SLADEN ASSOCIATES

COAL MINING RISK ASSESSMENT
Proposed Caravan Park
Blake Hall Fisheries
Cheadle
Staffordshire

Prepared for

Byatt Oliver Associates

Date : February 2018 **Job No : 18 1889**

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Prepared for: **Byatt Oliver Associates**

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REPORT No 18 1889

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1 INTRODUCTION

1.1 GENERAL

Byatt Oliver Associates has instructed Sladen Associates to carry out a Coal Mining Risk Assessment for a proposed caravan park development at Blake Hall Fisheries in Cheadle.

The assessment included a study of publicly available documentary sources concerning site history, geology and mining activities in the area but included no intrusive investigation. This report presents the results of the assessment together with recommendations for precautions that should be undertaken as part of the site re-development.

The present report is concerned only with precautions related to potential mining legacy issues. Other geotechnical issues, such as assessment of bearing capacity of near surface soils and potential geo-environmental issues, are not considered.

1.2 LOCATION AND PROPOSED DEVELOPMENT

The site is located some 2.5 km west of Cheadle Town Centre at National Grid Reference 3987 3433, see Figures 1 and 2. The study area lies to the south west of the main ponds associated with the fishery and is mainly agricultural land, with an existing club house near the lakes. Access is via a driveway from the north. It is proposed to develop a small touring caravan park in the western site area, with associated access road. It is expected that the pitches would comprise either gravel surface or some form of artificial turf. There will be a small extension to the existing clubhouse. The extension would comprise a single storey 'log cabin' type structure to house additional toilets and showers and catering accommodation. The building would be supported on a concrete slab.

2 SOURCES OF INFORMATION

Sources of information consulted for the present study included the following:

- Coal Authority Report.
- Historical Ordnance Survey Mapping.
- Geological Mapping published by the British Geological Survey.
- Online mapping published by the Coal Authority
- Geology of the country around Ashbourne and Cheadle. British Geological Survey. 1988.

3 THE SITE

3.1 HISTORY

Copies of relevant early historical Ordnance Survey (OS) maps are included in Appendix A, for reference. Other mapping was also reviewed. At the time of the first Ordnance Survey, the site was without built development, part of a larger field. A field boundary corresponded to the approximate location of the south western site boundary and the southern boundary was marked by a footpath. There were signs of former mining in the general area, in the form of old coal shafts and associated small spoil heaps to the west, north west, south west and south east. Little change is shown to the site area on the subsequent map record. The fishery was developed in the 1990's.

3.2 GEOLOGY

The site is shown on mapping published by the British Geological Survey to be underlain by solid strata of the Pennine Middle Coal Measures, of Carboniferous Age.

The Middle Coal Measures in this area comprise mainly mudstones and sandstones with some siltstones and coals.

The sub-crop of the Two Yard Coal is shown to pass close to the south western site boundary, dipping gently to the south west, such that that seam would not be expected to be present below most of the site area. The general downward sequence of the main coal seams below the site would be expected to be as follows:

Seam	Approximate Depth below Rockhead (m)		Approximate Thickness (m)
	South Western Site Boundary	North Western Site Boundary	
Two Yard Coal	At outcrop	Absent	1.9
Getley Coal	18	Close to outcrop, if present	Thin, may be absent
Half Yard Coal	25	10	0.8
Yard Coal	40	25	1.0
Litley Coal	60	45	1.2 in two leaves
Four Foot Coal	65	50	1.1
Little Dilhorne Coal	110	95	0.7

There are further deeper seams.

The bedrock in the study area is not shown to be overlain by natural drift deposits.

3.3 MINING

The area is one in which underground mining has been undertaken in the past. The Coal Authority (Appendix B) has record of workings in four coal seams below the site, at depths in the range 50 to 350 m, the last date off working being 1952. The shallowest recorded workings below the site would be expected to be in the Four Foot Coal. Any ground movements associated with the known workings should have stopped by now. The Coal Authority consider the site to be in an area where unrecorded shallow workings may also be present. This is consistent with the expected site geology. The Litley, Yard and Half Yard Coals are expected to be present at shallower depth and all have been known to be worked in some areas around Cheadle. Although the Two Yard Coal may also have been worked in the area it is likely absent below all but the south western edge of the site. The Getley Coal, if present, is unlikely to have been worked as it is thin and described in the relevant geological memoir as 'useless'.

The Coal Authority has no record of mine entries on or within 20 m of the site area. There is, however, some potential for unrecorded mine entries in the area.

4 SITE SPECIFIC RISK ASSESSMENT

4.1 KNOWN AND POTENTIAL HAZARDS

There are known underground mineral workings below the site. Any ground movements associated with the known workings, should have stopped by now.

The site geology suggests that there may be other mineral seams, shallower than the shallowest recorded workings at 50 m depth, that could have been worked before it became a legal requirement to keep detailed records of underground mining, i.e. before about 1870.

There are no known mine entries within 20 m of the site but the possibility of unrecorded, mine entries in the general area but cannot be discounted.

The property does not lie within 200 m of any active opencast mine sites or within the boundary of any former opencast sites.

The Coal Authority is not aware of any evidence of damage arising in the area due to geological faults or other lines of weakness that have been affected by coal mining.

Given the possible proximity of the site to the outcrop of one potentially exploited mineral seam, there is some potential for mine gas emissions to surface in the area.

4.2 ASSOCIATED RISKS

There are no records of shallow mining below the site reported by the Coal Authority but the Coal Authority consider this to be an area where unrecorded old shallow workings may be present. Based on the site geology although there is some potential for workings in the Litley, Yard and Half Yard Coals, their anticipated depths in relation to thickness below the proposed club house extension and caravan park areas is such that they are unlikely to pose a significant risk of future surface subsidence sufficient to cause structural damage.

The Two Yard seam is present close to outcrop near the south western site boundary and could still could still pose some risk of surface subsidence sufficient to cause damage to sensitive structures. However no significant earthworks or buildings are proposed in that area, which is intended for use as a touring caravan park.

There are no known mine entries within 20 m of the study area but given the potential presence of shallow mineral seams, there is some potential for unrecorded mine entries to be present in the area. Abandoned mine entries can potentially include large voids, for example where timber staging within a shaft has prevented fill materials from falling to the base of the shaft. Subsequent collapse of any overlying fill can lead to a void at the surface, which could be a significant risk to users of the immediate area. Given their potential age, prior to about 1870, the diameter of any unrecorded mine shafts is unlikely to exceed about 1.8 m.

Collapse of shaft lining materials can potentially result in subsidence over an area larger than the original shaft diameter and which could potentially cause damage to nearby structures. The maximum credible radius of such a feature is usually assumed to be less than the depth of unconsolidated deposits surrounding the shaft plus the shaft radius. In the present case based on published mapping, depth to bedrock is likely to be relatively shallow. In view of this and given the relatively low frequency of such events the associated risk level with respect to damage is judged to be low.

There is also the potential for the Two Yard Seam to have been worked by adits from outcrop near the south western site boundary. Such unrecorded workings have been reported a little way to the west of Blake Hall. However, any such adits would either be of very shallow gradient, or, more likely, located off-site to the south west, as the dip of strata in the area is very flat, about 4 degrees.

The proposed usage in the vicinity of the Two Yard outcrop would not be sensitive to ground gas emissions and associated risks are therefore judged to be very low.

Local differential subsidence due to fault or other discontinuity activation by mining would be expected to occur during or shortly after the mining operations. Given the time since known mining and since any unrecorded workings would have been undertaken below the site, the risk of fault reactivation by mining subsidence related to past mining is judged to be negligible. The potential for new deep mining in this area is considered to be very low.

Based on a consideration of the anticipated depths, thicknesses and potential age of workings associated with the main mineral seams below the site, and nature of the proposed development, the following presents a summary of assessed risks related to the mining legacy:

Hazard	Potential Consequence	Resultant Risk of Future Surface Ground Movements/Gas Emissions Sufficient to Cause Damage or of Explosion or Significant Risk to Site Users
Possible unrecorded workings in mineral seams at less than about 30 m depth.	Differential subsidence due to void migration or collapse/consolidation of old workings	Low to Very Low
Workings in deeper seams	Void migration or collapse of old workings	Very Low
Unrecorded Mine Entries	Collapse resulting in damage or harm	Low
Faults and Fissures	Local differential subsidence	Negligible
Mine Gas	Emissions leading to explosion or acute health effect.	Very Low

4.3 POTENTIAL IMPACT ON DEVELOPMENT

Very shallow mine workings could potentially be associated with some potential for future surface subsidence. However, the caravan park area would not be sensitive to such movements. The small 'log cabin' extension to the existing club house would also not be particularly sensitive to potential subsidence related damage. As the shallowest seam of potential economic interest below the extension area is expected to be at in excess of 10 m depth, with a thickness of 0.8 m, and given the potential age of any unrecorded workings, it is not considered that the level of risk would warrant any special precautions.

Potential unrecorded mine shafts could pose a low risk to site users and the proposed structure.

4.4 PROPOSED MITIGATION STRATEGY

Based on this assessment, it is not considered that any specific intrusive investigation is warranted to mitigate risks associated with the mining legacy at the site.

The slab foundation for the new extension should be provided with some reinforcement to reduce the risk of cracking in response to minor residual ground movements.

The new structure should be structurally independent of the existing club house.

The possibility of old un-recorded mine entries being present on site cannot be ruled out. Care should be taken during ground works to observe conditions encountered during site works. Any local areas of unusually deep made ground or other evidence of potential shafts, such as brick or timber lining materials, should be investigated. If any unrecorded mine entries are encountered, following further risk assessment, the potential need for some further precautions, such as drilling and stabilisation of the entry, should be assessed by a suitably qualified engineer.

5 CONCLUSIONS

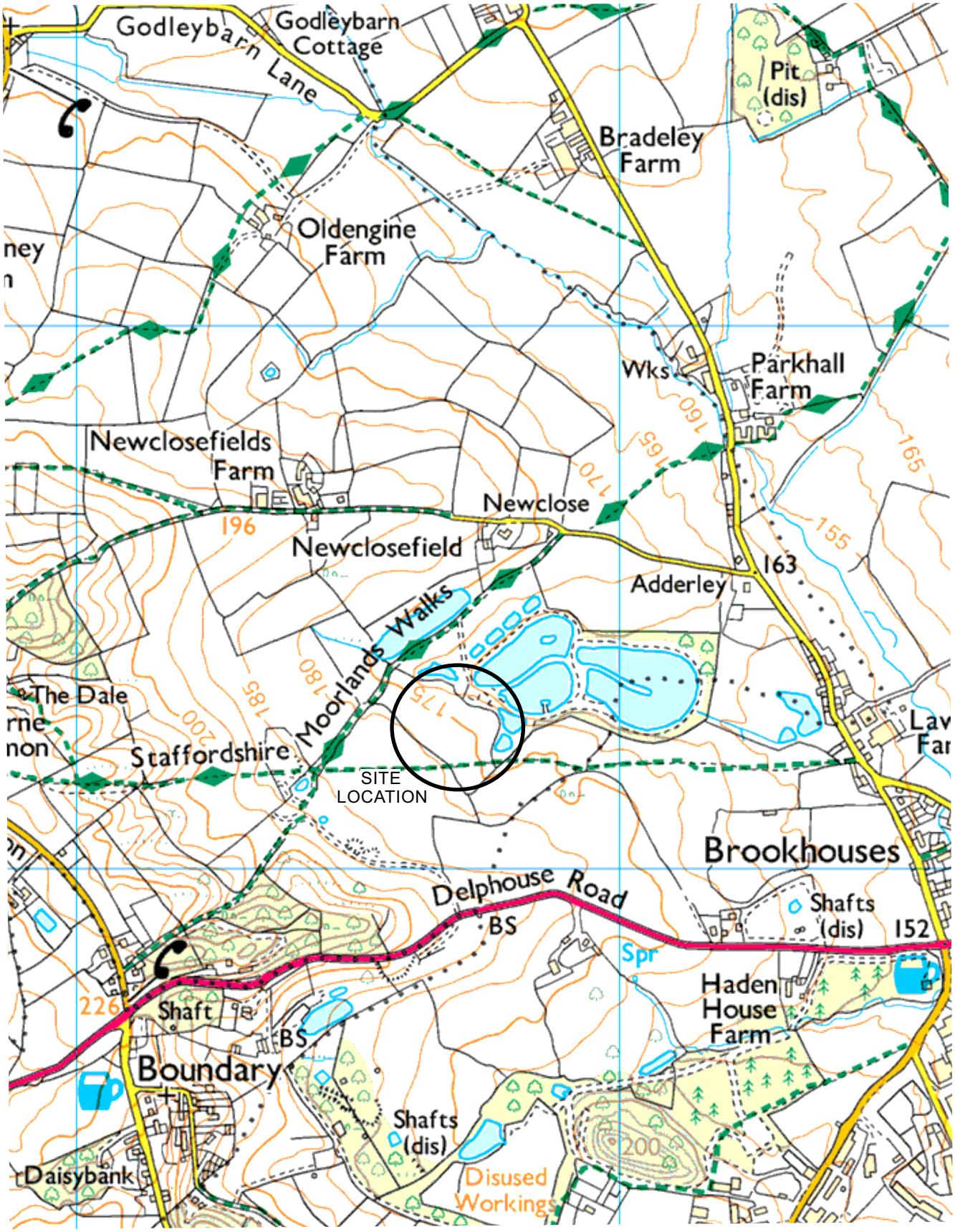
There are no known shallow workings below the site but there is some potential for shallow unrecorded workings to be present. The proposed caravan park usage involves no significant earthworks or new structures and would not be sensitive to mining subsidence related ground movements. The proposed extension to the existing club house will be of 'log cabin' type construction and would not me prone to significant structural damage in response to small ground movements. In view of this and the potential mining conditions in that area, the potential for significant future surface subsidence sufficient to cause significant damage to the structure is low to very low. Accordingly, it is not considered that any intrusive investigation is warranted. The slab foundation for the new extension should be reinforced and the building should be structurally independent of the existing club house.

Subject to the need for the precautions identified above, the present study has shown no reason why mining conditions would preclude safe development of the site for the proposed usage.

Report Prepared by:

J A Sladen BSc, MSc, CEng, CEnv, MICE, FGS

FIGURES



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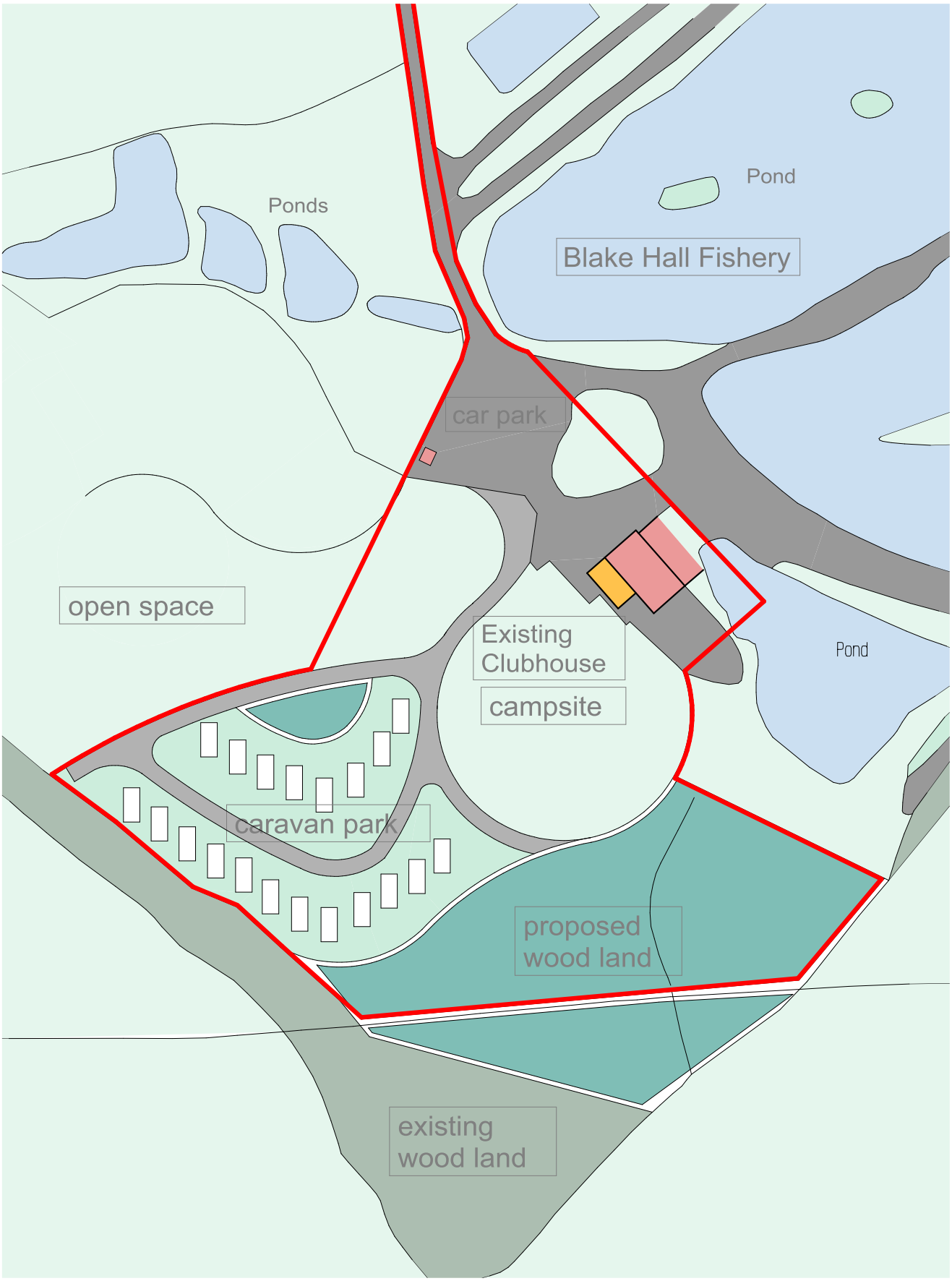
SITE LOCATION PLAN

SLADEN ASSOCIATES	Report No 18-1889	Project Site at Blake Hall Fishery Cheadle Staffordshire	Figure **1**



SITE LAYOUT PLAN

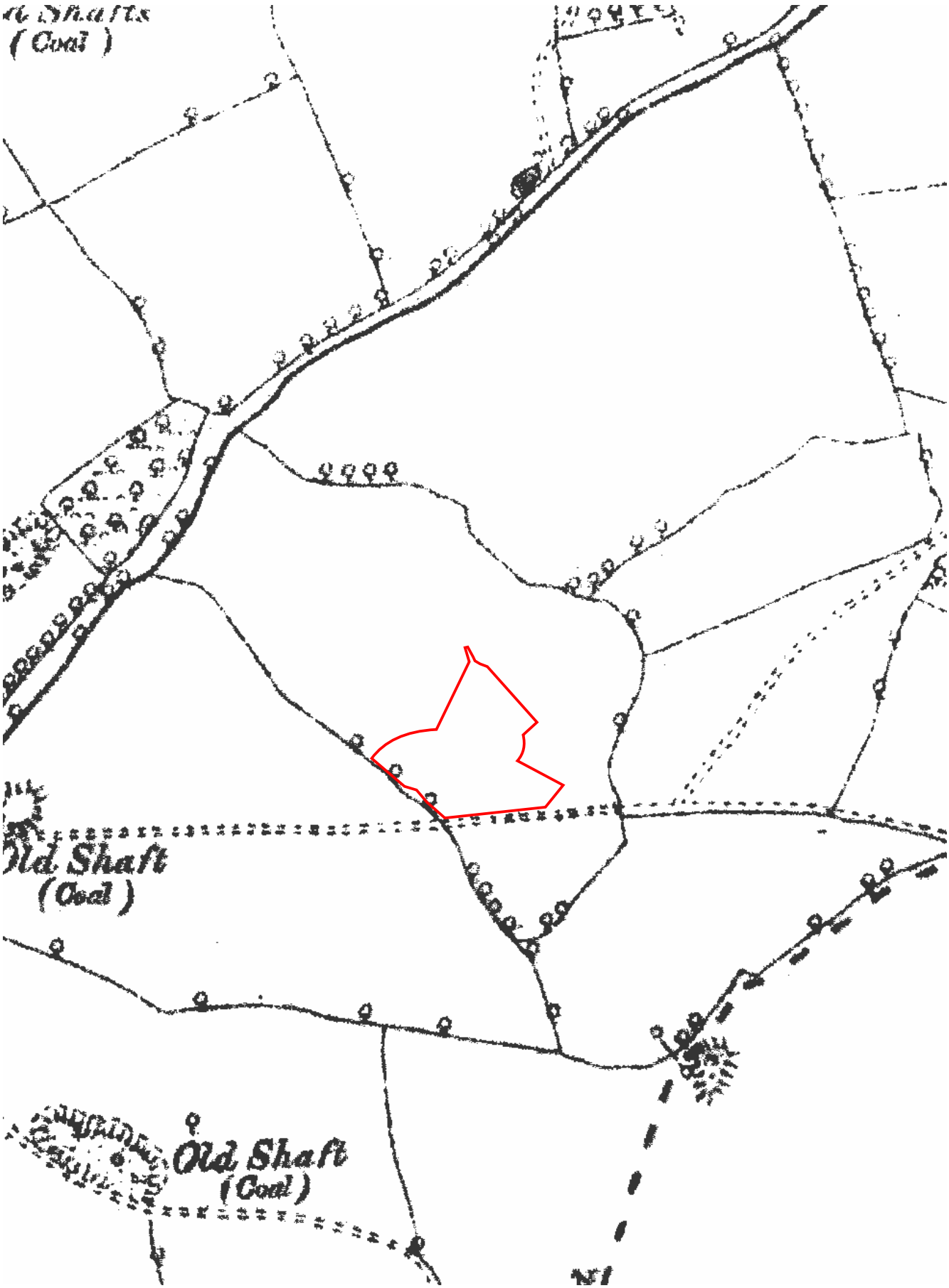
SLADEN ASSOCIATES	Report No 18-1889	Project Site at Blake Hall Fishery Cheadle Staffordshire	Figure **2**



PROPOSED SITE LAYOUT PLAN

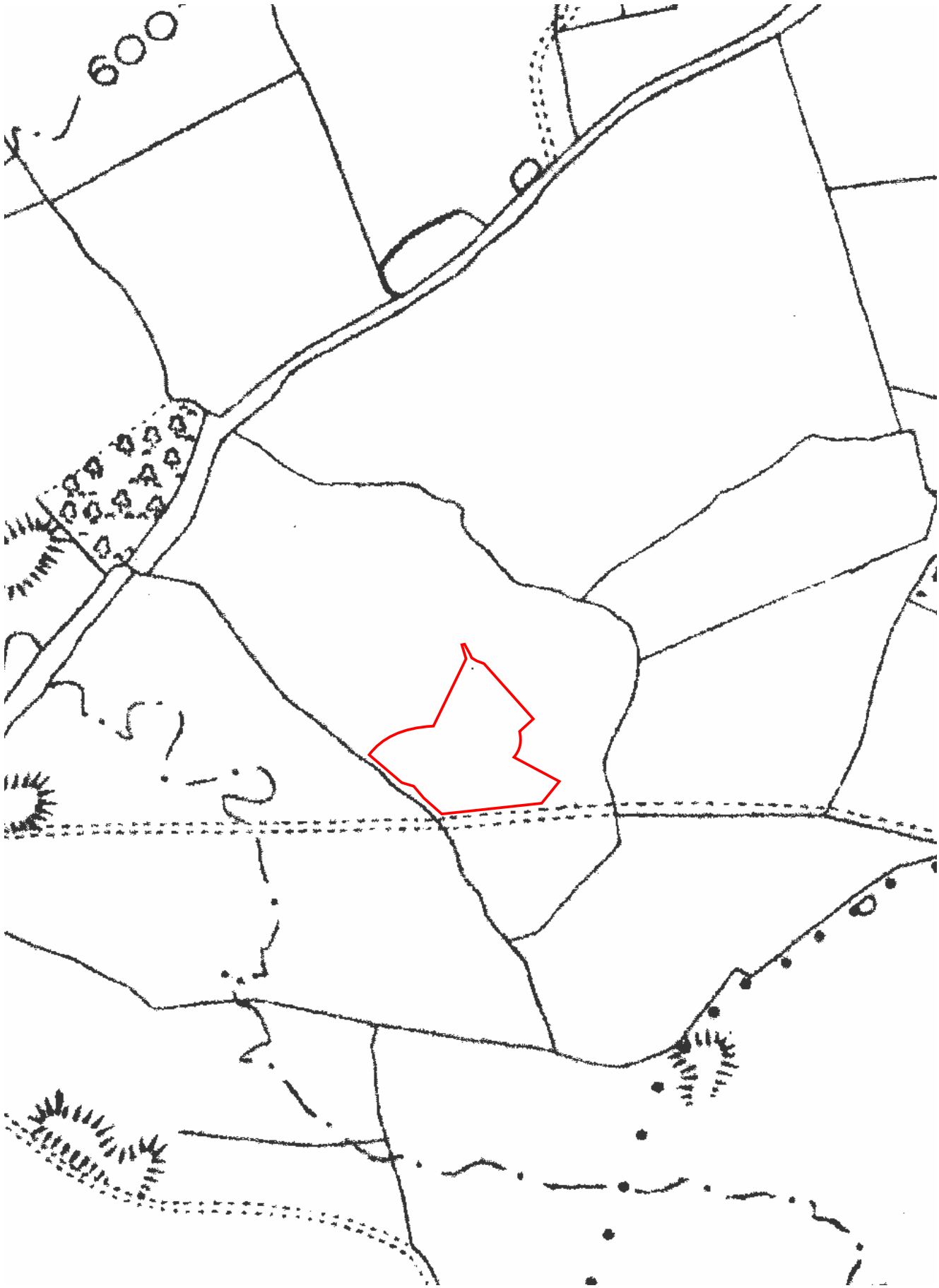
SLADEN ASSOCIATES	Report No 18-1889	Project Site at Blake Hall Fishery Cheadle Staffordshire	Figure **3**

APPENDIX A
HISTORICAL MAPS



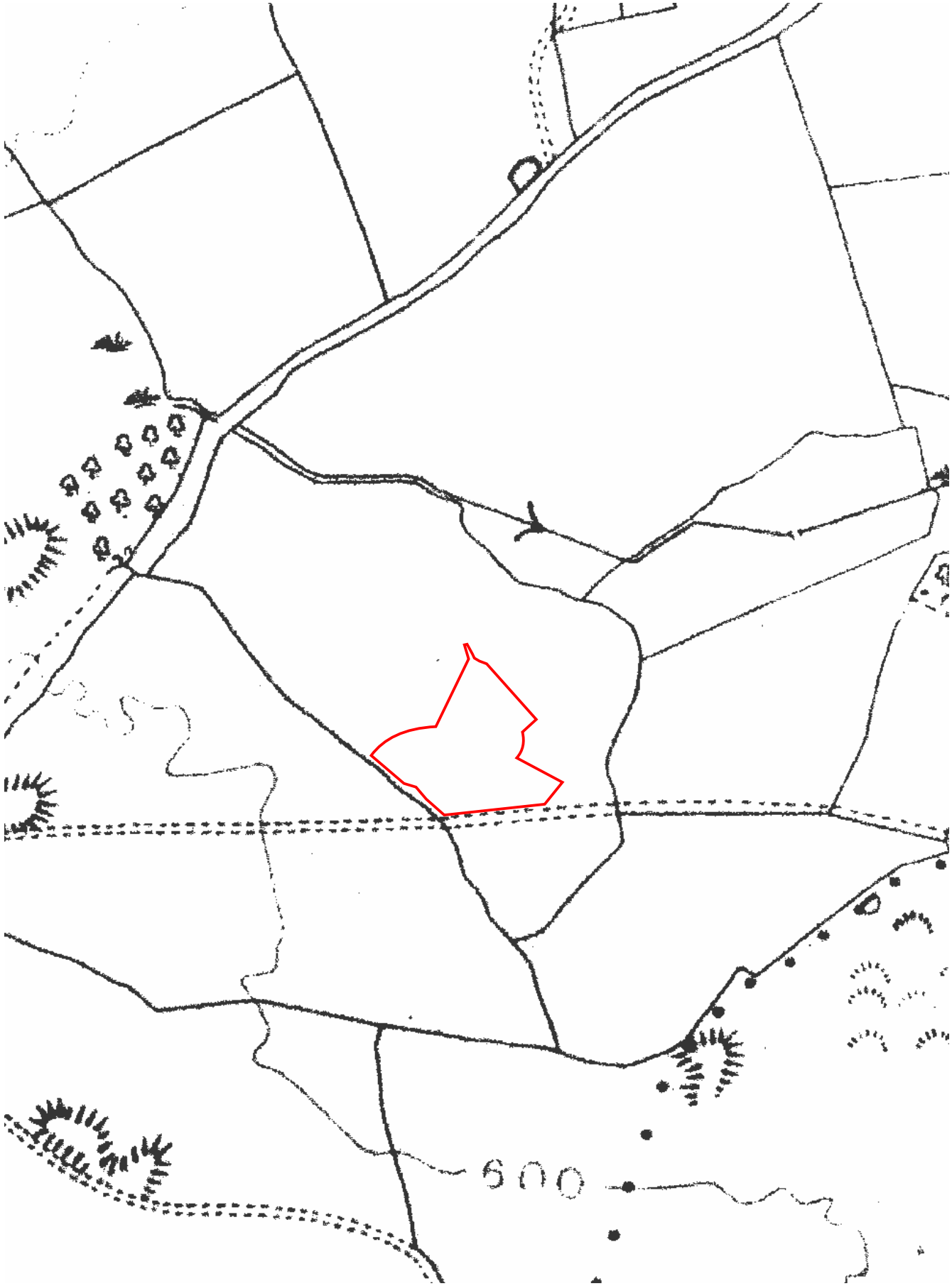
THE SITE AREA IN 1888

SLADEN ASSOCIATES	Report No 18-1889	Project Site at Blake Hall Fishery Cheadle Staffordshire	Figure **A1**



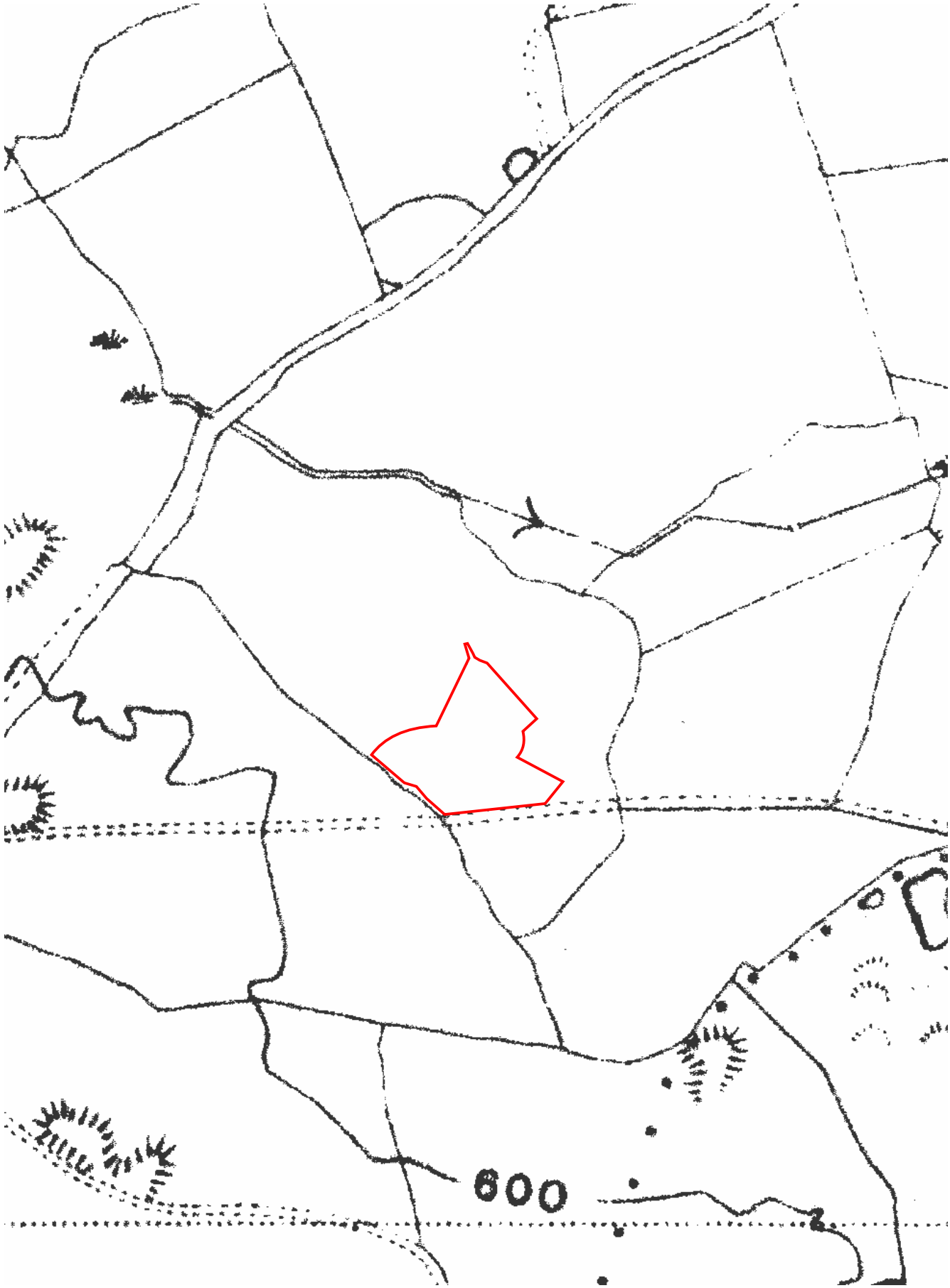
THE SITE AREA IN 1901

SLADEN ASSOCIATES	Report No 18-1889	Project Site at Blake Hall Fishery Cheadle Staffordshire	Figure **A2**



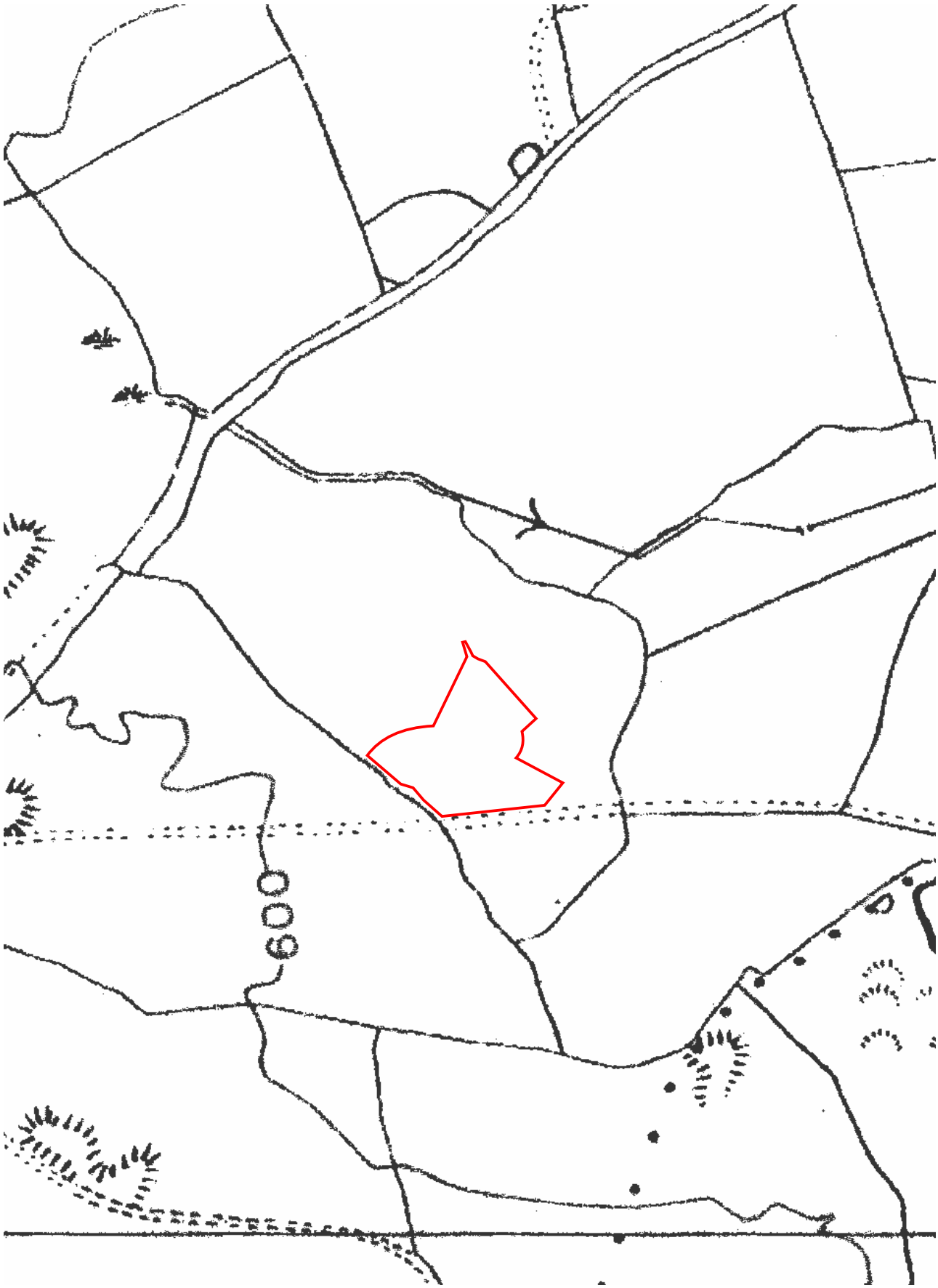
THE SITE AREA IN 1925

SLADEN ASSOCIATES	Report No 18-1889	Project Site at Blake Hall Fishery Cheadle Staffordshire	Figure **A3**



THE SITE AREA IN 1949

SLADEN ASSOCIATES	Report No 18-1889	Project Site at Blake Hall Fishery Cheadle Staffordshire	Figure **A4**



THE SITE AREA IN 1955

SLADEN ASSOCIATES	Report No 18-1889	Project Site at Blake Hall Fishery Cheadle Staffordshire	Figure **A5**

APPENDIX B
COAL AUTHORITY REPORT

The Coal Authority

Resolving the impacts of mining

CON29M Non-Residential Mining Report





BLAKE HALL FISHERY
DELPHOUSE ROAD
CHEADLE
BOUNDARY
STAFFORDSHIRE
ST10 2NX



Date of enquiry:	21 February 2018
Date enquiry received:	21 February 2018
Issue date:	21 February 2018
Our reference:	51001796632001
Your reference:	18-1899

CON29M Non-Residential Mining Report

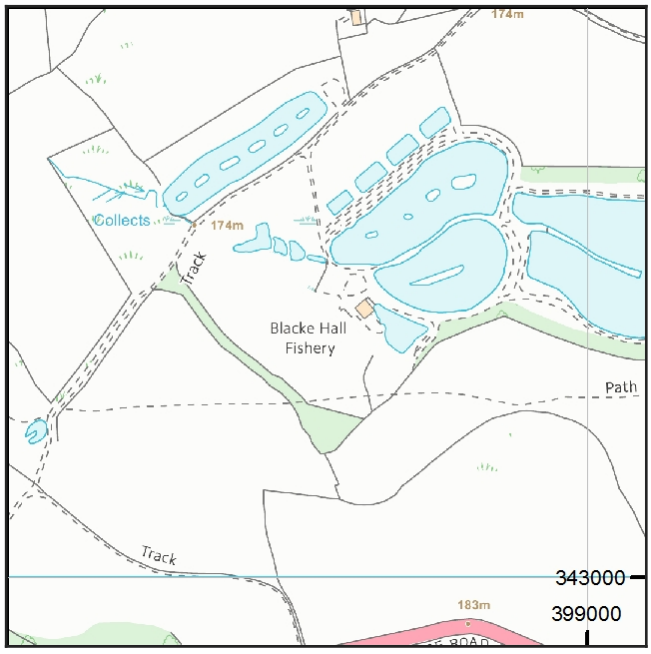
This report is based on, and limited to, the records held by the Coal Authority and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Client name

SLADEN PARTNERSHIP LTD

Enquiry address

BLAKE HALL FISHERY, DELPHOUSE ROAD,
CHEADLE, BOUNDARY, STAFFORDSHIRE, ST10 2NX



Approximate position of property

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NG18 4RG

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/thecoalauthority
/coalauthority

Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	Yes
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	Yes
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	No
13	Working facilities order	No
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is in a surface area that could be affected by underground mining in 4 seams of coal at 50m to 350m depth, and last worked in 1952.

Any movement in the ground due to coal mining activity should have stopped.

In addition the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered prior to any site works or future development activity. Your attention is drawn to the Comments on the Coal Authority information section of the report.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4. Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

There may however be mine entries/additional mine entries in the local area which the Coal Authority has no knowledge of.

5. Coal mining geology
The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6. Past opencast coal mining
The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7. Present opencast coal mining
The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8. Future opencast coal mining
There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9. Coal mining subsidence
The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10. Mine gas
The Coal Authority has no record of a mine gas emission requiring action.

11. Hazards related to coal mining
The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

12. Withdrawal of support
The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

13. Working facilities order
The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14. Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

15. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Comments on the Coal Authority information

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In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Additional remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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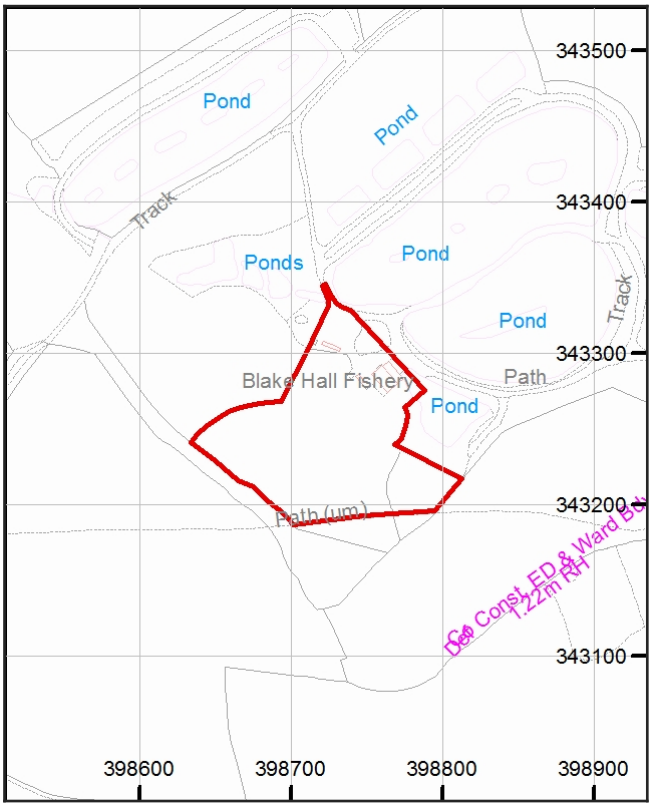
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Enquiry boundary

Key

Approximate position of enquiry boundary shown



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Map data

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