heap is circa 2 m of Made Ground, consisting of predominantly brick, clinker, ashes and spent burnt shale associated with the former colliery activities. In addition, there are significant residual stockpiles of demolition material, clinker and coke fines. The current topography at the site is shown in Drawing 173367/RIP/D/003.

3.2 The Made Ground at the site has been tested by AAE in 2019 (as presented in the factual report attached in Appendix A) in accordance with good industry practice and this data supplements the historic contaminated land data. The consolidated Made Ground results, including the 2006 data, are attached in Appendix B. It should be recognised, due to the presence of the stockpiles there are large areas of the site that have not been fully investigated and there remains a residual risk that other contamination may be present.

Human Health Assessment

3.3 The results have been assessed against the industry accepted human health standards for residential land uses with plant uptake and Public Open Space (Residential), hereafter termed POS (res). The relevant guidance values are presented in Appendix D. The exceedances of the human standards are presented in drawings 173367/RIP/D/004a (Residential) and 4b (POS(Res)).

3.4 During the investigation, due to lack of suitable Respirable Protective Equipment (RPE), AAE did not sample observed suspected asbestos fragments, however their presence was recorded and surveyed. Drawing 173367/RIP/D/005 shows where our asbestos trained consultants identified suspected ACM.

3.5 Table 3.1 sets out the contaminants exceeding the conservative Soil Guidance Values for residential land use (with plant uptake) and Public Open Space (Residential).

Table 3.1 Summary of Determinant Exceedances against Tier1 Soil Guidance Values for Human Health

Determinant	Number of Samples	Units	Max Recorded Concentrations	Avg. Concentrations	Number of Exceedances against Residential with Plant Uptake	Number of Exceedances against POS (Residential)
Arsenic	71	mg/kg	260	30.98	17	3
Lead	71	mg/kg	1670	85.31	3	1
Benzene	23	mg/kg	37	4.0	1	1
Asbestos	28	%	0.001	0.0005	1	1
TPH (Sum)	71	mg/kg	130,000	2,121.8	N/A	N/A
Aromatic (C12-16)	14	mg/kg	700	60.03	1	0
Aromatic (C16-21)	14	mg/kg	2700	235.28	1	0
Aromatic (C21-35)	14	mg/kg	83,000	6962.9	1	1
Aromatic (C35-44)	14	mg/kg	11,000	919.33	1	1
Naphthalene	15	mg/kg	8.2	0.95	1	0
Benzo(a)anthracene	15	mg/kg	9	0.73	1	0
Benzo(a)fluoranthene	15	mg/kg	10	0.75	1	1
Benzo(a)pyrene	15	mg/kg	7.4	0.58	1	1
Dibenzo(a,h)anthracene	15	mg/kg	1.3	0.16	1	1

3.6 Without remediation, the land is considered unsuitable for either use as public open space or residential development.

3.7 During the investigation, it was clearly apparent that the clinker and spent shale had elevated temperatures and some stockpiles were smouldering (in-situ combustion). This is an indication of a high calorific value and smouldering is likely to have occurred since placement from the furnaces. A

conservative guide is that there is a risk of smouldering in mineral deposits where calorific value is greater than 2 MJ/kg. The risk of self-combustion is considered to become significant above 7 MJ/kg. To assess the risk of self combustion in the materials a standard of 4 MJ/kg has been used. The clinker and shales at the site exceed this level and subsequently it is not considered suitable to leave these materials below the finished formation level of the proposed residential development.

Risk to Controlled Waters

3.8 The contamination levels at the site were deemed to potentially pose a risk to the surrounding controlled waters. Leaching tests were undertaken on the made ground materials identified. The consolidated results are presented in Appendix B.

3.9 The site is underlain by mudstone and the nearest receptor of concern is the Local Nature Reserves and wetlands to the east and north east of the site. As a consequence, the Environment Quality Standards were used as a conservative screen to determine whether leachate could pose a risk to Controlled Waters and the associated habitat. The results show elevated levels of metals above the conservative Environmental Quality Standards within the leachate, most notably nickel, zinc and sulphate. Subsequently, these exceedances needed further quantitative assessment to determine their significance.

3.10 AAe instructed its affiliate hydrogeologist, McDonnell Cole, to develop a site specific Controlled Waters Risk Assessment. This was completed in May 2020 and is attached in Appendix C.

3.11 The assessment identified that the levels of contamination at the site were not significant and did not pose a risk to the water environment. However, undiscovered risk cannot be fully discounted and coking potential sources of contamination are assessed, the risk assessment includes protective standards that all materials on the site should comply with.

4.0 ENABLING AND REMEDIATION WORKS

Overview

4.1 The enabling works will prepare the site for the follow-on residential development phase. The detailed layout and design of the proposed residential land use will be the subject of a detailed planning application.

4.2 The remedial aspects of the work seek to complete the following objectives:

- Provision of an engineered platform across the site, formed from site won and imported acceptable materials;
- Identify, remove and treat all areas of elevated contamination, in particular tars and leachable metals; and
- Remove any subsurface obstructions associated with the structures from the former colliery work operation.

4.3 The proposed levels across the site are designed to enable the surface water to drain to the north east where it will be attenuated prior to discharge to the existing drainage network to the surface water network. The proposed contours are set out in Drawing 173367/RIP/D/006.

Remedial works

General Specification

4.4 To ensure that the site has been fully investigated, materials with a high calorific value are removed and contamination sources exposed, it is proposed to fully excavate the Made Ground that forms the existing formation. This will also identify and enable the removal of any residual sub-surface structures that would obstruct the foundations in the follow-on contract. In addition, all stockpiled materials will be broken out, inspected and only used in the works if they are considered to be suitable. This will generate significant materials that will need careful control, inspection, testing, treatment where necessary, prior to re-use.

4.5 The materials will be placed in accordance with Series 600 ‘Earthworks’ of the Specification for Highway Works and a written method of works. The platform must achieve a bearing capacity (CBR) of at least 5% to enable follow-on contractors to be able to operate over the surface. On completion, a running surface of 150 mm of 6F2 consisting of site derived crushed concrete, brick, asphalt and tile will be placed over the surface.

4.6 All materials re-used on the project will be managed in accordance with the existing Environmental Permit at the site and based upon the principles set out in the CLA:IRE Material Management Guidance ‘Definition of Waste: Industry Code of Practice’. The Contractor will provide a cogent management regime for tracking the arisings from the excavated materials, treatment and reinstatement enabling the source and quality to be tracked from origin to final placement.

Environmental quality

4.7 The top 1 m of the engineered formation will meet with human health standards for Public Open Space (residential). These standards are termed as POS (res). These standards are set out in Appendix D. These standards are considered protective of workers and users of the site and amenity areas prior to the final development. All soft landscaping works during the follow-on phase will meet the more stringent Residential Criteria. Details of these standards will be presented in the RIP for the Main Construction Works.

4.8 In addition to the human health standards, all material used in the recontouring of the site, including the human health cap, must comply with groundwater protection standards derived from the Controlled Waters Risk Assessment (CWRA) presented in Appendix C. These standards have been derived using industry accepted hydrogeological modelling software and informed by site specific data. Models include CONSIM and the Environment Agency Remedial Target Methodology (P20

Spreadsheets). These models have been informed by a further site investigation assessing the local groundwater regime. For ease of reference the remediation target values from the CWRA are set out in Appendix E.

4.9 Bulk fill materials derived from site won sources before or after treatment will be assessed against the CWRA remedial standards alone if they are to be placed at depths greater than 1m (i.e. below the human health capping layer).

Excavation Management Regime

Stockpiles

4.10 Prior to earthworks and remediation of the ground conditions, all stockpiles in the areas of working will be excavated and removed. The stockpiles will be broken out in 500 cu m batches and will be characterised against the earthworks specification (including environmental criteria). The material will either be used, treated or transferred off site dependent upon the assessment. The inspection and testing process and outcome will be documented. Where the material requires treatment, it will be transferred to the Mineral Management and Treatment Area. Details of these operations are presented below. Where material is to be re-used it will be subject to a testing regime of 1 analysis per 500 cu m and assessment against the remedial standards set out in Appendix D.

Management of Made Ground

4.11 Once an area of free of stockpiles, the removal and inspection of Made Ground can progress. The works will progress from the north adjacent to the area already treated. This area will be verified as acceptable on a 20 m grid. One full environmental analysis will be undertaken per 500 cu m.

4.12 The earthworks will be progressed in 20 m grids. The full extent of made ground will be excavated and documented. The excavation will occur with a watching brief. Materials will be segregated by type. The material will be subject to the same inspection regime as the stockpiles and materials set aside for re-use, treatment or off site transfer as applicable.

4.13 Material will only be re-used when it has been deemed to meet the earthworks specification (including environmental criteria as set out in Appendix E). The verification requirements are presented in Table 4.1.

4.14 Typically the following excavation process and management process will be adopted:

- Large concrete, brick structures will be fully removed from the underlying strata. It is anticipated that these materials will be stockpiled for onsite recovery as recycled 6F2 aggregate. The recycled aggregate for use on site will accord with the WRAP aggregates protocol. The material will be used as granular fill for working platforms, capping and sub-base, haul routes and clean uncontaminated material for use in future site drainage. This material is typically not suitable for bulk fill as it can generate obstruction for foundations;
- Unrecoverable materials, including timber, metals and green waste will be segregated, bulked up and transferred from site in accordance with the waste regime;
- All materials with potentially high calorific value (>4 MJ/Kg) or showing evidence of smouldering will be segregated and transferred from the site. The material may be screened to remove inert oversize from its matrix;
- Stratum showing signs of hydrocarbon impact will be excavated, segregated and immediately transferred to the mineral management area;
- Mixed materials of unknown quality will be stockpiled and inspected/tested to determine the need for treatment or for use.

Table 4.1 Enabling works verification requirements			
Material	**Applicable Standards**		**Testing Frequency and other standards**
	Human Health	**Controlled Waters**	
Site won re-use of Made Ground and/or treated arisings below the human health capping (Bulk Fill)		X	1 test per 500 m^3
Site won re-use of Made Ground and/or treated arisings used for Human Health Capping	X	X	1 test per 250 m^3
Imported 6F5 or 6F2 capping materials and inert fill (Asbestos Testing Only)			1 test per 250 m^3 Asbestos <0.001% and no fragments. 6F5 must consist of brick/concrete /tile/glass/mineral aggregate only.
Imported materials for direct placement within the Human Health Cap	X	X	1 test per 250 m^3

Material volumes

4.15 The stockpile and remedial volumes have been assessed using the topographical data in AutoCAD's 3D modelling software and information by the site investigation data. The proposed topographical levels are presented in Drawing 173366/RIP/D/006 and the material management drawings are attached in Appendix D.

4.16 When existing levels are assessed against the proposed levels there is a surplus of circa 23,500 cu m which requires offsite disposal. The surplus is primarily due to the 85,000 cu m estimated to be stockpiled at the site. Of the 85,000 cu m, 14,500 cu m are known materials with elevated calorific value. These unsuitable materials will need to be transferred from the site.

4.17 The residual 70,500 cu m of stockpiled material has been assessed and a significant proportion is anticipated not to be suitable. This includes soils (not geotechnically suitable), mixed waste from recycling businesses (environmentally and geotechnically unsuitable) and construction/demolition mineral based wastes impacted by unpickable asbestos. The site remedial solution will minimise this volume through controlled break out, inspection, testing and processing (segregation, wet screening, picking and biopiling). Until the stockpiles are fully broken out (detailed in sections above) it is not possible to determine the proportion that can be used. Based on professional experience the unacceptability, post processing, may extend up to 40% of the volume present. If this is the case the available usable material from the stockpiles reduces to 42,300 cu m.

4.18 The remedial works involve the full excavation of Made Ground across the site, around and below the stock pile areas. The depth of Made Ground varies in thickness between 0.2 m and in excess of 3 m thick. On average it is assessed as 1.25 m deep. This strip of Made Ground is over circa 61,000 sq m and anticipated to generate circa 69,000 cu m of arisings. These will be subject to inspection, testing and processing. Of this 69,000 cu m, from the site investigation 45,000 cu m of this volume is anticipated to be material with high calorific value that is considered unsuitable for use on site. As a consequence, a residual 24,000 cu m of material is considered to be available for processing and potential re-use within the works. It is anticipated that the onsite remedial processes will have a 95% recovery rate.

4.19 From the volumetric assessment, as set out above, Table 4.2 presents the indicative material balance at the site.

Table 4.2 – Earthwork volumes				
Aspect	**Est. volume**	**Potentially Usable Material**	**Unusable Material**	
Stockpiles				
Unacceptable materials due to calorific value in stockpile	12,342	0	12,342	
Other stockpiled materials	70,500	42,300	28,200	
Remedial works		0	0	
Unacceptable materials due to calorific value (in-situ)	45,000	0	45,000	
Remedial excavations excluding those with unacceptable calorific value	24,000	22,800	1200	
Totals	**151,842**	**65,100**	**86,742**	

4.20 The enabling works will necessitate significant earthworks, involving the inspection and management of over 150,000 cu m of potentially contaminated materials. It should be recognised that the exact proportion of usable material on site and quantalities by type and source cannot be fully understood until remedial works commence and the environmentally quality determined.

4.21 The assessment of earthworks works, prior to the quality review and remedial requirements, identified a surplus of total 23,500 cu m of material. However, the remedial works will result in an estimated 86,742 cu m being transferred from the site. This results in the surplus volume becoming a deficit by deficit of 63,242 cu m of fill at the site. This number could significantly fluctuate dependent upon the quality of the materials identified and their treatability.

Treatment Area

4.22 The Enabling Works Contractor will set up a designated area within the site for managing contaminated soil and water. The area will have a sealed drainage system. The Enabling Works Contractor will obtain the suitable authorisation from the Environment Agency for the treatment activities. It is anticipated that the following remedial activities will be covered under a permit:

- Treatment of contaminated waters (typically surface water from sealed drainage) via Granulated Activated Carbon (GAC) filter or equivalent;
- Segregation of unacceptable material, including asbestos;
- Screening/crushing of oversize materials;
- Wet screening (soil washing plant) of Made Ground, splitting the mineral fraction from other materials;
- Biopiling to reduce VOC contamination levels; and
- Stabilisation to reduce the leachability of contamination.

4.23 The Enabling Works Contractor will ensure that the remedial and treatment works are validated by an independent consultant using an appropriately accredited laboratory. In addition, the Enabling Works Contractor will ensure that all remediation work activities are supervised by a Technically Competent Person holding the relevant WAMITAB certificate.

4.23 All material treated on site will be assessed post for compliance prior to placement. The assessment will be undertaken against the site re-use criteria and testing regime as presented in Table 4.1. The Enabling Works Contractor will implement a regime ensuring that material entering the remediation area will be trackable to fully understand and report the material management process from excavation to reinstatement.

4.24 Treated material will be stockpiled in batches of 250 m^3 or less. A composite sample will be taken from each batch and tested and assessed in accordance with Table 4.1. Samples failing the criteria with either be re-processed and retested or sent off-site as waste to a permitted facility.

4.26 Any surplus or sub-standard arisings transferred from the site will be characterised in accordance with UK waste regulatory regime, Environment Agency guidance WM3 (V1.1 GB), and Duty of Care requirements.

4.27 During all treatment work involving asbestos, monitoring of airborne fibre concentrations will be undertaken at the boundaries of the treatment area.

Validation requirements

4.28 As part of the enabling works a validation report will be prepared once the works are completed. It is anticipated the remedial enabling works will take 2 years to complete following re-commencement of the works. The validation report will detail the following:

- Details of who carried out the work;
- Details and justifications of any changes from the original Remediation Statement;
- Records of chemical characteristics for imported, or site generated, soils/materials used within the human health capping layers;
- Records of chemical characteristics for bulk fill materials used beneath the human health cap.
- Full details and volumes of material encountered and transferred off site. This will set out whether the materials were transferred for disposal or for on-site recovery;
- Final topographical survey of finished formation levels.
- Confirmation that the proposed enabling works capping levels have been achieved
- Laboratory and in situ test results showing the material imported, recovered and placed met the approved remedial criteria, relevant to either the human health capping system or the controlled waters standard for bulk fill;
- Records of any materials disposed offsite and their disposal locations; and
- Confirmation that remediation objectives have been met.

4.29 The completed works and the validation works will demonstrate that the remediation works have achieved the required level of environmental protection and that the site is suitable for the proposed end use.

Regulatory requirements

4.30 Prior to the remedial works being initiated the following regulatory requirements must be met:

- Planning Permission will be granted for the remedial works;
- All planning pre-commencement conditions will have been approved; and
- The Environmental Permit for the deployment of mobile remedial treatment plant will be obtained from the Environment Agency.

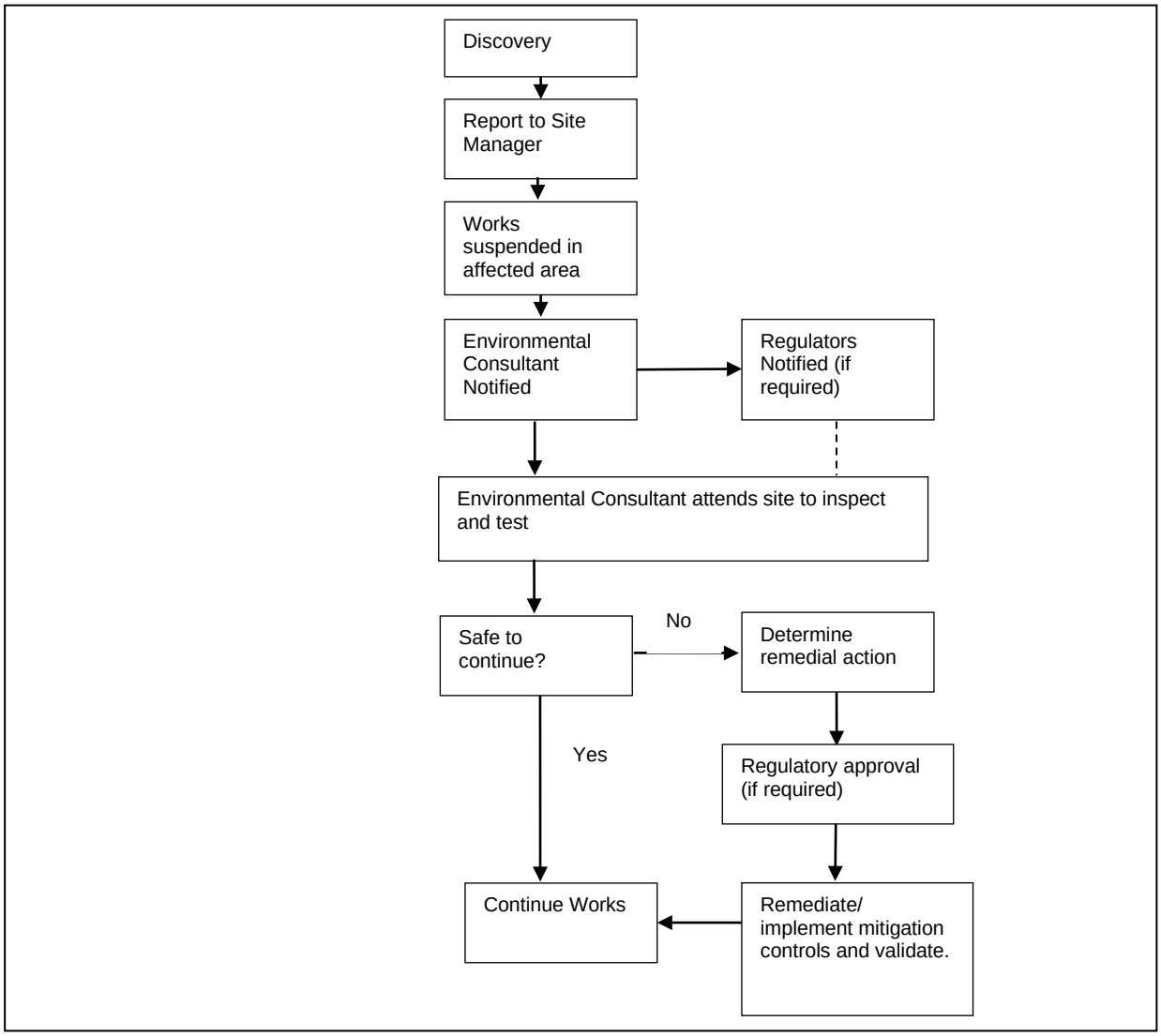
5.0 UNFORESEEN CONTAMINATION AND DISCOVERY STRATEGY

5.1 During the Enabling Works it is considered possible that unexpected contamination could be identified. Contamination can be identified through the following mechanisms:

- **visually** through staining, identification of a sheen on soils or product on ingressing groundwater, variability in strata, identification of potential asbestos, pipes or tank-like structures; **olfactory** presence of strong odours and vapour**,** change in odour around an excavation;
- **testing** of soils/materials during importation or validation.

5.2 In the event that potential contamination is identified, works will be suspended in the affected area until it is tested and, if considered significant, delineated. The environmental consultant will take initial samples and will be on site within 1 working day of the unforeseen contamination being identified. In the event this cannot be accommodated, a trained competent member of the Enabling Works team will sample the material under guidance from the environmental consultant. If the initial contamination is considered significant, works in the affected area will be suspended until the area of impact has been fully delineated and the remedial/mitigation requirements confirmed. The Local Authority Contaminated Land Officer and Environment Agency will be notified if the contaminant type and remediation/mitigation approach fall outside of the previous risk assessments and Enabling Works RIP. The discovery strategy is presented as Schematic 1.

Schematic 1: Discovery Strategy



6.0 ENVIRONMENTAL MONITORING AND DECOMISSIONING BOREHOLES

Monitoring of emissions

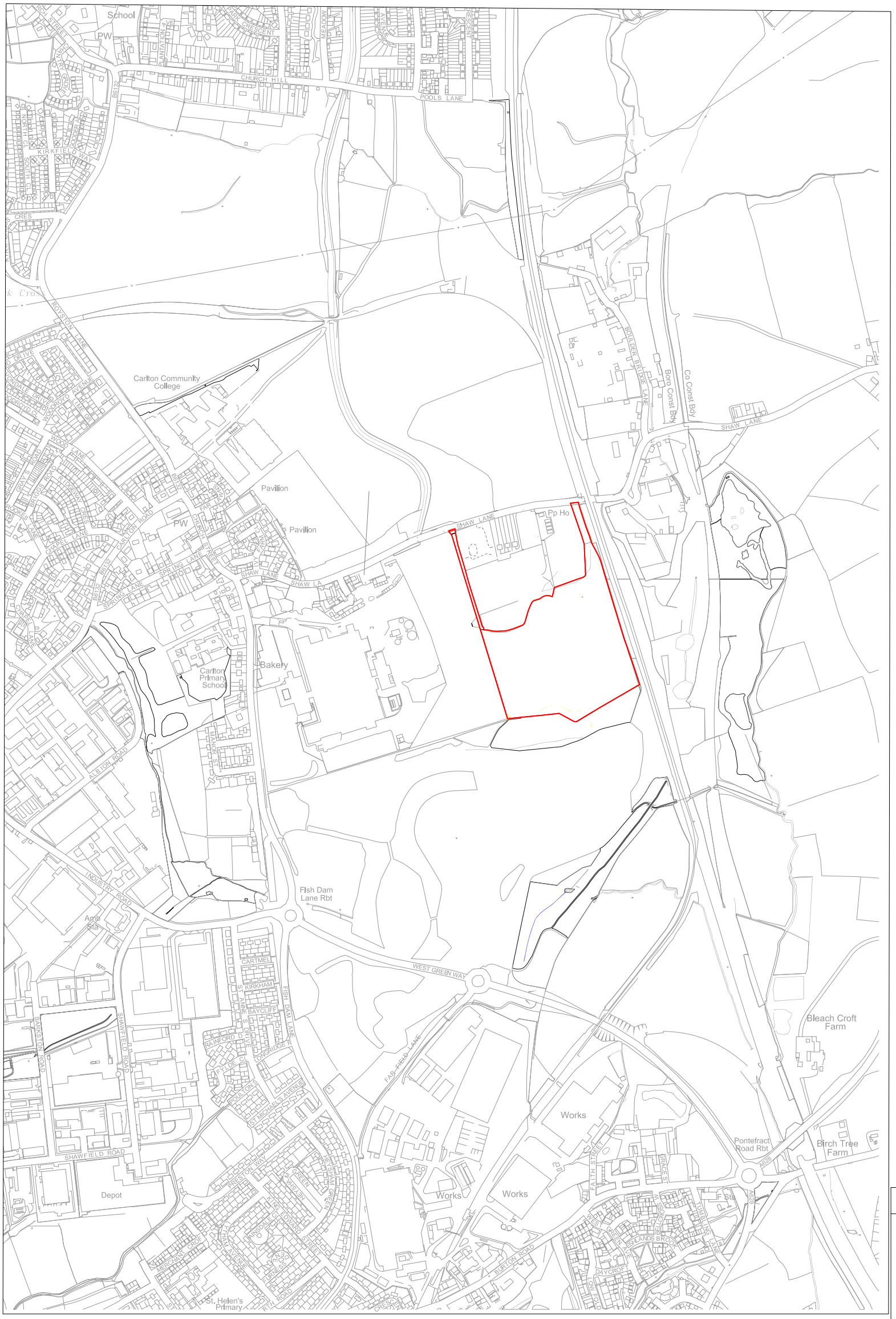
6.1 Monitoring of environmental emissions will be undertaken to protect the residents in the area and controlled water receptors. The Enabling Works Contractor will develop a Construction Environmental Management Plan (CEMP) which will cover the following items:

- Management and monitoring of noise and vibration;
- Management and monitoring of particulates, notably dusts and ACM fibres; and
- Management of odours and VOC levels at boundary during the excavation works.

Decommissioning existing boreholes

6.2 There are no boreholes identified that need decommissioning. In the event boreholes are identified or installed they will be decommissioned at the end of the enabling works or prior to earthworks taking place within 2 m of the borehole. The boreholes will be decommissioned in accordance with EA Guidance: Good Practice for Decommissioning Redundant Boreholes and Wells, as published in 2012. The Contractor will ensure after decommissioning of the boreholes no preferential pathways are present between the Made Ground and shallow soils and the underlying aquifers. The Contractor will ensure records are maintained regarding the methodology and works completed.

Drawings



Key:

Planning Application Boundary

Rev.	Details	Drawn / Chkd.	Date

Project

173367
Carlton Colliery Restoration
Barnsley

Title

Site Location Plan

AA Environmental Ltd
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Scale	Date	Drg. No.	Rev.
1:10,000@A3	Sept '19	173367/RIP/D/001	
	Drawn: JM / Chkd.: ML		

Key:

- Planning Application Boundary
- AAe April 2019 Trial Pit Location
- AAe April 2019 Stockpile Sample Location
- Environ Trial Pit Location
- Environ Window Sample Location
- Environ Surface Sample Location

Notes:
1. The historic underlay shown is from an 1893 drawing.

Rev.	Details	Drawn / Chkd.	Date

Project

173367
Carlton Colliery Restoration
Barnsley

Title

Site Investigaion Plan

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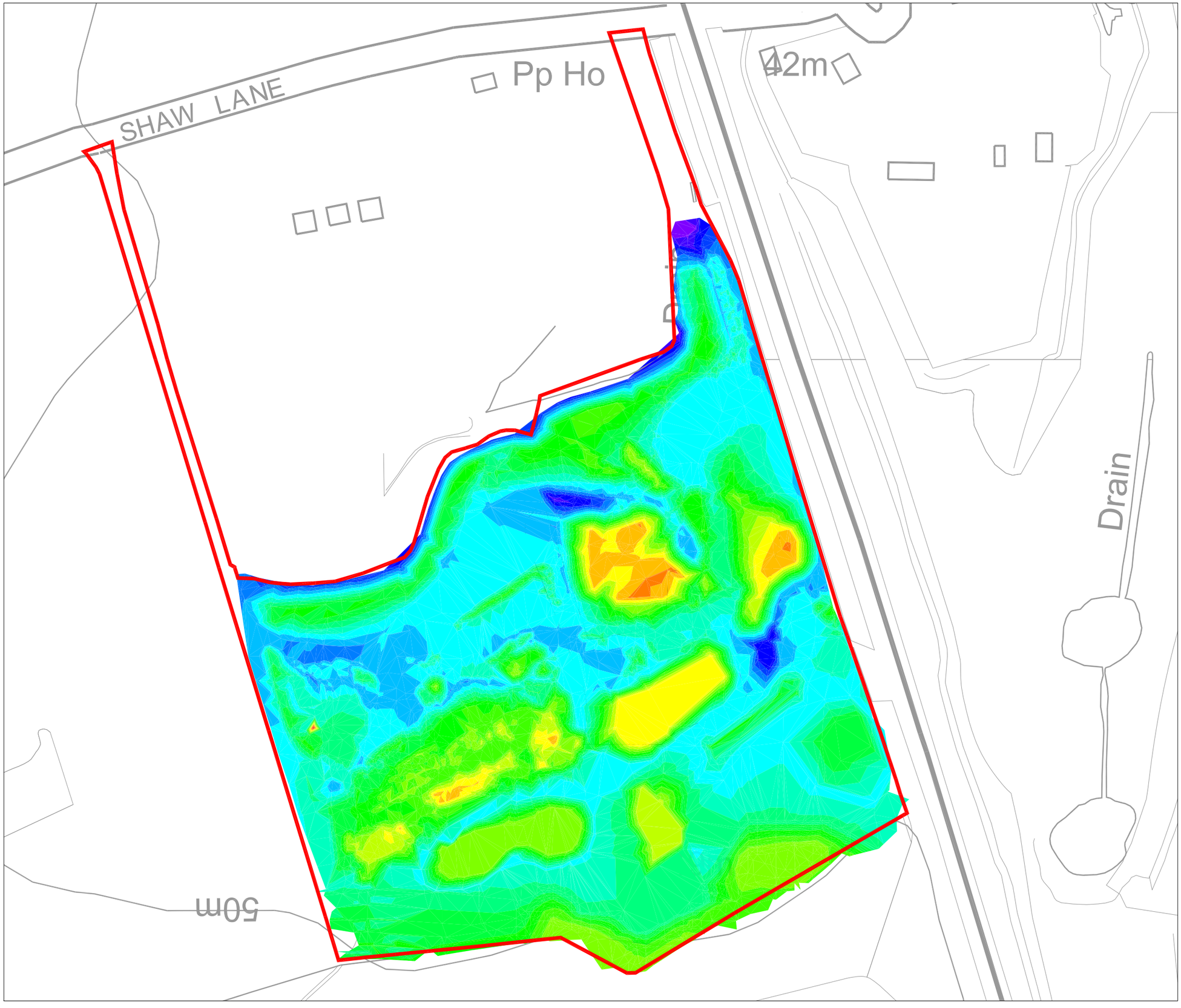
Scale	Date	Drg. No.	Rev.
1:2000@A3	Sept '19 (Drawn JM / Chkd. ML)	173367/RIP/D/002	



Key:

Planning Application Boundary

Colour, Band, Area

Colour, Band, Area				
43.00	43.70	0.0%	0.00
43.70	44.40	0.1%	95.87
44.40	45.10	0.2%	147.21
45.10	45.80	0.7%	561.98
45.80	46.50	1.0%	802.49
46.50	47.20	1.6%	1306.70
47.20	47.90	6.9%	5785.71
47.90	48.60	20.6%	17351.86
48.60	49.30	15.8%	13282.39
49.30	50.00	14.5%	12179.60
50.00	50.70	11.0%	9216.57
50.70	51.40	6.9%	5833.27
51.40	52.10	6.7%	5632.57
52.10	52.80	6.9%	5818.95
52.80	53.50	2.5%	2122.33
53.50	54.20	3.0%	2558.81
54.20	54.90	1.6%	1306.69
54.90	55.60	0.2%	151.89
55.60	56.30	0.0%	1.01
56.30	57.00	0.0%	0.32

Notes:

1. Topographical levels were interpreted from a survey carried out by an AA Environmental operative in April 2019 as well as previous topographical data including third party data.

Rev.	Details	Drawn / Chkd.	Date

Project

173367
Carlton Colliery Restoration
Barnsley

Title

Existing Topography

AA Environmental Ltd
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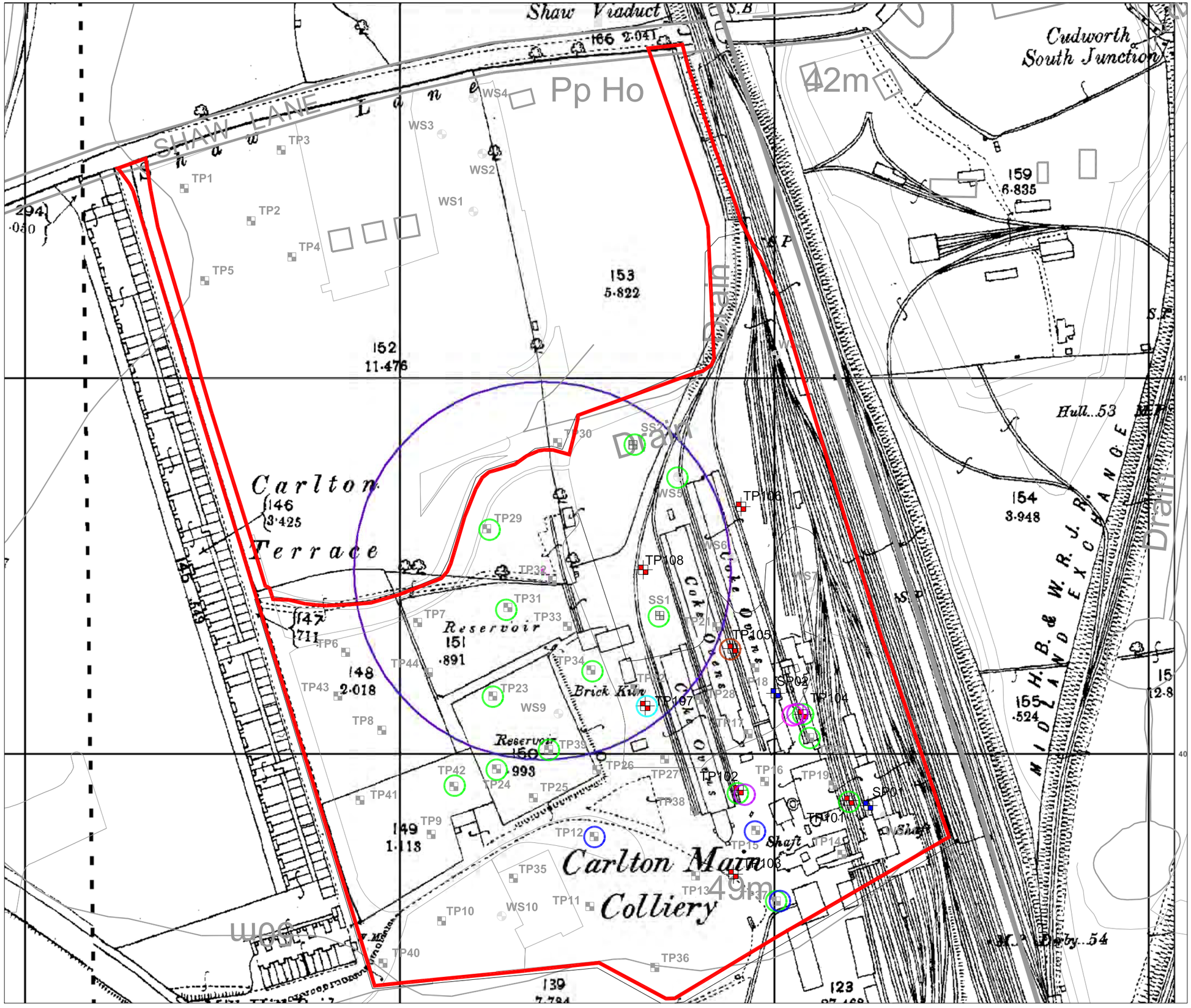
Scale	Date	Drg. No.	Rev.
1:2000@A3	Sept '19	173367/RIP/D/003	
	Drawn: JM / Chkd.: ML		



Key:

- Site Boundary
- AAe April 2019 Trial Pit Location
- AAe April 2019 Stockpile Sample Location
- Environ Trial Pit Location
- Environ Window Sample Location
- Environ Surface Sample Location
- Arsenic Exceedance
- Lead Exceedance
- TPH Exceedance
- PAH Exceedance
- Quantified Asbestos Exceedance
- Benzene Exceedance

Notes:

1. The historic underlay shown is from an 1893 drawing.

Rev.	Details	Drawn / Chkd.	Date

Project

173367
Carlton Colliery Restoration
Barnsley

Title

Land Quality Exceedances
Residential with Plant Uptake

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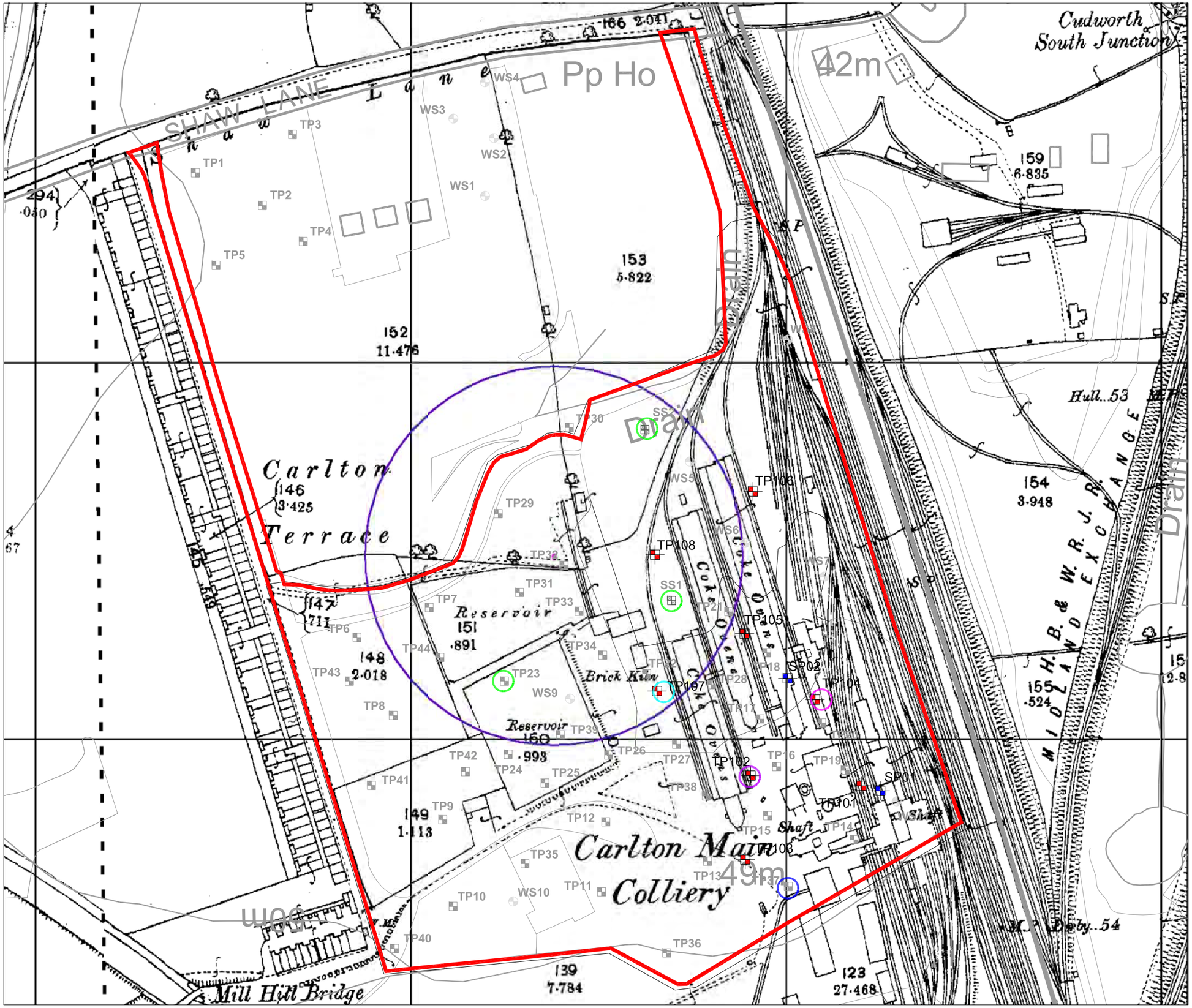
Scale	Date	Drg. No.	Rev.
1:2000@A3	Sept '19	173367/RIP/D/004a	
	Drawn: JM / Chkd.: ML		



Key:

- Site Boundary
- AAe April 2019 Trial Pit Location
- AAe April 2019 Stockpile Sample Location
- Environ Trial Pit Location
- Environ Window Sample Location
- Environ Surface Sample Location
- Arsenic Exceedance
- Lead Exceedance
- TPH Exceedance
- PAH Exceedance
- Quantified Asbestos Exceedance

Notes:

1. The historic underlay shown is from an 1893 drawing.

Rev.	Details	Drawn / Chkd.	Date

Project

173367
Carlton Colliery Restoration
Barnsley

Title

Land Quality Exceedances
Public Open Space, Residential (POS RES)

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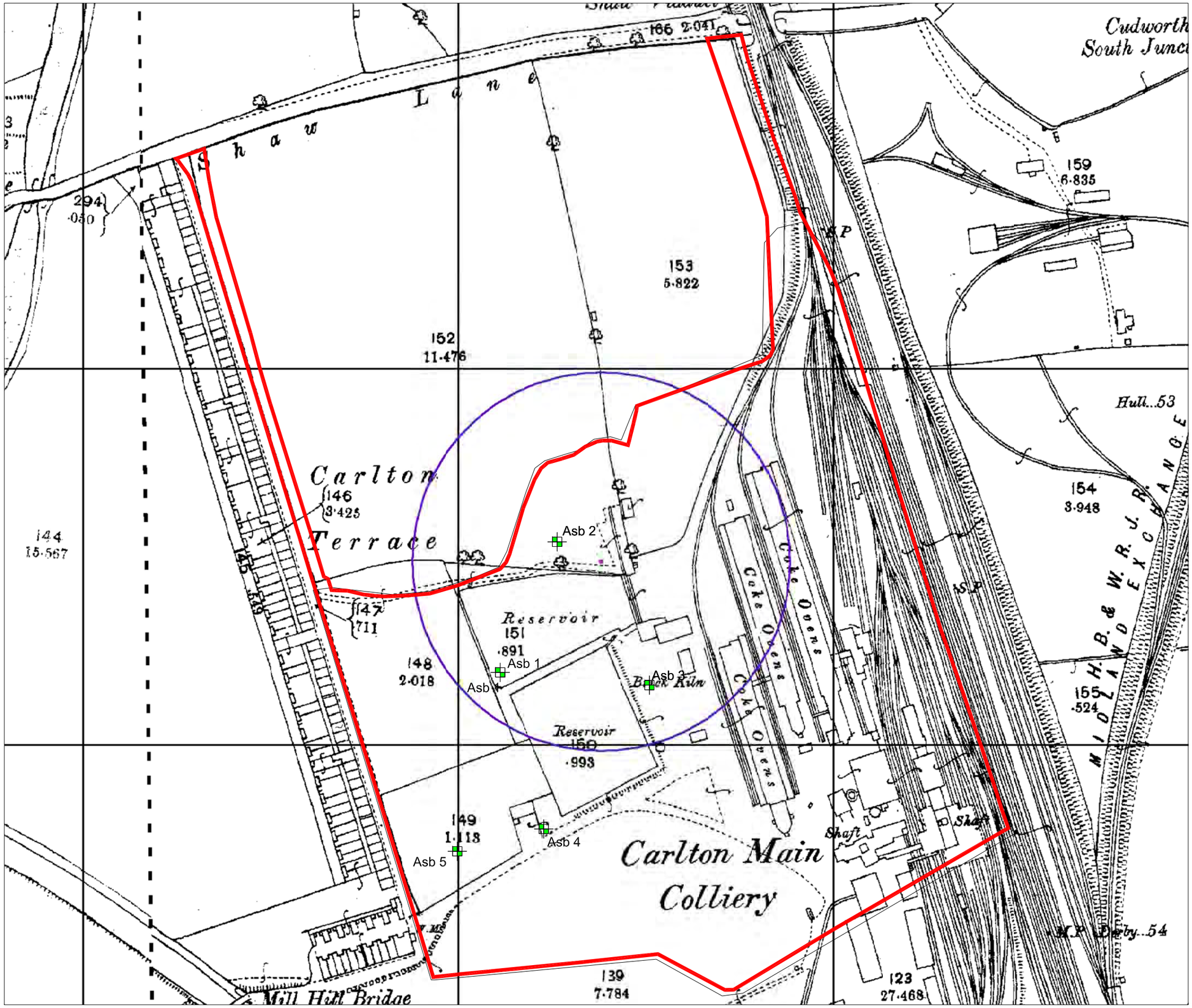

Key:

- Planning Application Boundary
- AAe Suspected ACM Location (April 2019)

Notes:

1. The locations of potential ACM were surveyed in by an AAe Operative during a topographical survey of the site in April 2019.
2. The historic underlay is from an 1893 drawing of the site.

Rev.	Details	Drawn / Chkd.	Date

Project

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Carlton Colliery Restoration
Barnsley

Title

Suspected Asbestos Location Plan

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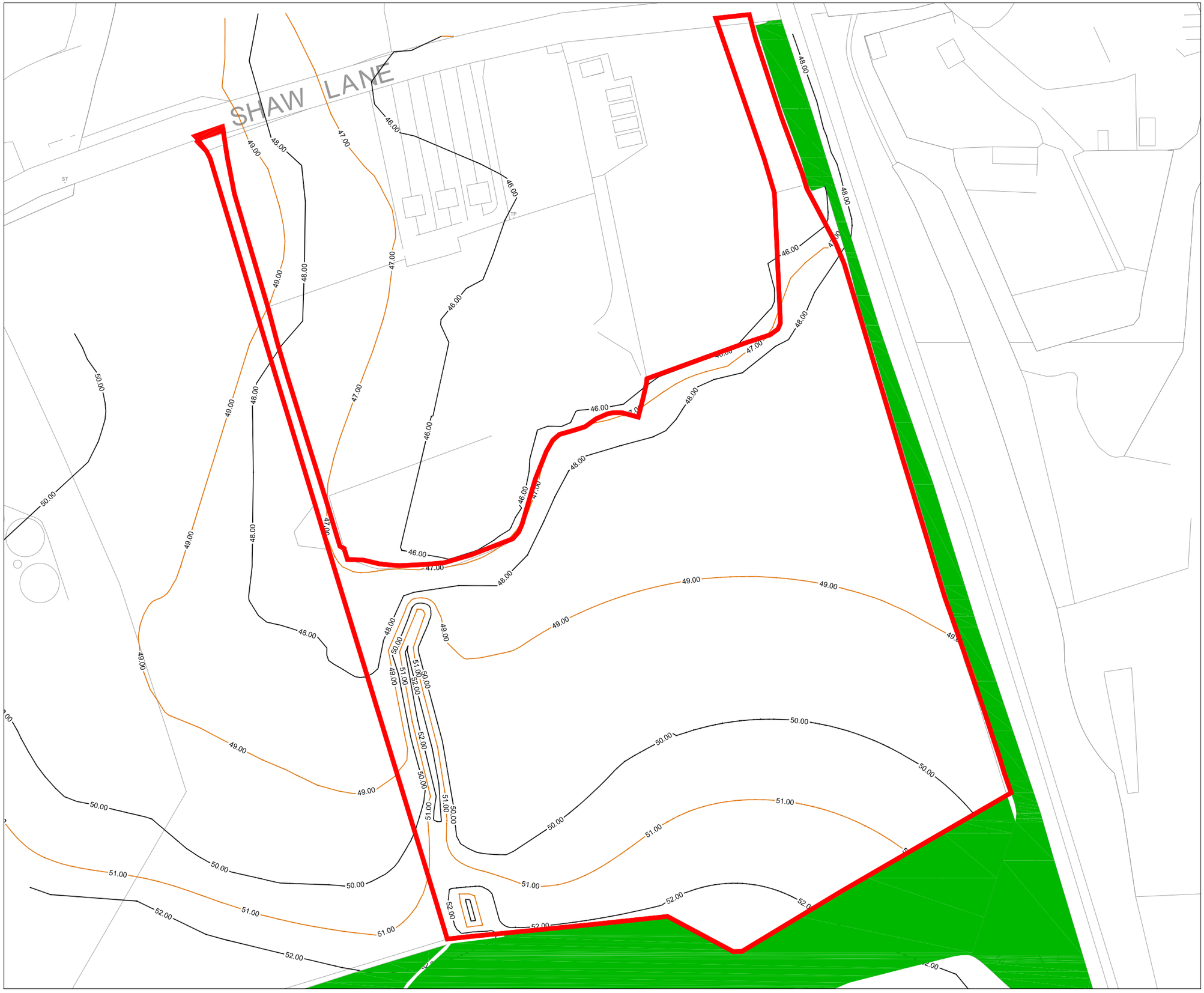

Key:

- Planning Application Boundary
- Proposed Finished 1 m Contours (m AOD)
- Proposed Finished 2 m Contours (m AOD)
- Existing Woodland Feature

Rev.	Details	Drawn / Chkd.	Date

Project

173367
Carlton Colliery Restoration
Barnsley

Title

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Scale	Date	Drg. No.	Rev.
1:2000@A3	Sept '19	173367/RIP/D/006	
	Drawn: JM / Chkd.: ML		

APPENDIX A
2019 Factual Report

Portward Homes Limited

Carlton Colliery

Factual Report:
Ground Investigation

Job No: 173367

Report Ref: 173367/FR/001

Environmental Consultants

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Document Control

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Issue Date	**Issue**
18th April 2019	Final

Document Reference

193072/SR/001

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Table of Revisions

Final	For issue

Contents

1.0 INTRODUCTION

1.1 AA Environmental Limited (AAe) has been commissioned by Portward Homes Limited (PHL) to undertake additional ground investigation in support of the enabling regeneration works at the former Carlton Colliery. The site location is shown in Drawing 173367/D/001.

1.2 PHL commissioned AAe to complete 8 trial pits to characterise ground conditions. The extent of the investigation was limited to the Made Ground at the site.

1.3 All testing has been completed in line with quality control procedures. All information provided in this report is based on the ground encountered during the investigation. It should be recognised that during any investigation the conditions identified may not be fully representative of the wider stratum quality.

2.0 SITE LOCATION & DESCRIPTION

2.1 The site is located at the former Carlton Colliery. All former colliery structures have been demolished to ground level all though there is clear evidence that sub-surface structures remain. The site is extensively covered with stockpiles of demolition material, excavated clinker and what is believed to be imported materials.

2.2 The site has been the subject of a number of site investigation and in 2008 FGB issued a remedial plan that was approved under planning permission 2007/1365.

2.3 With reference to the previous investigation at and around the site, the geological conditions underlying site are anticipated to be:

- Made Ground consisting of burnt shale, clinker, ashes, brick, soils and between typically 0.0 to 2.5 m;
- over re-worked colliery spoil (typically mudstone).

2.4 In addition, there are stockpiles up to 7 m high of the following types of materials:

- imported and site derived mixed construction and demolition wastes;
- segregated burnt shale and clinker;
- soils; and
- ashes.

3.0 GROUND INVESTIGATION

Fieldwork

3.1 The fieldwork undertaken between 9h and 10th April 2019 and comprised 8 machine excavated trial pits TP101-TP108. AAe were responsible for soil sampling and scheduling the environmental testing at a UKAS Accredited laboratory.

3.2 The investigation locations were surveyed by the site engineer. The locations are attached in Drawing 193072/D/002. In addition a topographical survey was completed site wide. Topographical levels are presented in the site investigation drawing.

Logging and Sampling

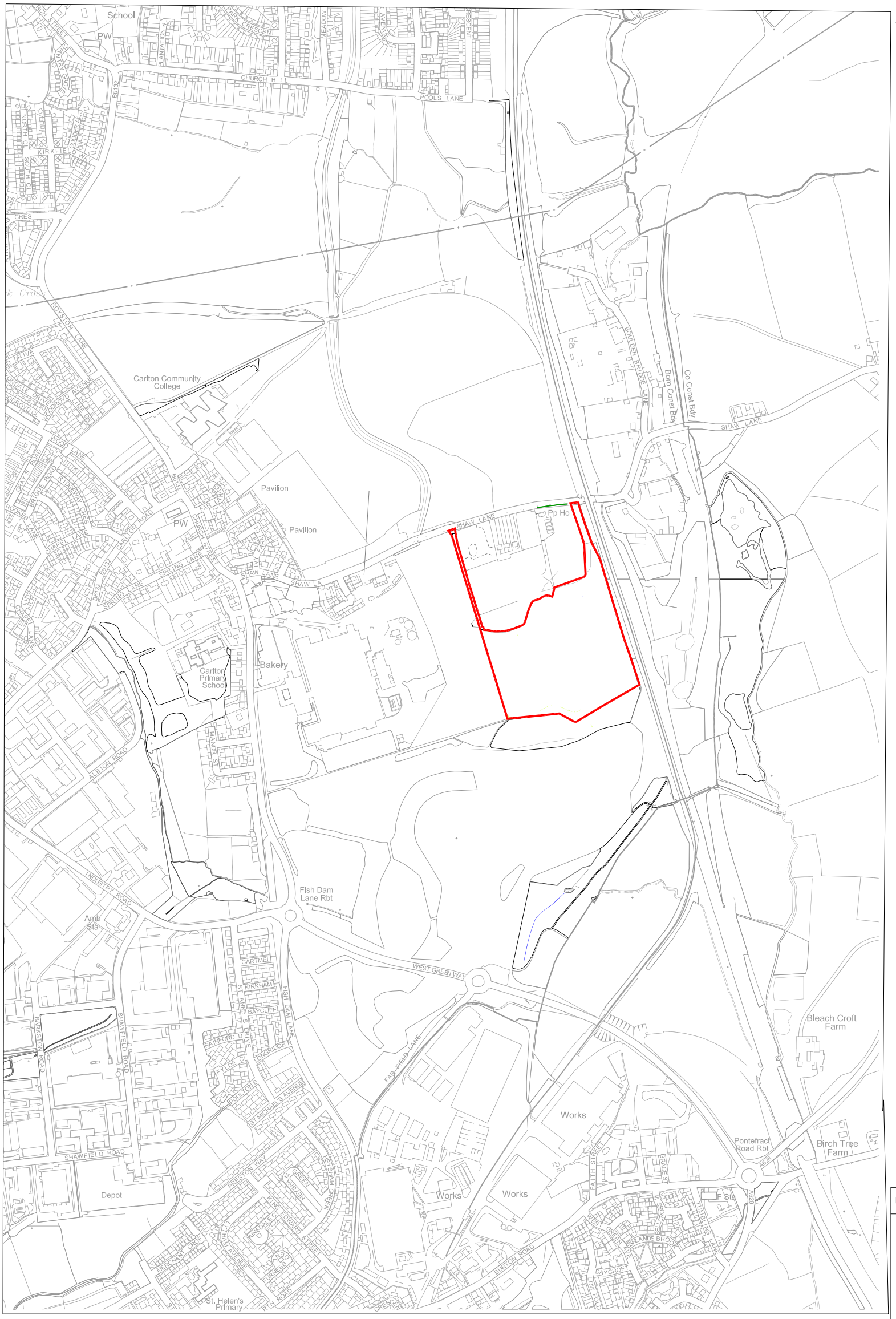
3.3 AAe logged the strata recorded in the trial pits for geo-environmental purposes in accordance with BS5930 and collected representative samples for laboratory testing analysis in accordance with quality control requirements.

Environmental Testing

3.4 Soil samples were sent to Chemtest, a UKAS accredited laboratory for chemical testing. Table 3.1 presents a summary of the scheduled environmental testing. The laboratory certificates of analysis B.

Table 3.1 Summary of Environmental testing		
Type of Test	**Number**	**Laboratory Reports**
AAE Soil Contamination Suite + Calorific Value	11	19-12605-1
AA Soil Suite: Total Petroleum Hydrocarbons and Polyaromatic Hydrocarbons	1	
AAE Metals Suite + Calorific Value	2	
AAE Leachate Suite: Metals	8	

DRAWINGS



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