

A photograph of a site investigation showing a cross-section of the ground. The top layer is dark brown soil with some green grass. Below that is a layer of light-colored rocks and debris. At the bottom, there is a layer of reddish-brown soil. The site is bordered by green plastic sheeting on both sides.

Preliminary Geoenvironmental Investigation

Land at Bradley Park Golf Course, Huddersfield For Kirklees Council

Report no: 2311/1A

Date: February 2016



BRADLEY PARK GOLF COURSE, HUDDERSFIELD SUMMARY OF GEOENVIRONMENTAL ISSUES

Job No.	2311	Site area/ha	76 hectares (188 acres)
Client:	Kirklees Council	NGR:	SE 157 207
Site:	Bradley Park Golf Course, Huddersfield	Nearest postcode:	HD2 1PZ

The site is located approximately 4 km north east of Huddersfield town centre, just south of the M62 motorway, between the A641 in the west and Tithe House Way in the east. The site is predominantly occupied by Bradley Park golf course, with areas of arable farmland in the east and west. There is a farmyard (Bradley Villa Farm) in the far west. A former landfill is present beneath an area of about 6 hectares (c. 8% of the total site area) in the far-east of the site.

Lithos were commissioned by Kirklees Council to provide a preliminary geoenvironmental appraisal of the site. In the current UDP, 10 hectares has been allocated for housing, with the remainder being allocated as Greenbelt. However, the draft allocation estimates that the site will ultimately accommodate around 2,000 homes.

Lithos' investigation included an inspection of historical and geological maps and information provided by the BGS, Landmark, the Coal Authority, Kirklees Council and the Environment Agency. In addition a site inspection has been carried out. A summary of salient geoenvironmental issues is provided in the table below.

Issue	Remarks
Anticipated ground conditions	Likely veneer of made ground within vicinity of Bradley Villa Farm, golf clubhouse & car park, and historical coke ovens. Deep made ground (former landfill) in the far-east. Geological maps suggest the site will be underlain by a veneer of residual soil over Coal Measures bedrock (interbedded mudstone, siltstone and sandstone).
Mining & quarrying	Mineworkings in the Crow, Black Bed and Better Bed coals, which could affect surface stability, are present beneath the site. Coal is likely to have been extracted by pillar & stall methods. There may also have been earlier, unrecorded mineworkings via bell pits and/or pillar and stall methods. If old mineworkings are considered to pose a significant risk to surface stability, mitigation of the risks posed will be required; this could be achieved in one of two ways: <ul style="list-style-type: none"> • Extraction of the remaining coal • Consolidation, via drilling & grouting
Hazardous gas	Given the presence of landfilled ground in the far-east, and proximity to the currently operational Bradley Park Tip, a robust ground gas investigation will be required. Protective gas measures will almost certainly be required for new buildings across this site. The site is also underlain by shallow mineworkings, although the site it is not in an area known to be susceptible to mine gas emissions.
Flooding & drainage	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low. The suitability of soakaways for the disposal of surface water should be assessed via soakaway testing during the ground investigation.
Anticipated contamination	Historical use of the site as farmland and current use of the site as a golf course is considered unlikely to have produced significant contamination. However, historical processes on/near site have included: mining; coke ovens; and landfilling, and all these may have given rise to significant contamination.
Anticipated foundation solutions	In the south and west of the site, beyond the influence of shallow mineworkings, weathered Coal Measures should allow the adoption of strip footings for two storey housing. In the north and east of the site appropriate foundation solutions will be largely determined by how risks associated with shallow mineworkings are mitigated. If grouting is preferred, footings will need to be at least 300mm thick, and reinforced top and bottom with a layer of mesh. If extraction of coal is undertaken, rafts would likely provide the most appropriate foundation solution, after consideration of potential high wall issues.
Potential constraints	In addition to concerns associated with shallow mineworkings, mine entries, and landfill gas there may be issues associated with: <ul style="list-style-type: none"> • The adjacent operational landfill (Bradley Park Tip) • The potential for the far-east of the site to be classified as Contaminated Land under Part IIA • Geotechnical issues (if development over landfilled ground were considered), including the potential for settlement of land around piled dwellings • Overhead utilities

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Appendix A – General notes

01	Environmental setting
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Appendix B – Drawings

Drawing	Title
2311/1	Site location plan
2311/2	Historical features
2311/3	Site features
2311/4	Site photos
2311/5	Site areas based on land use
2311/6	Coal & mine entries
2311/7	Preliminary conceptual site model
2311/8	CA Abandonment plan (all workings)
2311/8a	CA Abandonment plan (Better Bed from Anchor Pit)
2311/8b	CA Abandonment plan (Black Bed from Cookson Pits Colliery)
2311/8c	CA Abandonment plan (Better Bed from Bradley Park Colliery)
2311/10	Areas of landfill

Appendix C - Commission

Appendix D – Historical OS plans*

Appendix E – Search responses*

From	Date	Content
Landmark Information Group	Dec 2015	Envirocheck report
Kirklees Civil Council	Dec 2015	Landfill search data
Coal Authority	Dec 2015	Mining Report, Mine Entry datasheets (abandonment plans included in drawings in Appendix B)

* Some of this data is not included within the paper copy of this report; most is included in the PDF copy and all is included on the CD

FOREWORD (preliminary geoenvironmental investigation report)

This report has been prepared for the sole use and reliance of the Client named on page 1 and cannot be relied upon by any other parties without the express written authorisation of Lithos Consulting Limited (Lithos). Any unauthorized third party relies on this report at their own risk and the authors owe them no duty of care.

The report presents observations and factual data obtained during our site investigation, and provides an assessment of geoenvironmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from Lithos prior to significant revision of the development proposals.

The report should be read in its entirety, including all associated drawings and appendices. Lithos cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context. However, it should be noted that in order to keep the number of sheets of paper in the hard copy to a minimum, some information (e.g. full copy of the Landmark/Groundsure Report) is only included within the "electronic", PDF Report on the accompanying CD.

The findings and opinions conveyed in any Desk Study section of the report (including review of any third party reports) are based on information obtained from the sources listed, which Lithos understands are reliable. All reasonable skill, care and diligence has been applied in examining the information obtained. However, Lithos accept no responsibility for inaccuracies in the data supplied or for opinions based on any such inaccurate data.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

Lithos reserve the right to amend their conclusions and recommendations in the light of further information that may become available.

**PRELIMINARY
GEOENVIRONMENTAL INVESTIGATION
OF LAND AT
BRADLEY PARK GOLF COURSE, HUDDERSFIELD**

1 INTRODUCTION

1.1 The commission and brief

- 1.1.1 Lithos Consulting were commissioned by Kirklees Council to carry out a preliminary investigation of land at Bradley Park in Huddersfield.
- 1.1.2 Correspondence regarding Lithos' appointment, including the brief for this investigation, is included in Appendix C. The agreed scope of works included:
- A site walkover and inspection
 - An assessment of the land use history
 - Determination of the site's environmental setting
 - A mining risk assessment in accordance with Coal Authority guidance
 - Assessment of anticipated ground conditions, including potential contaminants
 - Assessment of anticipated foundation and engineering issues associated with redevelopment for a residential end-use
 - Provision of recommendations for an appropriate ground investigation
- 1.1.3 This Preliminary Investigation comprised an inspection of historical and geological maps and information provided by the British Geological Survey, the Landmark Information Group, the Coal Authority, Kirklees Council and the Environment Agency. In addition a site inspection has been carried out by Lithos.
- 1.1.4 Primary aims of this investigation were to identify salient geoenvironmental issues affecting the site to enable design and costing of an appropriate intrusive investigation, and to support the submission of a planning application.

1.2 The proposed development & planning

- 1.2.1 In the current Unitary Development Plan (UDP), 10 hectares has been allocated for housing (H8.39), with the remainder (c. 68 hectares) being allocated as Greenbelt.
- 1.2.2 The draft Local Plan allocation consists of two sites – H1747, which is in Council ownership and H351 which is in private ownership. The draft allocation estimates that the site will ultimately accommodate around 2,000 homes.

1.3 Report format and limitations

- 1.3.1 Standard definitions, procedures and guidance are contained within Appendix A, which includes background, generic information on assessment of the site's environmental setting.
- 1.3.2 General notes and limitations relevant to all Lithos preliminary investigations are described in the Foreword and should be read in conjunction with this report. The text of the report draws specific attention to any modification to these procedures and to any other special techniques employed.

2 SITE DESCRIPTION

2.1 General

- 2.1.1 The site comprises a single parcel of land of approximately 76 hectares. The majority of the site (about 64 hectares) is owned by Kirklees Council, land to the west (about 12 hectares) is owned privately.
- 2.1.2 The site is located just south of the M62 motorway, between the A641 in the west and Tithe House Way in the east; see Drawing 2311/1. Site details are summarised in the table below.

Detail	Remarks
Location	4 km north east of Huddersfield town centre
NGR	SE 157 207
Area	76 hectares (188 acres)
Known services	Underground drainage (within golf course). Overhead telecommunications and electricity utility (pylons). Underground water, drainage electricity and gas attached to Bradley Park Golf Club buildings.

2.2 Site features

- 2.2.1 Lithos completed a walkover survey of the site on the 18th December 2015. During the walkover, greenkeepers who had been employed at Bradley Park Golf Course for over 20 years were questioned.
- 2.2.2 Existing salient features, at the time of the walkover are presented on Drawing 2311/3 in Appendix B to this report, and summarised in the table below.

Feature	Remarks
Current access	Off Bradley Road, Tithe House Way & Bradford Road (A641) See comments in Section 2.2.5 below.
Topography	Typically slopes north and east. Land in the west of the site is domed. Land immediately east and north of the east of the site slopes steeply away to the north (at about 1 in 4).
Approximate areas	3,500m ² buildings. 8,000m ² tarmac hardstand. 748,500m ² grass (grazing land, greens, rough grasses) with decorative sand traps, ponds and woodland.
Nature of boundaries	North – wooden and metal fencing. East – low poorly maintained dry stone walls or no physical boundaries. South – garden fences and hedgerows. West – predominantly garden fences and hedgerows.
Surrounding land uses	North – Arable farmland (west) M62 motorway (centre) and Bradley Park waste management site [operational landfill] (east). Scout camping centre, farmland, River Calder and railway tracks beyond. East – rough open grassland. Woodland and industrial site beyond. South – Housing and industrial/commercial park. Bradley Park (POS) and woodland beyond West – Housing with farmland beyond.

- 2.2.3 A selection of site photographs is included on Drawing 2311/4.

2.2.4 At the time of walkover the site could be divided into 3 areas based on usage. These areas are summarised in the table below and shown in Drawing 2311/5 in Appendix B to this report.

Site Area	Land use	Area (m ²)	Location within wider site.
A	Arable farmland, and farming operations	122,000m ²	West of site (west of Shepherds Thorn Lane)
B	Bradley Park Golf Club	559,500m ²	Centre, north and east.
C	Arable farmland	78,500m ²	South east.

2.2.5 Access to the site is via one of 3 roads (suitable for wheeled traffic) at 5 points around the site boundary:

- Bradford Road (A641) runs 10m west of site's western boundary orientated north-south. Access is via a double metal 5 bar gate which is reached via a rough track surfaced with granular hardstand. At the time of walkover this entrance was secured by a trailer which was parked across the gate. This gate is the only apparent entrance to Area A.
- Bradley Road (A6107) runs along the site's southern boundary orientated east to west. Access is via a narrow private lane (Lamb Coates Road), which is bordered by brick walls and hedgerows. This access goes directly into the Bradley Park Golf Club clubhouse complex.
- Tithe House Way runs, from its junction with Bradley Road, along the site's south eastern boundary orientated north-south. Access to, Area B is via a roughly surfaced track at the northern end of Tithe House Way which opens out into the site.
- Shepherds Thorn Lane intersects the site (separating Areas A and B) and provides access to Area B via gates in the south and via the yard of Shepherds Thorn Farm in the north.

2.2.6 Further tracks and footpaths (private and public) cross the site. Land immediately east of the site is crossed with several rough footpaths. One of these footpaths is understood to be a public right of way. During the walkover several dog walkers were noted.

2.2.7 A public right of way (the Kirklees Way) enters the site in the far-east from the nearby Lower Quarry Road. The footpath is clearly marked and runs along the site's northern boundary from the east into the central north of the site. The footpath joins Shepherds Thorn Lane at Shepherds Thorn Farm and exits the site heading south along Shepherds Thorn Lane.

2.3 Site description

Area A

2.3.1 No access was available to Area A during the site walkover. Observations were made from Bradford Road and Shepherds Thorn Lane.

2.3.2 There is a farmyard (Bradley Villa Farm) comprising 16 buildings (including a farm shop) and external areas of tarmac hardstand in the far west of the Area A.

2.3.3 Buildings appear to be of a mix of stone, brick and portal frame with steel cladding construction.

2.3.4 Very sparsely spaced low hedgerows divide land beyond the farmyard into 3 fields.

2.3.5 Topography undulates moderately smoothly and domes in the centre of the area. Within the south eastern corner of Area A, a broad smooth hollow is present which appears to have been cut into natural topography; the sides of the hollow slope at about 1 in 4.

Area B

- 2.3.6 Area B is occupied by Bradley Park Golf Club - buildings and associated golf course. The course itself comprises a 9 hole 'foot golf' course, a practice putting area, a driving range and an 18 hole golf course (including teeing grounds, fairways, bunkers, ponds and putting greens).
- 2.3.7 The clubhouse is a single storey stone building, with a separate golfing 'pro' shop which sells golfing equipment and attire. The pro shop appears to be constructed of timber. Immediately south of the club house are areas of tarmac hardstand used for parking.
- 2.3.8 To the south west of the club house is a very flat area of short maintained grass which is understood to be used as a practice green.
- 2.3.9 To the immediate east of the clubhouse is a driving range. This comprises a portal framed and metal clad building with an open front which looks out at a flat area of short, well-maintained grass.
- 2.3.10 To the south east of the clubhouse is a 9 hole foot golf course which comprises a flat area with short maintained grass, 9 holes and 7 sand bunkers.
- 2.3.11 Across the remainder of Area B is an 18 hole golf course. The course comprises teeing grounds, which are made level by earthworks, fairways and greens. Dispersed across the course are frequent sand bunkers, ponds and drains/streams. Footpaths constructed of limestone chippings cross the course, providing access.
- 2.3.12 Areas of semi-mature (c. 20 year old) trees are located across the site. An area of mature woodland is located in the centre-north of this area.
- 2.3.13 The topography of the area generally slopes down to the north and east and broadly undulates. The east of Area B is known to be underlain by former landfill (see further comments in Section 4.2). The topography of the landfill is hummocky, uneven and slopes down to the east.
- 2.3.14 The greenkeepers told of a mining incident which occurred several years ago within the foot golf pitch. The approximate location of this incident is shown on Drawing 2311/2. A circular hole, measuring approximately 5 feet wide and 4 feet deep, opened up within the ground. The hole was described as circular, with straight vertical sides. Following the occurrence a geologist, who the greenkeepers suggest might have been from the Coal Authority, visited the feature and surveyed it in. The feature was then backfilled with inert soils. It should be noted that the location of this collapse is in close proximity to Coal Authority-recorded mine entries 416420-014 (adit) and 416420-015 (shaft); it is more than likely the latter, both are shown on Drawing 2311/6. No record of treatment of this mine entry is contained within the Coal Authority mine entry datasheet, which is presented in Appendix E.
- 2.3.15 It is clear that some landscape earthworks have been carried out across the golf course. Furthermore, ground levels in the east have been raised. Land immediately beyond the site's north-eastern boundary is significantly lower than the site itself (by up to 5m); a moderately steep banking (c. 1 in 3) slopes down away from the site.

2.3.16 Anecdotal information provided by the greenkeepers suggests:

- The majority of trees within the boundary of the golf course have been planted by the greenkeepers questioned; and therefore are no older than about 20 years.
- Streams and ditches across the area require frequent clearing out in order to keep them operating effectively.
- Bridges over the ditches have been installed by the greenkeepers questioned; and are therefore 20 years old or less.
- Excavations within the east of the site bring up waste materials including plastic, wood, glass and ash.

Area C

2.3.17 Area C comprises arable farmland. Occasional trees and low dry stone walls divide the site roughly into 3 separate fields. It is understood from discussions with locals that the land is used for grazing livestock. A well maintained hedgerow, which is approximately 3m tall, separates Area C from Area B.

2.3.18 An overgrown ditch, which is approximately 1m deep, separates Area C from the adjacent Tithe House Road.

2.3.19 The topography of the area slopes broadly down to the south.

The surrounding area

2.3.20 As part of the walkover, nearby features of interest (the adjacent landfill, and the area of historical quarrying to the east) were also inspected. These features are discussed further in Sections 4.2 and 4.1 respectively.

2.3.21 An area of quarrying 100m east (shown on historical plans from the 1890s) was visited during the walkover. The quarry appeared to have exploited sandstone, probably for use as a construction material. The quarry is not backfilled but is overgrown with trees and shrubs. Several footpaths cross the quarry.

2.4 Site operations

Area A

2.4.1 No access was available to this part of the site; therefore operations within the farm buildings are unknown.

Area B

2.4.2 Operations across the area are typically limited to maintenance of the golf courses. Maintenance is carried out using petrol-powered gardening and grass mowing machinery. Fuel on site is stored in plastic fuel cans which are stored within a locked machinery room when not in use.

2.4.3 At the time of walkover a diesel-powered mini digger (c. 2 tonne) was also present on site and being used to clean out drainage ditches.

Area C

2.4.4 Operations across Area C appeared to be limited to livestock grazing, although none were present at the time of walkover.

3 SITE HISTORY

- 3.1 In order to investigate the development history and previous land uses at the site and immediate surrounding land, site centred extracts from Ordnance Survey (OS) plans dating back to 1854 have been examined. These plans are presented in Appendix D to this report.
- 3.2 The table below provides a summary of the salient points relating to the history of the site with respect to the proposed end use. It is not the intention of this report to describe in detail all the changes that have occurred on or adjacent to the site.
- 3.3 Significant former uses/operations are highlighted in bold text for ease of reference.

Date(s)	Site	Surrounding land
1854	Site predominantly comprises fields divided up by hedgerows with widely spaced trees. Coal Pit & coke ovens in centre of site. Two further coal pits in north of site. 'Mankin Holes' in east of site. Far-east of site occupied by woodland and Parkhill Quarry (sandstone). Bradley Wood encroaches into north of site. Bradley Villa within south western corner of site. Farm building 'Lambe Cote' within centre of site. Two lanes & associated footpaths cross site. Well in centre-south of site.	Bradley Park to the north and east. Predominantly open farmland with occasional woodland to the north west, west and south. Bradley Road immediately south of the site. Sandstone quarry 100m south west. Coal pits c.300m north of site's northernmost corner. Well 100m east.
1893 - 94	Coal Pits & Coke oven no longer shown (1894 only). Parkhill Quarry no longer shown. Mankin Holes no longer shown. Footpaths cross site.	Old quarry 100m east. Quarry to the south east no longer shown. Coal pits 300m north not called Anchor Pit. Bradley Quarry 300m east. Manchester and Normanton railway line 200m north east of site orientated north west to south east.
1907 - 08	No significant changes.	Quarry 100m east expanded to adjacent to eastern boundary.
1918	Area of woodland shown central to site.	No significant changes.
1930 - 33	Area of woodland no longer shown.	
1956 - 59	No significant changes.	Development of housing immediately south and west of site. Refuse tip shown 100m west of site.
1966 - 75	Electricity pylons cross site orientated east to west. Lamb Coates Farm no longer shown.	M62 motorway constructed adjacent to site's northern boundary.
1982 - 84	Golf club - club house shown in centre-south of site.	Scout camp shown in Bradley Wood to the north.
1991 - 93	Site predominantly marked as Bradley Park Golf Course. Tank shown in woodland within centre-north of site.	Expansion of tip adjacent to north eastern boundary.
2015	Expansion of Bradley Villa in south west of site. Driving range in centre of site.	Expansion of tip adjacent to north eastern boundary which is now shown as disused.

- 3.4 Bradley Park Golf Club is understood to have been constructed in 1977.
- 3.5 DoE industry profile (Gas works, coke works and other coal carbonisation processes) notes that, pre 1900s, coke was produced within beehive ovens, in which volatile gases were burned, in order to provide heat for the coke making process. Beehive ovens were used exclusively up until the 1850s.

- 3.6 The DoE profile suggests that above ground storage and landfilling of waste by-products (coal, clinker, ash, metal oxides etc.) was common adjacent to coke ovens. Given the long period of time between surveying by the OS, particularly in the 1800's and early 1900's, it is possible that stockpiling and/or landfilling of the above materials may have occurred on site yet never been recorded on historical mapping.

4 ENVIRONMENTAL SETTING

4.1 General

4.1.1 Notes describing how the site's environmental setting has been assessed are included in Appendix A to this report. The responses received from the Environment Agency, the Coal Authority, Kirklees Council, the BGS and extracts from the Landmark Report are presented in Appendix E.

Issue	Data reviewed	
Geology	1:50,000 BGS map (Sheet SE12SW/SE) 1:10,000 BGS map (Sheet 77) BGS Logs: SE12SE813 & SE12SE115	Drift – None shown. Solid – Lower Coal Measures, Thick Stone Sandstone, un-named sandstone leaves & members and Clifton Rock Sandstone. Elland Flags (Sandstone anticipated at c.45m depth). Shallowest coal seams – Black Bed Coal and Crow Coal outcrop on site. Strata Dip – between 3° and 10° to the east. Faults – two cross the site. Further details in Section 4.3 below.
Mining	Coal Authority BGS maps	This site is predominantly located within a Coal Mining Development Low Risk Area, but parts lie within High Risk Area. Further details in Section 4.4 below
Quarrying	Historical OS plans	Historical sandstone quarrying has taken place within and close to the site boundary.
Radon	Public Health England	Less than 1 % of homes above the Action Level. No protective measures required.
Hydrogeology	Environment Agency	Source Protection Zone? No. Aquifer Secondary A (Drift); None recorded (Solid). Groundwater abstractions? 36m west. Kirklees Active Leisure (Kirklees Council) groundwater abstraction for spray irrigation at Bradley Park Golf Course. Ongoing. Soil leaching potential – High (U). Pollution incidents? None of significance.
Hydrology	Envirocheck Report	Nearest watercourse(s) – 3 no. tertiary rivers cross north and south of site. Pollution incidents? None of significance to site. Abstractions? None of significance to site. Discharge consents? 30m south east. Yorkshire Water. Discharge of storm water overflow into freshwater stream/river.
Flood risk	Environment Agency Envirocheck Report	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low. The site area is greater than 1 hectare Flood Zone 1, therefore a Flood Risk Assessment, focused on the management of surface water run-off, will be required. Development that increases the amount of impermeable surfaces can result in an increase in surface water run-off, which in turn can result in increased flood risk both on site and elsewhere within the catchment.

4.2 Landfills

- 4.2.1 The Groundsure report and information provided by the Environment Agency show that a former landfill is present in the far-east of the site. An active landfill is also present adjacent to the site's north-eastern boundary. Further information has been obtained from Kirklees Council (Environmental Health). Kirklees Council's response is included in Appendix E.
- 4.2.2 Information from the Groundsure Report, Kirklees Council and the Environment Agency is summarised in the table below. This information has been supplemented by discussions with site workers and observations made during the site walkover.

Landfill name/ location	NGR (proximity to site)	Remarks																				
Bradley Golf Course.	SE 41655 42110 (within site boundary) Ref. Site 159 (Kirklees/EA waste site reference).	Filling from 1955 to unknown (likely c. 1975). Fill comprising industrial and household waste. Gas and leachate controls considered unlikely to have been installed. Site currently owned by Kirklees Council and used as golf course.																				
Bradley Park Tip	SE1670 2130 (Adjacent to north eastern boundary) Ref. WDL 53 (Kirklees waste site reference). Ref. EA0053 (EA waste site reference).	<p>Filling from 1945 to present (current license is 1977; ongoing). Total capacity of 7.5 million m³. Fill can comprise the following (tonnes per day):</p> <table border="0"> <tr> <td>Inert non-flammable industrial waste (8)</td> <td>Contaminated demolition waste (30)</td> </tr> <tr> <td>Ash (5)</td> <td>Iron oxide (7.5)</td> </tr> <tr> <td>Gypsum (180)</td> <td>Effluent treated sludge (72)</td> </tr> <tr> <td>Settling pit sludge (8)</td> <td>Solid still residues (8)</td> </tr> <tr> <td>Chemically contaminated rubbish (47)</td> <td>Filtration materials (2)</td> </tr> <tr> <td>Empty used containers (0.3)</td> <td>Laboratory waste (0.4)</td> </tr> <tr> <td>Mixed organic compounds (3)</td> <td>Sodium carbonate (3.5)</td> </tr> <tr> <td>Tankered sedimentation tank gypsum (20)</td> <td>Contaminated packaging (2)</td> </tr> <tr> <td>Inert construction and demolition waste (100)</td> <td>Foundry sand (20)</td> </tr> <tr> <td>Imported cover materials (100)</td> <td>Asbestos (1.5)</td> </tr> </table> <p>Site currently operated by Zeneca. Golf course slope is recorded as lined and capped. Site is recorded as first in country to use Asphaltic Concrete as a cover layer. A leachate lagoon has been in operation since 1993.</p>	Inert non-flammable industrial waste (8)	Contaminated demolition waste (30)	Ash (5)	Iron oxide (7.5)	Gypsum (180)	Effluent treated sludge (72)	Settling pit sludge (8)	Solid still residues (8)	Chemically contaminated rubbish (47)	Filtration materials (2)	Empty used containers (0.3)	Laboratory waste (0.4)	Mixed organic compounds (3)	Sodium carbonate (3.5)	Tankered sedimentation tank gypsum (20)	Contaminated packaging (2)	Inert construction and demolition waste (100)	Foundry sand (20)	Imported cover materials (100)	Asbestos (1.5)
Inert non-flammable industrial waste (8)	Contaminated demolition waste (30)																					
Ash (5)	Iron oxide (7.5)																					
Gypsum (180)	Effluent treated sludge (72)																					
Settling pit sludge (8)	Solid still residues (8)																					
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Inert construction and demolition waste (100)	Foundry sand (20)																					
Imported cover materials (100)	Asbestos (1.5)																					

- 4.2.3 The approximate extent of each of the above landfills is shown on Drawing 2311/10 in Appendix B to this report. The former golf course tip extends across an area of about 6 hectares (c. 8% of the total site area) in the far-east of the site.
- 4.2.4 No significant monitoring information was made available to Lithos, but during the walkover several gas/water monitoring wells with discarded monitoring equipment (bailers and waterra pipe) were noted around the area. Therefore it seems likely that monitoring has been carried out, or is ongoing.

Bradley golf course (within site boundary)

- 4.2.5 The following anecdotal information was provided by the greenkeepers.
- 4.2.6 Materials were tipped included 'black bag' domestic waste. Waste was tipped both into hollows where historical quarrying had occurred, and onto natural ground, effectively raising the sites levels by several meters.

- 4.2.7 On completion of landfilling the east of the site was smooth and level. However, over subsequent years the area has settled unevenly resulting in hummocky topography. Ground movement was described as ongoing and staff suggested that the change was noticeable from season to season.
- 4.2.8 Shallow excavations (for drainage and planting trees and shrubs) are suggested to predominantly encounter ash sand with miscellaneous waste. The staff noted that trees/shrubs growth appeared to be unaffected by the underlying waste.

The Control of Pollution Act 1974

- 4.2.9 Landfilling in the far-east of Bradley Golf Course pre-dates the Control of Pollution Act 1974. Prior to 1974 legislation on waste disposal had focussed on public health with no concern for wider environmental issues related to leachate and landfill gas. There was no classification of waste and no control over what types of waste were deposited in landfill sites. There are numerous stories of dead cows, chemical drums, etc. being deposited in such landfill sites.
- 4.2.10 Sites were usually capped off with a layer of soil to cover the waste without consideration of controlling gas emissions or rainfall infiltration. The Control of Pollution Act 1974 was the first major legislation to control the operation of landfill sites with an emphasis on environmental protection. It led to the creation of Waste Collection Authorities and introduced licensing for waste disposal facilities. The Act led to the introduction of waste classification and the first controls on what type of waste landfill sites could accept.
- 4.2.11 The act also required consideration of the wider environmental effects of waste disposal due to leachate generation.
- 4.2.12 At this time, "dilute and disperse" was still an accepted practice, most landfills were not lined and large volumes of degradable waste were placed in unlined pits in permeable soils (the worst conditions for landfill gas and leachate generation and migration). Co-disposal of hazardous waste with other types was also an accepted practice and so some domestic refuse sites from this time contain a wide range of hazardous materials.
- 4.2.13 In 1980, the Control of Pollution (Special Waste) Regulations were implemented under the Control of Pollution Act 1974. These defined hazardous waste through toxicity criteria and concentration of chemicals or substances. They retained the need (from the Deposit of Poisonous Waste Act 1972) to pre-notify the waste regulation authorities before moving special waste to pre-determined disposal sites.
- 4.2.14 In 1989, the first edition of Waste Management Paper 27 was published by the Department of the Environment. Updated in 1991, and now superseded by the Environment Agency's guidance on the management of landfill gas (LFTGN 03, 2004), this provided the first guidance on managing landfill gas emissions from landfill sites.

Bradley park tip (adjacent to north eastern boundary)

- 4.2.15 Landfilling was ongoing at the time of walkover and a moderately steady stream of tipper trucks visited the landfill via Low Quarry Road. Lorries drove up a long ramped dirt road and tipped material directly onto top of the tip. Waste was then distributed by a tracked 360° excavator and heavy roller.
- 4.2.16 Several complaints have been made by golf course staff to Kirklees Council regarding the adjacent landfill producing dust and fine debris which blows across onto the golf course greens. The staff suggested that the greens were occasionally coloured purple and pink with fine dust during dry spells (assumed to be ash sand), and that they avoided cutting the greens during dry periods. A tractor and water bowser was noted to be present on the adjacent landfill during the walkover.

4.2.17 Landfilling is believed to have significantly raised ground above original levels. Anecdotal information suggests that it was formerly possible to see the River Calder and the canal from the golf course's north eastern boundary; both are topographically lower than the site and c. 0.5km north.

Planning & development

4.2.18 Current Environment Agency guidance on the management of landfill gas (LFTGN 03, 2004) which provides an update to Waste Management Paper 27.

4.2.19 The Town and Country Planning (General Development Procedure) Order 1995 (GDPO) (as amended) requires planning authorities to consult with the Environment Agency (EA) before granting planning permission for development within 250 metres of land which is being used for the deposit of waste (or has been at any time in the previous 30 years).

4.2.20 The EA has developed 'standing advice' to enable LPAs to make decisions on planning applications for hard development within 250 metres of a 'licensed' or 'permitted' landfill without consulting the EA. The standing advice should be a material consideration in determining the planning application, as would advice received from the EA under Article 10(5) of the GDPO.

4.2.21 For landfill sites that are no longer licensed or permitted, the EA holds information that it can provide to local authorities to aid decision-making on relevant planning applications. However, local authority records for landfill sites that closed prior to the requirements of waste management licensing regime are likely to be more complete than those held by the EA.

4.2.22 Given the presence of landfilled ground in the far-east, and proximity to the currently operational Bradley Park Tip, a robust ground gas investigation will be required. Such investigation should be undertaken in accordance with current UK guidance, most notably:

- CIRIA C665 (2007) – Assessing risks posed by hazardous ground gases to buildings
- BS 8485:2015 – Code of Practice for the characterisation & remediation from ground gas in affected developments
- BS8576:2013 Guidance on investigations for ground gas – permanent gases and volatile organic compounds
- Boyle & Witherington (2007) – Guidance on evaluation on development proposals on sites where methane and carbon dioxide are present, incorporating "traffic lights". Report Ref. 10627-R01-(02), for NHBC
- Wilson, Card & Haines (CIEH, 2008) The Local Authority Guide to Ground Gas

4.2.23 In addition to concerns associated with landfill gas there may be issues associated with:

- The adjacent operational landfill (Bradley Park Tip), including:
 - emissions of dust and odours;
 - wind-blown material;
 - noise and traffic;
 - birds, vermin and insects;
 - the formation of aerosols;
 - fires
- The potential for the far-east of the site to be classified as Contaminated Land under Part IIA of the Environmental Protection Act 1990
- Geotechnical issues (if development over landfilled ground were considered), including:
 - potential for settlement of land around piled dwellings
 - damage to underground services, especially drainage caused by uneven settlement

4.3 Geology

4.3.1 Solid geology beneath the site is summarised in the table below:

Geological unit/Member/Formation			
	Geological Name	Area of the site	Bedrock type
Youngest	Clifton Rock	East	Fine grained cross bedded sandstone
↑	Lower Coal Measures	West and north	Interbedded mudstone, siltstone and sandstone
	Clifton Rock	East	Fine grained cross bedded sandstone
	Lower Coal Measures	West and north	Interbedded mudstone, siltstone and sandstone
	Crow Coal	Centre and east	Coal
	Lower Coal Measures	West and north	Interbedded mudstone, siltstone and sandstone
	Unnamed Sandstone unit	Far west	Likely fine to medium grained sandstone
	Lower Coal Measures	West and north	Interbedded mudstone, siltstone and sandstone
	Black Bed Coal	Centre and north	Coal
	Lower Coal Measures	West and north	Interbedded mudstone, siltstone and sandstone
	Thick Stone	Central south	Fine grained Sandstone
	Lower Coal Measures	West and north	Interbedded mudstone, siltstone and sandstone
	Oldest	Unnamed Sandstone	Far west

4.3.2 Two geological faults cross the site as summarised below:

- Crosses the west of the site orientated roughly 330° north to south, downthrowing to the east.
- Crosses the north east of site orientated roughly 180° east to west ; downthrows 8m to the south.

4.3.3 No drift deposits are shown across the site on BGS mapping. Therefore it is likely that bedrock is overlain by a veneer of residual soils (probably gravelly clay or clayey gravel).

5 COAL & MINING

5.1 Background

5.1.1 In July 2011 the Coal Authority (CA) formalised their requirements in relation to planning applications and introduced some new terminology relating to coal mining development areas. This Section provides the necessary mining risk assessment required by the proposed planning application.

5.1.2 Geological maps and BGS Technical Report suggest that 4 coal seams underlie the site at shallow depth. These are the:

- Crow Coal: 0.5m thick, outcropping in the east, and underlying about 16 ha (c. 20%) of the site in the east.
- Black Bed Coal: 0.8m thick, outcropping across the centre of the site, and underlying about 35 ha (c. 45%; eastern half of the site). Lies about 10m below the Crow Coal.
- Better Bed Band Coal: a thin seam; about 35m below the Crow Coal.
- Better Bed Coal: 0.5m thick, outcropping just beyond the site's northern boundary, and underlying the entire site. Lies about 45m below the Crow Coal.

5.1.3 Approximate outcrops are shown on Drawing 2311/6.

- 5.1.4 It should be noted that seam outcrops plotted on geological maps have been known to be inaccurate by distances in excess of 100m.
- 5.1.5 About half of the site (central, south & far-east) lies within a Low Risk Area - within the defined coalfield, but no known defined risks have been recorded by the CA; there may still be unrecorded issues.
- 5.1.6 However, land close to the conjectured outcrops of the Crow and Black Bed coals are shown to lie within High Risk Areas - areas with specific mining legacy risks to the surface, including mine entries; shallow coal workings etc.
- 5.1.7 A CA mining report states that:
- *The property is in the likely zone of influence from workings in 2 seams of coal at shallow to 100m depth, and last worked in 1917. This means that there are historical mineworkings beneath the site.*
 - *The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.*
 - *However reserves of coal exist in the local area which could be worked at some time in the future*
 - *Within, or within 20m of the boundary of the property there are 15 mine entries. The approximate locations of these entries are shown on Drawing 2311/6.*
 - *The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.*
 - *The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.*
 - *There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.*
 - *The property is not in an area for which a notice of entitlement to withdraw support has been published.*

5.2 Recorded mineworkings

- 5.2.1 The site is underlain by known workings from 3 collieries: the Anchor Pit Colliery (working the Better Bed Coal); the Bradley Park Colliery (working the Better Bed Coal); and the Cookson Colliery (working the Black Bed Coal).
- 5.2.2 Abandonment plans have been obtained from the Coal Authority and are reproduced in Drawings 2311/8 to 2311/8c in Appendix B to this report. These plans clearly show the royalty dates and associated areas but these may not reflect actual worked areas. Liaison with the Coal Authority indicates that they consider the workings shown to most likely be pillar and stall due to the fact that the workings are extremely shallow and it would therefore be impossible to totally extract the coal by longwall mining.
- 5.2.3 The plans show that the Better Bed Coal Seam has been worked extensively beneath approximately 40% of the site in the east; see Drawing 2311/8a and 2311/8c. The plans also show workings within the Black Bed Coal Seam (approximately 10% of the site area beneath the centre of the site), but with old workings shown east of the recorded workings; see Drawing 2311/8b.
- 5.2.4 The abandonment plan shown on Drawing 2311/8 is different to those shown on Drawings 2311/8A to /8C, as it is based on a District plan and shows workings by different companies; it is a composite plan depicting workings in the general area.
- 5.2.5 Abandonment plans also show dayholes associated with historic mining within the Anchor Pit.

5.3 Unrecorded mineworkings

- 5.3.1 Coal has been mined in Yorkshire for centuries, and there are also likely to be unrecorded mineworkings which pre-date the requirement for abandonment plans (Coal Mines Regulation Act of 1872). Early mining methods included drifts or adits from outcrop. Where mining extended further from the crop, bell pits were often sunk, and as the coal got deeper still, shafts were used to access gallery workings (pillar & stall).
- 5.3.2 The shafts associated with bell pits are typically only about 1.2m in diameter, and the bell pit itself was typically 5m to 10m in diameter (bell pit size would have been constrained by roof stability). Consequently, bell pits are often closely spaced; the most intensive concentration of shafts recorded to date (66 per acre) was at the Middleton Broom Opencast site.
- 5.3.3 As coal was removed during bell pitting, the unsupported strata above assumed an inverted slope of stability, generating a bee-hive shape around the base of the shaft which forms the characteristic vertical section. The depth limit of bell pit mining is almost certainly 15m, and this is considered a deep bell pit; the vast majority were probably less than half this depth.
- 5.3.4 At greater depths, pillar and stall workings appear to have been the preferred method, and such workings were often accessed via a single shaft. Consequently, shafts associated with such workings are more widely spaced; but rarely exceeded one quarter of a mile (400m) shaft to shaft, due to problems with ventilation and underground haulage. It was customary to view the life expectancy of an individual pit as about three to five years and at any one time several new pits would be sinking to replace those currently operating.
- 5.3.5 Up until the last decades of the eighteenth century, coal mining almost always represented a short-term interruption to ongoing use of land for agricultural. The right to sink shafts and extract coal was usually conditional upon restoration of the surface after coal extraction was complete. This not only involved filling the shaft, but also required that any subsequent settlement of shaft fill material did not result in depressions in the field surface. Consequently, it was usual to fill the shaft and heap excess arisings into a dome over the shaft eye. Over subsequent years, the dome supplied material to compensate for settlement of the shaft fill. In the normal course of events, at the conclusion of the recovery period, any remaining spoil accumulations above ground level would have been planed-off to leave a relatively stable, level surface where the shaft had been.
- 5.3.6 Bell pits may be present at Bradley Park. If they are, given the likely depth constraints discussed above, it seems likely they will be limited to land immediately east of the Crow and Black Bed coals.
- 5.3.7 Given the absence of loose superficial deposits, it is considered unlikely that any shallow mine entries at Bradley Park would have been lined.
- 5.3.8 Faults are believed to present beneath the land at Bradley Park. Faults are usually bordered by a shatter zone where the coal is degraded. The nature and extent of a shatter zone varies according to the intensity of the faulting. Early and modern mining practice was to leave the coal in the shatter zone untouched as it was of little economic value. Thus there is usually a margin between the workings and the fault, which based on observations elsewhere might be about 60m wide (30m either side of the fault).

5.4 Mine entries (shafts & adits)

5.4.1 The site has 15 known mine entries within, or within 20m of, its boundary. The location of mine entries across the site are taken from both the Coal Authority mining report and abandonment plans and are shown on Drawing 2311/6 in Appendix B. Of these:

- 5 are located close to the site's northern boundary, likely targeting the Better Bed coal;
- 8 located close to the outcrop of the Black Bed seam; 6 of these lie within about 250m of the golf clubhouse, to the east;
- 2 are located close to the site's eastern boundary.

5.4.2 Mine entry information has been procured from the Coal Authority and is summarised in the table below:

Mine entry CA Reference	Source	Remarks – type, treatment, depth ect	Location (NGR)
415421-003	Abandonment Plan	Adit – probable azimuth of 149° to the south east.	SE 15484 21009
415421-002	Abandonment Plan	Shaft – 3.3m to base.	SE 15506 21004
415420-008	Abandonment Plan & BGS map	Shaft – 45.7m to base. Likely extracted the Better Bed Coal.	SE 15827 20885
415420-007	Abandonment plan	Shaft – no further details.	SE 15815 20886
415420-009	Abandonment Plan	Shaft – no further details.	SE 15890 20877
415420-010	Abandonment Plan	Shaft – no further details.	SE 15988 20762
416420-014	Abandonment Plan	Adit – probable azimuth of 9° to the north.	SE 16050 20666
416420-015	Abandonment Plan	Shaft – no further details.	SE 16084 20690
415421-009	BGS map	Shaft – no further details.	SE 15798 21167
415421-005	Abandonment Plan	Shaft – no further details.	SE 15980 21263
415421-007	BGS map	Shaft – no further details.	SE 15995 21266
416421-003	Abandonment Plan	Shaft – no further details	SE 16095 21264
416421-004	Abandonment Plan & BGS map	Adit – probable azimuth of 206° to the south.	SE 16129 21290
416421-023	Abandonment Plan & BGS map	Shaft – no further details.	SE16421 21188
416421-009	416421-023	Abandonment Plan & BGS map	SE 16689 21018

5.4.3 It is worth noting that CA shaft positions are often only approximate, and in some cases the same shaft has been recorded in multiple locations, or some other feature such as a chimney has erroneously been recorded as a shaft.

5.5 Mining risks

5.5.1 Risks associated with shallow mineworkings include:

- Mines gas
- Combustion
- Collapse, with consequent subsidence affecting surface stability
- Recorded, and unrecorded, mine entries

Mining risks – gas

5.5.2 Gas monitoring and a hazardous gas risk assessment will be required; see Sections 4.2 & 7.3.

Mining risks – combustion

- 5.5.3 Where coal is exposed during any site preparatory earthworks, or within excavations, care should be taken to avoid the potential for spontaneous coal combustion.
- 5.5.4 If any foundation excavation comes into contact with coal, the foundation should be taken through the coal seam, into underlying natural in-situ strata of adequate bearing. The full thickness of coal should then be sealed with mass concrete fill placed as soon as possible after exposing the seam to prevent the ingress of air.
- 5.5.5 By virtue of the provisions of the Coal Industry Act 1994 interests in unworked coal and coal mines previously vested in the British Coal Corporation are now vested in the Coal Authority. Lateral will need to contact the Coal Authority to dig or carry away such coal as they encounter in connection with redevelopment of the site (this is often referred to as incidental coal).
- 5.5.6 Any ground investigation and/or drilling for grouting purposes should be carried out to HSE and Coal Authority guidelines to minimise the risk of coal combustion and potential for migration of mine gases into neighbouring properties.

Mining risks – mine entries

- 5.5.7 The Coal Authority hold records of 15 known mine entries on the site, all of which are believed to remain uncapped. It is possible that in addition to these known entries several unrecorded mine entries, possibly including bell pits exist.
- 5.5.8 The Coal Authority discourage development over or adjacent to shafts. However, such features are typically of less concern where they only extend to relatively shallow seams. The recommended no build zone around deep shafts is usually defined by a line drawn up at 45° from the top of the shaft, where it intercepts rock head.
- 5.5.9 Once located, each shaft should be accurately located by grid co-ordinates, proved to its base, pressure grouted and then be capped off at rockhead level. A shaft cap is generally required to be twice the shaft diameter and designed to support the depth of fill above plus any surcharge loads. Detailed cap design is beyond the scope of this report but should also include gas venting measures.

Mining risks – surface stability

- 5.5.10 Mineworkings in the Crow, Black Bed and Better Bed coals, which could affect surface stability, are present beneath the site. Coal is likely to have been extracted by pillar & stall methods.
- 5.5.11 In addition there may also have been earlier, unrecorded mineworkings via bell pits and/or pillar and stall methods, and if present these could result in unpredictable subsidence. Individual pillars may collapse at any time, leading to settlement in the overlying strata. As the mine roof degrades and collapse the void migrates upwards, sometimes causing a surface collapse or crown hole.
- 5.5.12 The vertical distance through which a void can migrate is difficult to assess. Made ground and superficial deposits are considered to have no inherent strength and the assumption is generally made that if a void reaches the base of these formations, it will reach the surface.

- 5.5.13 CIRIA ('Construction over abandoned mine workings', 1989) suggest a thickness of solid rock through which a void can migrate as $7h$ to $10h$ above the roof of the workings, where h is the height of the workings (generally assumed to be similar to the seam thickness; i.e. about 1m). The succession here is likely to comprise a mixed sequence of siltstones and mudstones and it is therefore considered appropriate to assume a figure of $10h$ (i.e. about 10m of bedrock, plus any overlying residual soil and made ground) for void migration calculations.
- 5.5.14 Mitigation of the risks posed by the shallow mineworkings will be required, and this could be achieved in one of two ways:
- Extraction of the remaining coal
 - Consolidation, via drilling & grouting

5.6 Coal extraction

- 5.6.1 Prior extraction of coal is encouraged by both the Coal Authority and Planning Authorities, largely because a potential mineral resource will not be sterilised by the development.
- 5.6.2 The Extraction Contractor would pay the landowner a disturbance allowance for the coal. Consequently, there could be a significant financial benefit to this approach, since in essence much of the proposed earthworks would be undertaken and there would be a considerable saving because grouting would not be required.
- 5.6.3 Coal extraction could be completed within about 12 months, and would include redistribution of the excavated materials to an engineered specification as required by the final earthworks model.
- 5.6.4 In order to pursue this option, it will be necessary to obtain a statutory licence from the Coal Authority.
- 5.6.5 In addition to commercial and planning considerations, advantages of coal extraction over grouting include the removal of development constraints associated with known mine entries. Traffic movements (associated with coal export) are expected to be no greater than those associated with grouting (import of PFA and cement).

5.7 Drilling & grouting

- 5.7.1 If shallow coal seams are not entirely removed by prior extraction, then it may be necessary to consolidate the mineworkings by drilling and grouting.
- 5.7.2 The necessary consolidation should be achieved by drilling holes on an appropriate grid (likely 3m to 5m spacings). A viscous grout composed of appropriate proportions of OPC, PFA, sand or pea gravel would then be injected into the workings via these holes.
- 5.7.3 Drilling and grouting operations should be carried out with engineering supervision, and be undertaken in accordance with a revision of Lithos' "General Specification for the Treatment of Shallow Mineworkings" tailored to the site-specifics associated with this site.
- 5.7.4 Proposals to treat the mineworkings and shafts will need to be discussed with both Kirklees Council (most notably Highways), and the Coal Authority well in advance of starting works on site.

5.8 Local Authority policy requirements

Mineral safeguarded areas

- 5.8.1 The site is underlain by coal and might therefore be considered by the Local Authority to lie within a Mineral Safeguarding Area (MSA).
- 5.8.2 MSAs are areas of known mineral resources that are of sufficient economic or conservation value to warrant protection for generations to come. The purpose of MSAs is not to preclude automatically other forms of development, but to make sure that mineral resources are adequately and effectively considered in land-use planning decisions.
- 5.8.3 Specialist guidance on Mineral Safeguarding "A Guide to Mineral Safeguarding in England" has been produced by The Coal Authority and the British Geological Survey.
- 5.8.4 Paragraph 143 of the National Planning Policy Framework (NPPF) requires Local Authorities, when preparing Local Plans to:
- Define Minerals Safeguarding Areas and adopt appropriate policies in order that known locations of specific minerals resources of local and national importance are not needlessly sterilised by non-mineral development, whilst not creating a presumption that resources defined will be worked; and define Minerals Consultation Areas based on these Minerals Safeguarding Areas.
 - Set out policies to encourage the prior extraction of minerals, where practicable and environmentally feasible, if it is necessary for non-mineral development to take place.
- 5.8.5 NPPF Paragraph 144 notes that when determining planning applications, local planning authorities should give weight to the benefits of the mineral extraction.
- 5.8.6 As a consequence of the NPPF, and the presence of coal beneath the site, the Local Authority may require Kirklees Council to consider the opportunity to recover (extract) the coal. Applicants submitting planning applications may need to demonstrate to the Local Authority that they will extract the coal, unless:
- It can be shown it is not economically viable to do so, or
 - It is not environmentally acceptable to do so, or
 - The need for the development outweighs the need to extract the coal, or
 - The coal will not be sterilised by the development

Kirklees Council Policy

- 5.8.7 The Council have a Unitary Development Plan (UDP), adopted in 1999 with some revision in 2007. Section 6.10 (Minerals) of the UDP notes that: *"In West Yorkshire opencast coal mining is concentrated in Leeds and Wakefield Districts. There has not been an operational opencast coal mine in Kirklees since 1984 perhaps because the local geology is more difficult and because of the extent of previous extraction in the exposed coalfield within Kirklees during the 1950's and 1960's. Unlike aggregates there is no national or regional guidance on the level of production required or where it should be met; MPG3 leaves that to market forces. For these reasons no allocations for opencast coal mining are considered necessary."*
- 5.8.8 However, Kirklees Council has to comply with national planning policy to extract coal where it is feasible in order to avoid sterilisation caused by building over it. In essence Section 6.10 is concerned with coal extraction where no subsequent development is proposed; this is quite different to the NPPF scenario with its emphasis on avoiding sterilisation of coal reserves.

6 LAND CONTAMINATION - PART IIA & PLANNING

- 6.1.1 Local Authorities have responsibilities with respect to land contamination in the context both of Part IIA of the Environmental Protection Act 1990, and Planning.
- 6.1.2 The contaminated land regime in Part IIA was introduced specifically to address the historical legacy of land contamination. It applies where there is unacceptable risk, assessed on the basis of the current use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission. This is primarily a task for the planning system, which aims to control development and land use in the future.

Planning

- 6.1.3 As of 27th March 2012, Planning Policy Statement (PPS23) was replaced by the National Planning Policy Framework (NPPF). The NPPF includes the following with respect to contamination and site investigation:
- 6.1.4 'Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.
- 6.1.5 Planning policies and decisions should ensure that:
- The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses, and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;
 - After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the environmental protection act 1990; and
 - Adequate site investigation information, prepared by a competent person, is presented'.
- 6.1.6 Annex 2 of the NPPF states that 'all investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175 - 2011, Code of Practice for the Investigation of Potentially Contaminated Sites)'.

This site

- 6.1.7 The underlying Coal Measures geology is classified as a Secondary A aquifer. The nearest surface watercourses are 3 tertiary rivers which issue on site and flow away from site. Therefore, the site's environmental setting is considered to be of moderate sensitivity.
- 6.1.8 With respect to human health, the proposed end use (residential) is also sensitive.
- 6.1.9 Historical use of the site as farmland and current use of the site as a golf course is considered unlikely to have produced significant contamination. However, historical processes on/near site have included: mining; coke ovens; and landfilling, and all these may have given rise to significant contamination.
- 6.1.10 It is considered that the majority of the site should be suitable for the proposed use subject to implementation of appropriate preparatory works. However, the far-east which is underlain by landfill is unlikely to be suitable for residential redevelopment.

7 GROUND INVESTIGATION DESIGN

7.1 Anticipated ground conditions & potential issues

7.1.1 Based on the data reviewed in Sections 4 (Environmental Setting) and 5 (Coal), anticipated ground conditions are expected to comprise:

Anticipated condition	Remarks
Made ground	Veneer of made ground within vicinity of Bradley Villa Farm, Golf clubhouse & car park, and historical coke ovens. Deep made ground comprising landfill waste (household, commercial & industrial) in the far-east.
Natural soils	Topsoil over majority of the site. Veneer of residual soils (likely 1m to 2m thick) comprising gravelly clay/clayey gravel.
Bedrock	Coal Measures sandstone, siltstone and mudstone from about 2m depth.
Mineworkings	Considered highly likely beneath at least parts of the site.
Groundwater	Likely at depth within bedrock.

7.1.2 Based on the data above and that in Sections 2 (Site Description) and 3 (History), potential ground-related issues associated with this site are likely to include:

Type of issue	Specific issue	Remarks
Potential on-site contamination sources	1. Landfill (on & adjacent to site) 2. Former coke oven 3. Made ground (golf course & buildings)	
Potential off-site contamination sources	1. Adjacent landfill	1. Migration of hazardous ground gas
Potential geotechnical hazards	1. Shallow mineworkings 2. Mine entries (shafts, adits ect)	1. & 2. Ground instability where workings are near surface
Other potential constraints	1. Overhead electricity utilities	1. Expensive to divert, likely to require easement during planning and construction stages.

7.2 Preliminary conceptual site model

7.2.1 A preliminary conceptual site model, presented as Drawing No 2311/7 in Appendix B, has been prepared after consideration of all the data presented in Sections 2 to 5 inclusive of this report.

7.2.2 An assessment of potential contaminants associated with the former uses has been undertaken with reference to CLR8 and the following DETR Industry Profiles; Gas works, coke works and other coal carbonisation plants; and Waste recycling, treatment and disposal sites. As a consequence of this assessment, anticipated potential contaminants, within soil and/or groundwater include:

- Coke Ovens:
 - Metals; arsenic, cadmium, lead, manganese, magnesium, etc
 - PAH's
 - Sulphates, sulphides, cyanides, ammoniacal compounds
 - ash, clinker & coal dust/waste
- Landfill:
 - Contaminants too varied to list comprehensively

7.2.3 Historical plans show that parts of the site has been occupied by arable farmland which is not considered likely to have caused significant ground contamination. Nonetheless, activities such as slurry spreading, the discharge of chemicals to ground, and unregulated burial have all occurred on farmland. Potential pollutants associated with farming activity might include any of the following:

Agricultural activity	Potential contaminant
Sewage farming, slurry spreading	Methane, metals, nitrates, oxygen depletion
Carcase burial	Anthrax & other biohazards
Crop & animal protection	Pesticides & herbicides
Timber processing/treatment	Metals, PAH, chlorinated organics
Soil conditioners	Metals, sulphates, PAH
Equipment maintenance	Hydrocarbons, metals
Waste burial, land levelling, backfilling ponds/quarries	Methane, metals, PAH etc
Naturally occurring contaminants	Arsenic, metals

7.2.4 Potential pollutant linkages are shown on the preliminary conceptual site model.

7.3 Ground investigation design & strategy

7.3.1 The preliminary conceptual site model has used as a basis for design of an appropriate ground investigation, the scope of which is summarised below.

Exploratory holes	Purpose
About 300 Trial Pits	To determine the general nature of soils underlying the site, including the: <ul style="list-style-type: none"> nature, distribution and thickness of shallow soils, including any made ground suitability of the ground for founding structures and highways
About 20 Trial Pits	To determine the general nature of soils underlying areas underlying the former farm buildings and coke ovens, including the: <ul style="list-style-type: none"> nature, distribution and thickness of made ground nature, degree and extent of contamination proportion of undesirable elements eg biodegradable matter, foundations etc suitability of the ground for founding structures and highways
About 30 Trial Pits	To determine the depth, extent and nature of fill within the areas of on-site landfill.
About 100 Probeholes	To check for the presence of voids or broken ground associated with possible unrecorded shallow mine workings. To install monitoring wells across the site in order to monitor for hazardous gas and to determine groundwater levels.
About 20 Boreholes	To determine the depth, extent and nature of fill within the areas of on-site landfill. To install monitoring wells across the site in order to monitor for hazardous gas and to determine groundwater levels.

7.3.2 Proposed exploratory hole locations should be selected to provide a representative view of the strata beneath the site and to target potential areas of interest. A nominal 50m grid spacing should be appropriate, with additional exploratory locations scheduled as necessary in light of the ground conditions actually encountered.

7.3.3 Exploratory holes within areas on landfill must be advanced with care in order to avoid opening contaminant pathways (both to groundwater and the general public).

7.3.4 Representative soil samples of natural and any man-made ground should be taken during the works. The number of soil samples taken should be reflective of the geological complexity actually encountered, but in general about 3 samples should be taken from most exploratory holes.

- 7.3.5 The investigation should be undertaken in general accordance with:
- BS5930:2015 "Code of practice for site investigation"
 - BS10175:2011+A1:2013 "Code of practice for the identification of potentially contaminated sites"
 - "Technical Aspects of Site Investigation" – EA R&D Technical Report P5-065/TR (2000)
 - "Development of appropriate soil sampling strategies for land contamination" – EA R&D Technical Report P5-066/TR (2001)
- 7.3.6 The in-situ shear strengths of any cohesive soils encountered should be determined by use of a hand-held shear vane.
- 7.3.7 The potential for soakaways should be reviewed in light of ground conditions actually encountered, and if considered possible, soakaway tests should be commissioned. Testing would also remove any ambiguity with respect to Yorkshire Water queries.
- 7.3.8 Routine geotechnical soils analysis (moisture content, Atterberg limits, pH, water soluble sulphate) should be scheduled on about 50 samples.
- 7.3.9 Within 'greenfield' areas of the site testing of potentially contaminated samples should only be required if made ground is encountered in the exploratory holes. Analysis of topsoil (for pH, metals, TOC, speciated PAH and asbestos ID) should be undertaken in order to confirm its suitability for re-use.
- 7.3.10 Within 'brownfield' areas, analysis of made ground should be undertaken in order to assess the nature (if any) of contamination beneath the site. Appropriate chemical analyses is likely to comprise about 100 samples for a suite including heavy metals, cyanide, sulphide, sulphate, asbestos ID, TOC, phenols, banded TPH (with supplementary speciation where appropriate), and speciated PAH.
- 7.3.11 100 probeholes should be sufficient to assess the feasibility of prior extraction of coal and/or *determine* whether old mineworkings in the Crow, Black Bed and Better Bed are present and pose a significant risk to surface stability of the site
- 7.3.12 At least 3 holes should be cored through each of the 3 coal seams, and 1 sample of coal from each cored borehole be analysed to determine its quality, elemental ash and NOX.
- 7.3.13 It will be necessary to submit an application (with the associated fee) to the Coal Authority (CA) for '*Permission to enter CA mining interests*'.
- 7.3.14 Given the size of the site it should be possible to advance probeholes at least 50m from surrounding properties; therefore air-mist should be a suitable flushing medium for probeholes.
- 7.3.15 The generation potential of potential gas sources (adjacent landfill and shallow mineworkings) is considered likely to be High. Therefore, in accordance with CIRIA Report C665, it would be prudent to initially allow for 24 visits over a 12 month period. Revision of this monitoring programme should be possible in light of actual masterplan proposals.
- 7.3.16 On completion of the fieldwork and laboratory testing a comprehensive bound, factual and interpretative report should be issued. This should contain detailed engineering records, laboratory test results, copies of all relevant correspondence and drawings of the site. The report should also include qualitative risk assessment with respect to both controlled waters and human health.

8 CONCLUSIONS & RECOMMENDATIONS

8.1 General

- 8.1.1 It is understood the site is being considered for redevelopment; initially 10 hectares has been allocated for housing, but ultimately around 2,000 homes may be built.
- 8.1.2 The main issues considered in this report are based on a review of historical maps and available geological/environmental data. This report provides an assessment of geoenvironmental issues and implications associated with the proposed residential redevelopment of the site, together with any implications for current use of the site.
- 8.1.3 Ideally, the proposed masterplan would take account of constraints identified to date. Most notably, residential development on, and within 50m of, landfilled ground in the far-east (former golf course tip) which extends across an area of about 6 hectares (c. 8% of the total site area), should be avoided. Ground-related abnormal costs will also be higher where development in areas (centre-east and north of the site) underlain by shallow mineworkings are proposed.
- 8.1.4 With regards to the mine entries, there is no merit in avoiding these features when developing a masterplan due to their potential inaccuracy on Coal Authority plans. Mine entries should be located during an intrusive phase of investigation then minor revisions made to layout proposals in order to avoid such features.

8.2 Mining and quarrying

- 8.2.1 This site is located within both Coal Mining Development Low and High Risk Areas; about 50:50.
- 8.2.2 It is known from Coal Authority abandonment plans that there are workings beneath the site. Furthermore, 15 mine entries are recorded within, or within 20m of, the site boundary.
- 8.2.3 The Coal Authority discourage development over or adjacent to shafts. However, such features are typically of less concern where they only extend to relatively shallow seams. The recommended no build zone around deep shafts is usually defined by a line drawn up at 45° from the top of the shaft, where it intercepts rock head.
- 8.2.4 Mineworkings in the Crow, Black Bed and Better Bed coals, which could affect surface stability, are present beneath the site. Coal is likely to have been extracted by pillar & stall methods. There may also have been earlier, unrecorded mineworkings via bell pits and or pillar and stall methods. Pillar and stall can result in unpredictable subsidence.
- 8.2.5 If mineworkings in the Crow Coal, Black Bed and/or Better Bed coal seams are considered to pose a significant risk to surface stability, mitigation of the risks posed will be required; this could be achieved in one of two ways:
- Extraction of the remaining coal
 - Consolidation, via drilling & grouting

8.3 Hazardous gas

- 8.3.1 Given the presence of landfilled ground in the far-east, and proximity of the site to the currently operational Bradley Park Tip, a robust ground gas investigation will be required.
- 8.3.2 Protective gas measures will almost certainly be required for new buildings across this site.
- 8.3.3 The site is also underlain by shallow mineworkings, although it is not in an area known to be susceptible to mine gas emissions.

8.3.4 Public Health England UK radon map indicates that radon protection measures are not required for new dwellings at the site.

8.4 Potential development constraints

8.4.1 In addition to concerns associated with shallow mineworkings, mine entries, and landfill gas there may be issues associated with:

- The adjacent operational landfill (Bradley Park Tip), including:
 - emissions of dust and odours;
 - wind-blown material;
 - noise and traffic;
 - birds, vermin and insects;
- The potential for the far-east of the site to be classified as Contaminated Land under Part IIA of the Environmental Protection Act 1990
- Geotechnical issues (if development over landfilled ground were considered), including:
 - potential for settlement of land around piled dwellings
 - damage to underground services, especially drainage caused by uneven settlement

8.4.2 Overhead utilities may present a potential constraint unless they can be relocated.

8.5 Foundations

8.5.1 Geological maps suggest the site will be underlain by a veneer of residual soil over Coal Measures bedrock (interbedded mudstone, siltstone and sandstone). Deep made ground is anticipated in the far-east, associated with an area of former landfill.

8.5.2 At present, no geotechnical ground investigation data is available and consequently it is only possible to estimate the ground conditions. Before firm foundation recommendations can be given, it will be necessary to undertake an appropriate ground investigation. However, tentative recommendations are provided below.

8.5.3 Made ground is not generally considered a suitable founding material and foundations should be taken through it, into underlying natural in-situ strata of adequate bearing capacity.

8.5.4 In the south and west of the site, beyond the influence of shallow mineworkings, weathered Coal Measures should provide sufficient bearing capacity to enable the adoption of strip footings for two storey housing. Reinforcement, as a precaution against differential settlement, is recommended only where foundation excavations encounter significant lateral and vertical variations in strata.

8.5.5 In the north and east of the site appropriate foundation solutions will be largely determined by how risks associated with shallow mineworkings are mitigated.

8.5.6 If **grouting** is preferred, NHBC typically require foundations to be strengthened. Footings will probably need to be at least 300mm thick, and reinforced top and bottom with a layer of mesh.

8.5.7 If rock is encountered at shallow depth, foundations should be placed entirely on rock and not partially on rock and partially on residual soil. This may, depending on surface gradient, necessitate significant over deepening of foundations.

- 8.5.8 If **extraction** of coal is undertaken, this will entail the excavation of made ground, and natural strata to depths of up to about 20m, with excavated arisings being replaced in engineered layers (to an agreed Specification) after coal has been extracted. Rafts would likely provide the most appropriate foundation solution, after consideration of potential high wall issues.
- 8.5.9 A detailed 'end-product' type earthworks specification would be required and should be based on performance criteria such as anticipated/achievable safe bearing capacity and acceptable settlement along with consideration of the potential for inundation settlement.
- 8.5.10 The NHBC will require post fill placement settlement monitoring using in-situ plate gauges and surface monitoring stations. They will likely require a post-fill placement monitoring period of at least six months in order to demonstrate that initial settlement has occurred ahead of any construction.

8.6 Highway, drainage and external works issues

- 8.6.1 Given the site's topography, there may be some need for retaining walls, tanking etc.
- 8.6.2 It is recommended that the developer contact Yorkshire Water Services with respect to capacity in existing foul and surface water sewers in the vicinity of the development area.
- 8.6.3 The suitability of soakaways for the disposal of surface water should be assessed via soakaway testing during the ground investigation. However, given anticipated ground conditions, testing might not yield satisfactory results.
- 8.6.4 Whilst the site may not lend itself to the adoption of discrete soakaways, ground might have the capacity to absorb surface water run-off, and systems which spread infiltration over a wider area (e.g. an infiltration basin, swales and/or pervious paving) may provide the best solution.
- 8.6.5 Alternative SuDS options (see CIRIA C697:2007 for further details) include:
- Swales – linear grassed features in which surface water can be stored or conveyed. Where suitable, swales can be designed to allow infiltration.
 - Infiltration basins – vegetated depressions designed to store runoff and infiltrate it gradually into the ground.
 - Rain-gardens - shallow landscape depressions with shrub or herbaceous planting.
 - Pervious Pavements – provide a surface suitable for pedestrian and/or vehicular traffic, while allowing rainwater to infiltrate into subsurface storage, with subsequent infiltration or controlled discharge. Pavement could be porous (water able to infiltrate across entire surface material; e.g. reinforced grass), or permeable (water infiltrates via joints between concrete blocks).
 - Ponds – designed to have permanent pool of water, but with capacity to provide temporary storage controlled discharge.
 - Reed beds and other wetland habitats that collect, store, and filter dirty water whilst also providing a habitat for wildlife.
- 8.6.6 SuDS rationale is to try to replicate natural systems that use cost-effective solutions, with low environmental impact, to drain away surface water run-off through collection, storage, and cleaning before allowing it to be released slowly back into watercourses.
- 8.6.7 SuDS solutions should be easy to manage, requiring little or no energy input (except from environmental sources such as sunlight, etc.), resilient to use, as well as being aesthetically attractive.

8.7 Contamination

- 8.7.1 The site's environmental setting is considered to be of moderate sensitivity. With respect to human health, the proposed end use (residential) is also sensitive.
- 8.7.2 Made ground is only expected within the vicinity of Bradley Villa Farm, the Golf clubhouse & car park, historical coke ovens and an area of landfill in the far-east. Some significant contaminated soils and possibly groundwater are likely; most notably in the vicinity of the landfill and coke ovens.
- 8.7.3 However, the majority of the site is greenfield and no significant contamination is anticipated. Nonetheless, activities such as the discharge of chemicals to ground and burning of waste may have occurred.
- 8.7.4 Consequently, a ground investigation is required in order to assess the degree and extent of any ground contamination, and enable the preparation of a Remediation Strategy.

8.8 Further investigation

- 8.8.1 Whilst the site is considered suitable for its current and proposed use, the proposed change in use will require intrusive investigation.
- 8.8.2 This would include:
- Machine-excavated trial pits to determine near surface ground conditions including depth to bedrock, the presence of obstructions, groundwater and stability
 - Soakaway tests
 - Geotechnical soils analysis to enable foundation recommendations
 - Chemical testing on soil, and if necessary groundwater, samples to assess the significance of contamination as a result of former land use
 - Rotary probeholes to confirm depths to coal and seam thicknesses in order to assess risks associated with possible old mineworkings and surface stability
 - Gas monitoring and risk assessment
- 8.8.3 An appropriate ground investigation strategy is presented in Section 7.3.

Appendix A
General Notes

General

Third party information obtained from the British Geological Survey (BGS), the Coal Authority, the Local Authority etc is presented in the "Search Responses" Appendix of this Geoenvironmental Report.

Geology, mining & quarrying

In order to establish the geological setting of a site, Lithos refer to BGS maps for the area, and the relevant geological memoir. Further information is sourced from the Local Authority and by reference to current and historical OS plans. A coal mining report is obtained from the Coal Authority (CA).

In July 2011, the CA formalised their requirements in relation to planning applications and introduced some new terminology. The CA, using its extensive records has prepared plans for all coalfield Local Planning Authorities, which effectively refines the defined coalfield areas into areas of higher risk (known as the Coal Mining Development Referral Area) and lower risk (known as the Standing Advice Area). The Coal Mining Development Referral Areas contain a range of specific mining legacy risks to the surface, including mine entries; shallow coal workings; workable coal seam outcrops; mine gas; geological features; and previous surface mining sites. The Standing Advice Area is the remainder of the defined coalfield. In this area no known defined risks have been recorded; although there may still be unrecorded issues.

Landfills

Lithos obtain data from the Landmark Information Group, the Environment Agency and the Local Authority with respect to known areas of landfilling within 250m of the proposed development site. Reference is also made to historical OS plans, which are inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Radon

Radon is a colourless, odourless gas, which is radioactive. It is formed in strata that contain uranium and radium (most notably granite), and can move through fissures eventually discharging to atmosphere, or the spaces under and within buildings. Where radon occurs in high concentrations, it can pose a risk to health.

In order to assess potential risks associated with radon gas, Lithos refer to BRE Report BR211, 2007: "Radon: guidance on protective measures for new buildings", and to information from the BGS / HPA (Health Protection Agency) radon potential dataset provided by the Landmark Information Group. The level of protection needed is site-specific and is determined by reference to the maps contained in Annex A of BR211. These maps are derived from the Radon Atlas of England and Wales (2007), and indicate the highest radon potential within each 1km grid square.

Each 1km grid square is classified on the basis of the percentage of existing homes within that grid square estimated to have radon concentrations above the Action Level (average annual radon concentration of 200 Bq.m-3), as follows:

- Unshaded grid squares where less than 3% of homes are estimated to be above the Action Level, and no radon protection is required in new dwellings
- Light grey shaded grid squares where between 3% & 10% of homes are estimated to be above the Action Level, and basic radon protection is required in new dwellings
- Dark grey shaded grid squares where greater than 10% of homes are estimated to be above the Action Level, and full radon protection is required
- Sites where either basic or full radon protective measures are required (i.e. Where greater than 3% of homes are estimated to be above the Action Level) are referred to as Radon Affected Areas

BR211 provides a preliminary indication of the measures required for a particular site, as the Annex A maps indicate the highest geological radon potential within each 1km grid square, but in many cases the radon potential varies considerably within the grid square. The Landmark information is more site-specific and therefore may allow the adoption of a lower level of protection than that indicated in the Annex A maps. Alternatively, a BR211 Radon Report can be obtained from the BGS in order to provide more site-specific information.

It should be noted that in July 2010 the Health Protection Agency (HPA) published new advice (Document RCE-15: "Limitation of Human Exposure to Radon"), in which they recommend that all new buildings, extensions, conversions & refurbished buildings in the UK include (at least) basic radon protective measures. The HPA also widened the definition of Radon Affected Areas to include areas where greater than 1% of homes are estimated to be above the Action Level.

Hydrogeology

Lithos obtain information from the Environment Agency (EA) and the Landmark Information Group with respect to:

- groundwater quality
- recorded pollution incidents
- licensed groundwater abstractions

From April 2010 the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply), but also their role in supporting surface water flows and wetland ecosystems. The aquifer designation data is based on geological mapping provided by the British Geological Survey. The maps are split into two different type of aquifer designation:

- Superficial (Drift) - permeable unconsolidated (loose) deposits. For example, sands and gravels
- Bedrock -solid permeable formations e.g. sandstone, chalk and limestone

The maps display the following aquifer designations:

Principal Aquifers: 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.

Secondary Aquifers: These include a wide range of rock layers or drift deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into two types:

- Secondary A - permeable layers 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. These are generally aquifers formerly classified as minor aquifers
- Secondary B - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers
- Secondary Undifferentiated - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

Unproductive Strata: These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Note: The maps are only display the principal and secondary aquifers as coloured areas. All uncoloured areas on the bedrock designation map will be unproductive strata. However, for uncoloured areas on the superficial (drift) designation map it is not possible to distinguish between areas of unproductive strata and areas where no drift is present. To do this, it is necessary to consult the published geological survey maps.

For the purposes of our Groundwater Protection Policy the following default position applies, unless there is site specific information to the contrary:

- If no superficial (drift) aquifers are shown, the bedrock designation is adopted
- In areas where the bedrock designation shows unproductive strata (the uncoloured areas) the superficial designation is adopted
- In all other areas, the more sensitive of the two designations is used (e.g. If secondary drift overlies principal bedrock, an overall designation of principal is assumed)

The EA have also designated Source Protection Zones, which are based on proximity to a groundwater source (springs, wells and abstraction boreholes). The size of a Source Protection Zone is a function of the aquifer, volume of groundwater abstracted and the effective rainfall, and may vary from tens to several thousand hectares.

Hydrology

Lithos obtain information from the Environment Agency and the Landmark Information Group with respect to:

- surface water quality
- recorded pollution incidents
- licensed abstractions (groundwater & surface waters)
- licensed discharge consents
- site susceptibility to flooding

Generic notes – geoenvironmental Investigations

The EA have set water quality targets for all rivers. These targets are known as River Quality Objectives (RQOs). The water quality classification scheme used to set RQO planning targets is known as the River Ecosystem scheme. The scheme comprises five classes (RE1 to RE5) which reflect the chemical quality requirements of communities of plants and animals occurring in our rivers.

General Quality Assessment (GQA) grades reflect actual water quality. They are based on the most recent analytical testing undertaken by the EA. There are six GQA grades (denoted A to F) defined by the concentrations of biochemical oxygen demand, total ammonia and dissolved oxygen.

The susceptibility of a site to flooding is assessed by reference to a Flood Map on the Environment Agency's website. These maps provide show natural floodplains - areas potentially at risk of flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

There are two different kinds of area shown on the Flood Map:

1. Dark blue areas could be flooded by the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year, or by a river by a flood that has a 1% (1 in 100) or greater chance of happening each year
2. Light blue areas show the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance of occurring each year

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements

The maps also show all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods.

The Agency's assessment of the likelihood of flooding from rivers and the sea at any location is based on the presence and effect of all flood defences, predicted flood levels, and ground levels.

It should also be noted that as the floodplain shown is the 1 in 100 year (or 1 in 200 year as appropriate), areas outside this may be flooded by more extreme floods (e.g. the 1 in 1000 year flood). Also, parts of the areas shown at risk of flooding will be flooded by lesser floods (e.g. the 1 in 5 year flood). In some places due to the shape of the river valley, the smaller floods will flood a very similar extent to larger floods but to a lesser depth.

If a site falls within a floodplain, it is recommended that a flood survey be undertaken by a specialist consultant who can advise on appropriate mitigating measures; ie raising slab levels, provision of storage etc.

COMAH & explosive sites

Lithos obtain information from the Landmark Information Group with respect to COMAH or explosive sites within 1km of the proposed development site. Lithos's report refers to any that are present, and recommends that the Client seeks further advice from the HSE.

Areas around COMAH sites (chemical plants etc) are zoned with respect to the implementation of emergency plans. The HSE are a statutory consultee to the local planning authority for all COMAH sites. The COMAH site may have to revise its emergency action plan if development occurs. This might be quite straightforward or could entail significant expenditure. Consequently, the COMAH site may object to a proposed development (although it is the Local Authority who have final say, and they are likely to place more weight on advice from the HSE).

Preliminary conceptual ground model

The site's environmental setting (and proposed end use) is used by Lithos to assess the significance of any contamination encountered during the subsequent ground investigation

Assessment of contaminated land is based on an evaluation of pollutant linkages (source-pathway-receptor). Contaminants within the near surface strata represent a potential source of pollution. The environment (most notably groundwater), site workers and end users are potential targets.

Potential pollutant linkages are shown on a preliminary conceptual site model, presented as a Drawing in an Appendix to this Geoenvironmental Report. The preliminary model is revised in light of data arising from the subsequent ground investigation.

Appendix B
Drawings



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CLIENT

O'NEILL
ASSOCIATES

JOB TITLE

BRADLEY PARK
GOLF COURSE,
HUDDERSFIELD

DRAWING TITLE

SITE LOCATION
PLAN

DRAWN

GLM

DATE

11/12/2015

CHECKED

MJT

DATE

11/12/2015

STATUS

FOR COMMENT

DRAFT

FOR APPROVAL

FINAL

SCALE

1:25,000

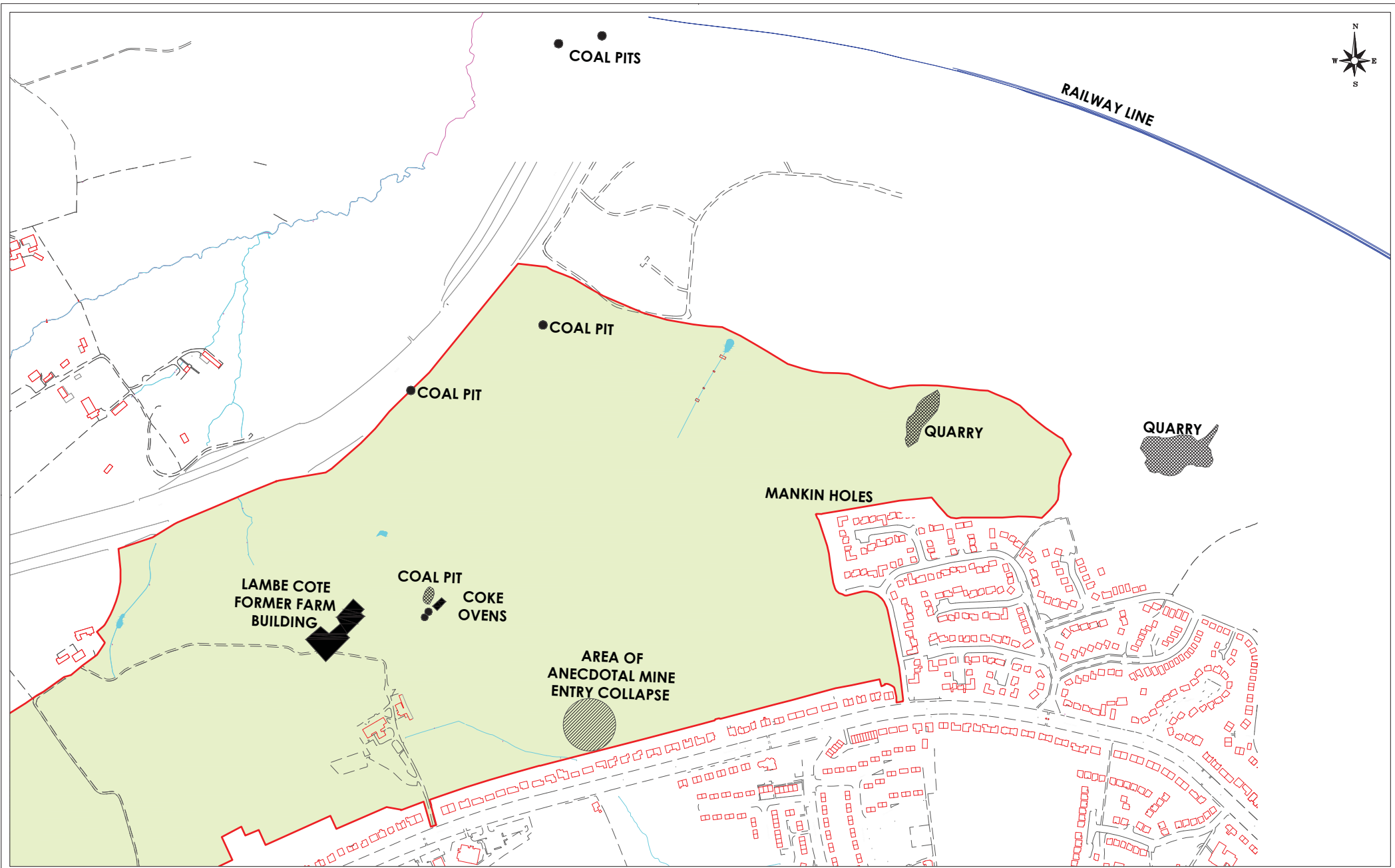
SHEET

A4

DRAWING NO.

2311/1

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O'NEILL
ASSOCIATES

BRADLEY PARK
GOLF COURSE,
HUDDERSFIELD

HISTORICAL FEATURES

GRASS / LANDSCAPED AREAS
APPROXIMATE SITE BOUNDARY

FOR COMMENT	FOR APPROVAL	DEALT	FINAL
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GLM	11/01/2016		
MJT	11/01/2016		
SCALE	1:2,500	A1	
PROJECT NO.	2311/2		



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JOB TITLE
BRADLEY PARK GOLF COURSE, HUDDERSFIELD

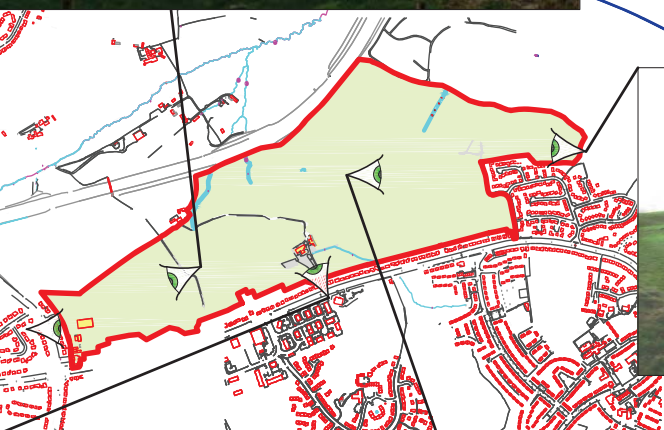
DRAWING TITLE
SITE FEATURES

SYMBOLS

- GRASS / LANDSCAPED AREAS
- BUILDING
- TARMAC HARDSTAND (ROAD / FOOTPATH)
- WOODLAND
- WATERCOURSE (STREAM / POND)
- STEEP SLOPE
- APPROXIMATE LINE OF KIRKLEES WAY (FOOTPATH)
- LINE OF OVERHEAD POWER UTILITY (WITH PYLONS)
- APPROXIMATE SITE BOUNDARY

SCALE	1:2,500
DATE	11/01/2016
BY	MJT
CHECKED BY	AI
PROJECT NO.	23117/3

FOR COMMENT	FOR APPROVAL	DATE	BY
		11/01/2016	GLM
		11/01/2016	MJT



NOTES

- GRASS / LANDSCAPED AREAS
- BUILDING
- TARMAC HARDSTAND (ROAD / FOOTPATH)
- WATERCOURSE (STREAM / POND)
- APPROXIMATE SITE BOUNDARY
- LOCATION & ORIENTATION OF PHOTOGRAPH

REV.	DESCRIPTION	DATE



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CLIENT

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JOB TITLE

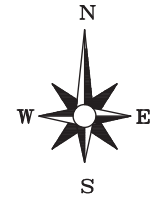
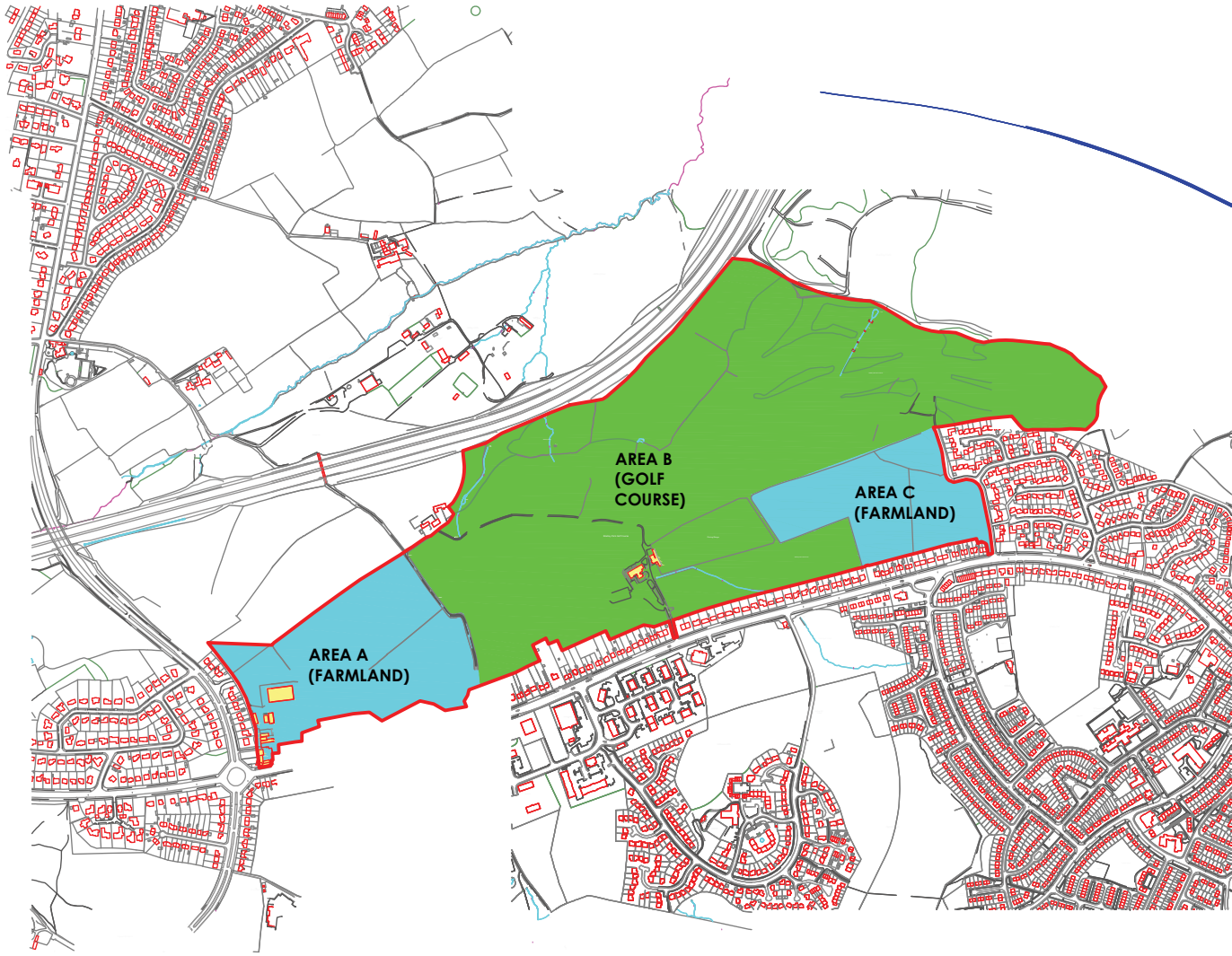
BRADLEY PARK GOLF COURSE, HUDDERSFIELD

DRAWING TITLE

SITE PHOTOGRAPHS

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					FINAL	<input checked="" type="checkbox"/>

SCALE	SHEET	DRAWING NO.	REVISION
NOT TO SCALE	A3	2311/4	



NOTES

- APPROXIMATE SITE BOUNDARY
- AREAS A & C - IN USE AS FARMLAND & FARMYARD
- AREA B - IN USE AS BRADLEY PARK GOLF CLUB

REV.	DESCRIPTION	DATE



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CLIENT

O'NEILL ASSOCIATES

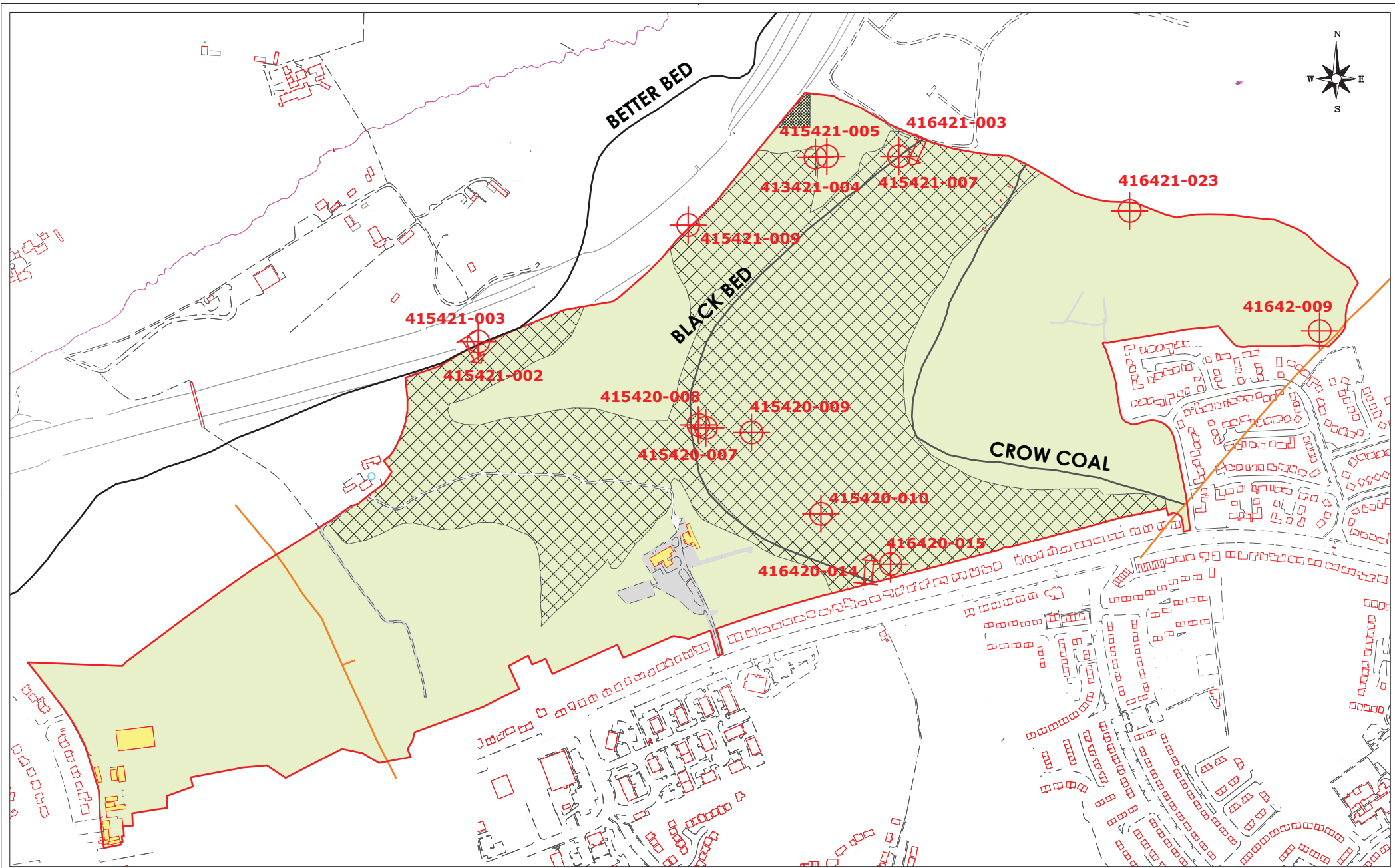
FOR TITLE

BRADLEY PARK GOLF COURSE,
HUDDERSFIELD

DRAWING TITLE

SITE AREAS
(BASED ON LAND USE)

DRAWN	GLM	DATE	22/12/2015	STATUS	FOR COMMENT	<input type="checkbox"/>	
CHECKED	MJT	DATE	22/12/2015		FOR APPROVAL	<input type="checkbox"/>	
					DRAFT	<input type="checkbox"/>	
					FINAL	<input checked="" type="checkbox"/>	
SCALE	1:10,000	SHEET	A3	DRAWING NO.	2311/5	REVISION	



LITHOS CONSULTING
 info@lithos.co.uk
 www.lithos.co.uk
 tel 01937 543330

CLIENT
O'NEILL ASSOCIATES

JOB TITLE
BRADLEY PARK GOLF COURSE, HUDDERSFIELD

DRAWING TITLE
COAL & MINE ENTRIES

KEY

- APPROXIMATE LINE OF COAL SEAM OUTCROP
- APPROXIMATE LINE OF GEOLOGICAL FAULT
- 001-015 APPROXIMATE LOCATION OF MINE SHAFT
- 001-015 APPROXIMATE LOCATION & DIRECTION OF MINE ADIT
- COAL MINING DEVELOPMENT HIGH RISK AREA
- APPROXIMATE SITE BOUNDARY

NO.	DESCRIPTION	DATE

REVISION	FOR COMMENT	FOR APPROVAL	DATE	BY
	GLM		08/01/2016	
	MJT		08/01/2016	
	SCALE	1:2,500		A1
			2311/6	

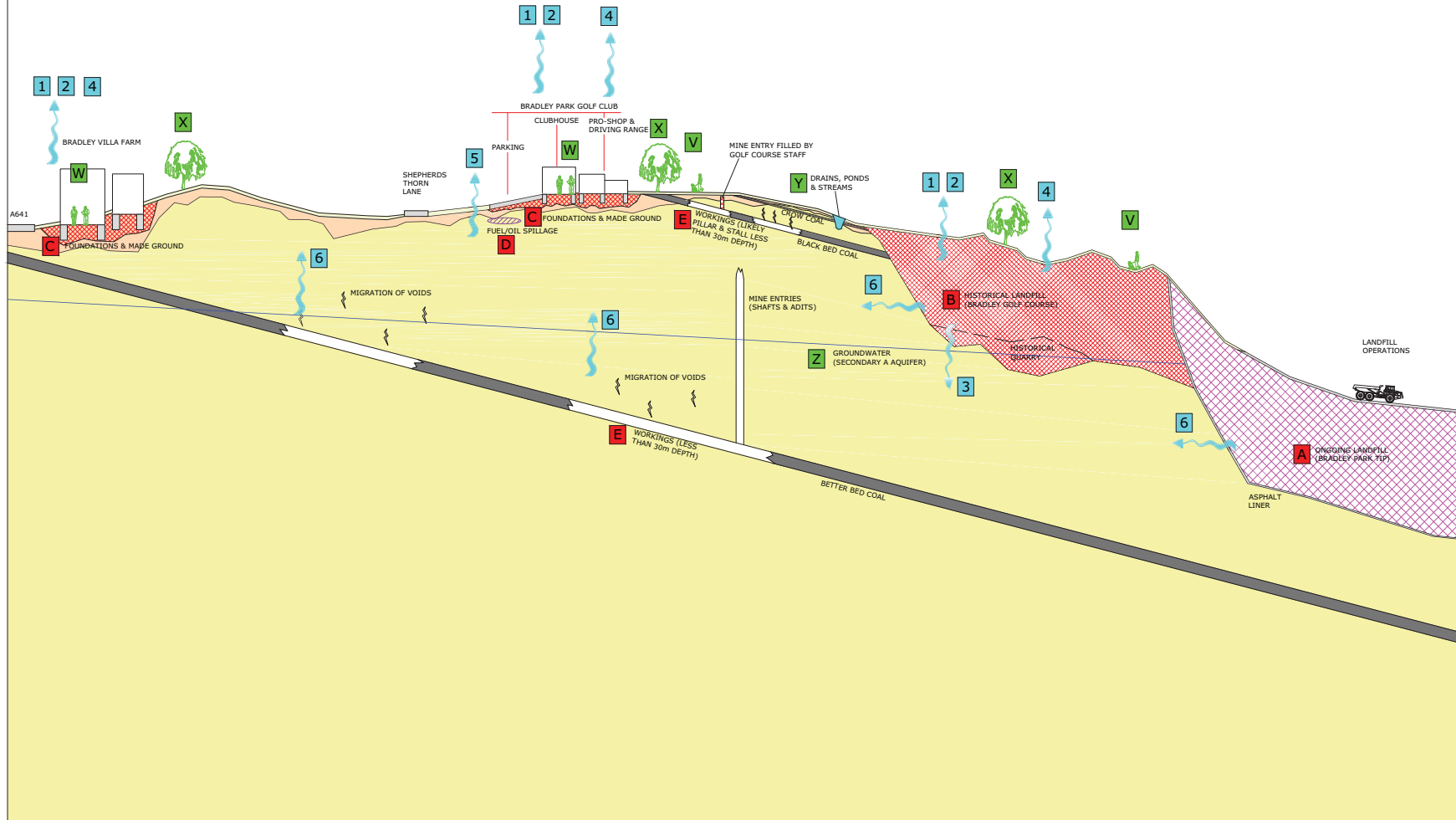
WEST

EXTENT OF SITE

EAST

FARMLAND

GOLF COURSE



KEY	
	OFF-SITE LANDFILL
	ON-SITE LANDFILL
	COAL MEASURES (MUDSTONE, SILTSTONE & SANDSTONE)
	RESIDUAL SOIL
	TOPSOIL

SOURCES	
A	OFF-SITE ONGOING LANDFILL (BRADLEY PARK TIP)
B	ON-SITE HISTORICAL LANDFILL (BRADLEY GOLF CLUB)
C	MADE GROUND (INORGANICS)
D	SPILLAGE/LEAKAGE (ORGANICS)
E	MINERWORKINGS

PATHWAYS	
1	DERMAL CONTACT
2	INGESTION/INHALATION
3	LEACHING OF CONTAMINANTS
4	UPTAKE BY PLANTS
5	VOLATILISATION
6	MIGRATION OF GAS

RECEPTORS	
V	END USERS (RESIDENTS)
W	SITE WORKERS
X	VEGETATION
Y	SURFACE WATERS
Z	GROUNDWATER

REV	DESCRIPTION	DATE

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O'NEILL ASSOCIATES

BRADLEY PARK GOLF COURSE, HUDDERSFIELD

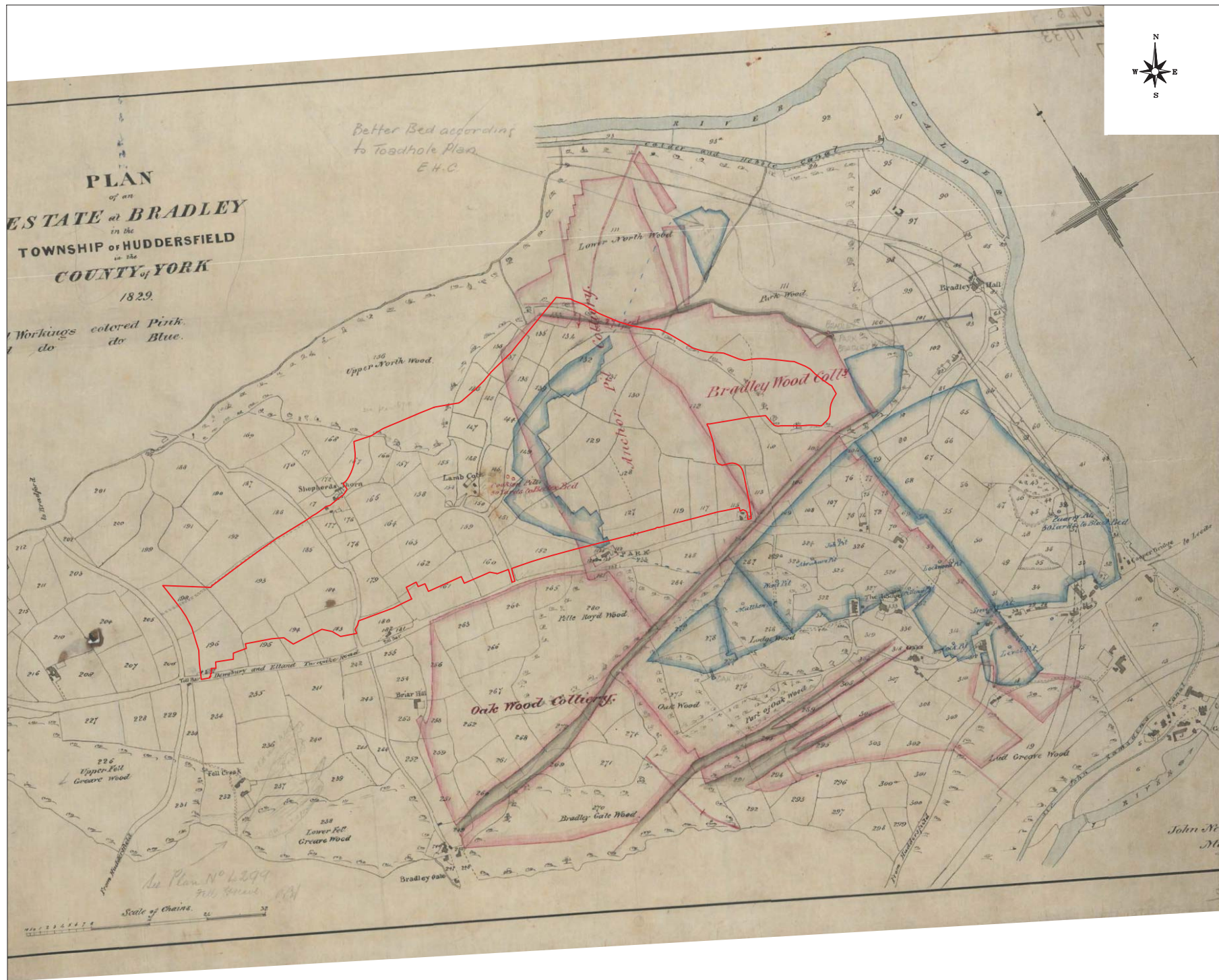
PRELIMINARY CONCEPTUAL SITE MODEL

DATE	BY	FOR	FOR APPROVAL
12/01/2016	GLM	FOR COMMENT	<input type="checkbox"/>
12/01/2016	MJT	DRAFT	<input type="checkbox"/>
2311/7	A1	2311/7	<input type="checkbox"/>

PLAN
of an
ESTATE at BRADLEY
in the
TOWNSHIP of HUDDERSFIELD
in the
COUNTY of YORK
1829.

Workings colored Pink
do do Blue.

Better Bed according
to Toadhole Plan
E.H.C.



COAL MINE WORKINGS
ABANDONMENT PLAN
REPRODUCED FROM PLAN
SUPPLIED BY THE COAL
AUTHORITY. 'PLAN OF AN ESTATE
AT BRADLEY IN THE TOWNSHIP
OF HUDDERSFIELD IN THE
COUNTY OF YORK' REF.
11045-99-9999. DATED 1829.
BETTER BED WORKINGS SHOWN
IN PINK AND BLACK BED
WORKINGS SHOWN IN BLUE

— APPROXIMATE SITE
BOUNDARY

REV.	DESCRIPTION	DATE

LITHOS CONSULTING
info@lithos.co.uk
www.lithos.co.uk
Tel 01937 545330

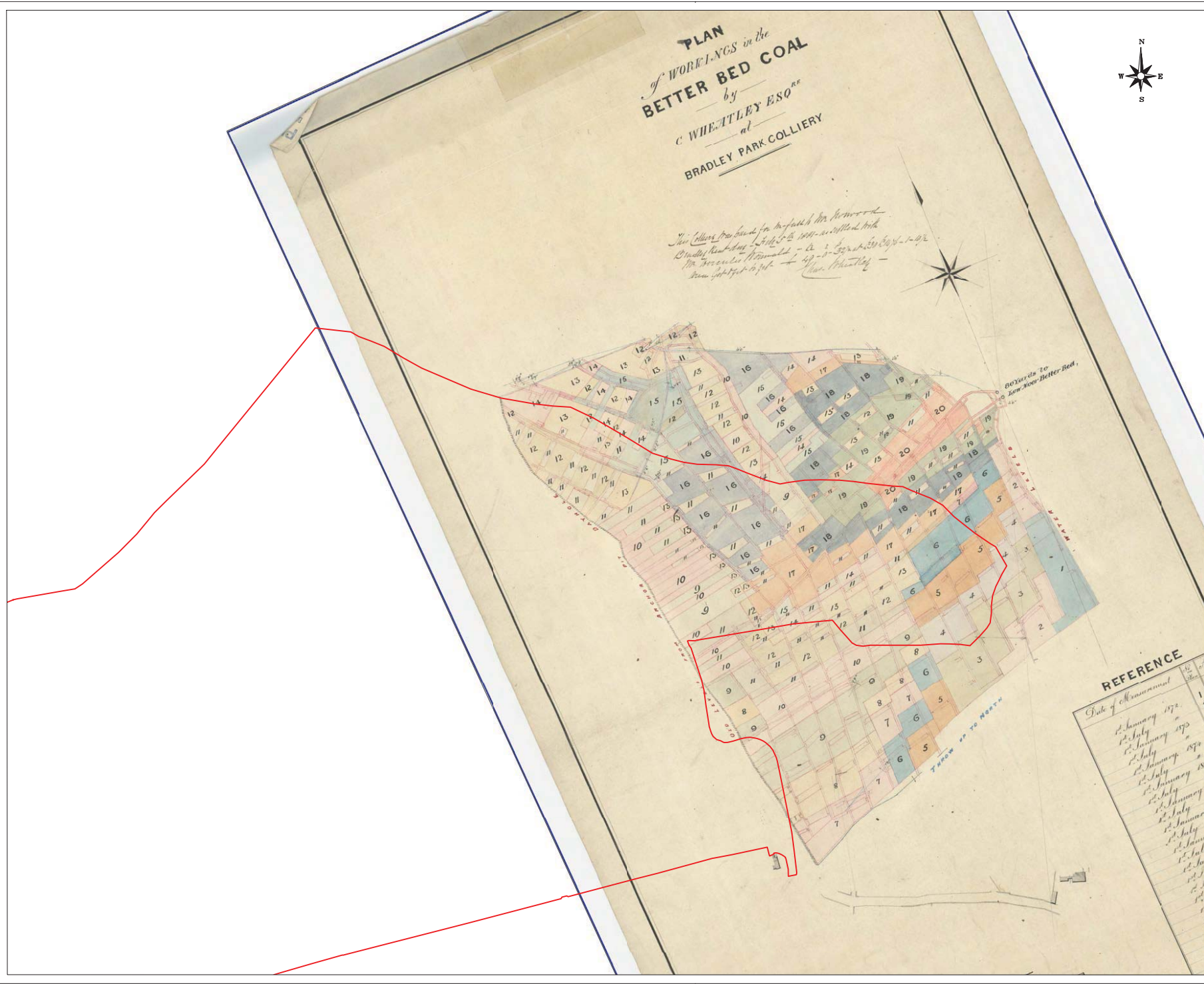
O'NEILL ASSOCIATES

BRADLEY PARK GOLF COURSE,
HUDDERSFIELD

COAL MINING ABANDONMENT
PLANS (OVERVIEW OF ALL
WORKINGS)

DATE	BY	FOR COMMENT	FOR APPROVAL	DRAFT	FINAL
12/01/2016	GLM				
12/01/2016	MJT				

SCALE: 1:5000
SHEET: A1
REVISION: 2311/8



COAL MINE WORKINGS
ABANDONMENT PLAN
REPRODUCED FROM PLAN
SUPPLIED BY THE COAL
AUTHORITY. 'PLAN BRADLEY
PARK COLLIERY' - WORKINGS
WITHIN THE BETTER BED COAL
REF. 11045 SHEET 9 of 15.
DATED 1872 to 1881

— APPROXIMATE SITE
BOUNDARY

REV.	DESCRIPTION	DATE

LITHOS CONSULTING

info@lithos.co.uk
www.lithos.co.uk
Tel 01937 545330

O'NEILL ASSOCIATES

BRADLEY PARK GOLF COURSE,
HUDDERSFIELD

ABANDONMENT PLAN -
BETTER BED COAL

DATE	BY	FOR COMMENT	FOR APPROVAL
12/01/2016	GLM	<input type="checkbox"/>	<input type="checkbox"/>
12/01/2016	MJT	<input type="checkbox"/>	<input type="checkbox"/>

SCALE: 1: 2000 A1 2311/8A



**COAL MINE WORKINGS
ABANDONMENT PLAN
REPRODUCED FROM PLAN
SUPPLIED BY THE COAL
AUTHORITY. WORKINGS
WITHIN THE BLACK BED
COAL REF. 11045 SHEET
6 of 15.
DATED 1872 to 1881**

— APPROXIMATE SITE BOUNDARY

REV.	DESCRIPTION	DATE

info@lithos.co.uk
www.lithos.co.uk
Tel 01937 545330

O'NEILL ASSOCIATES

BRADLEY PARK GOLF COURSE, HUDDERSFIELD

ABANDONMENT PLAN - BLACK BED COAL

DATE	BY	FOR COMMENT	FOR APPROVAL	FOR APPROVAL	FOR APPROVAL
12/01/2016	GLM				
12/01/2016	MJT				

SCALE	1: 2000	SHEET	A1	REVISION NO.	2311/8B	DATE	
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**COAL MINE WORKINGS
ABANDONMENT PLAN
REPRODUCED FROM PLAN
SUPPLIED BY THE COAL
AUTHORITY. 'WORKINGS
WITHIN THE ANCHOR PIT
COLLIERY' - BETTER BED
COAL REF. 11045 SHEET
3 of 15.
DATED 1845 to 1856**

— APPROXIMATE SITE
BOUNDARY

REV.	DESCRIPTION	DATE

**LITHOS
CONSULTING**

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www.lithos.co.uk
Tel 01937 545330

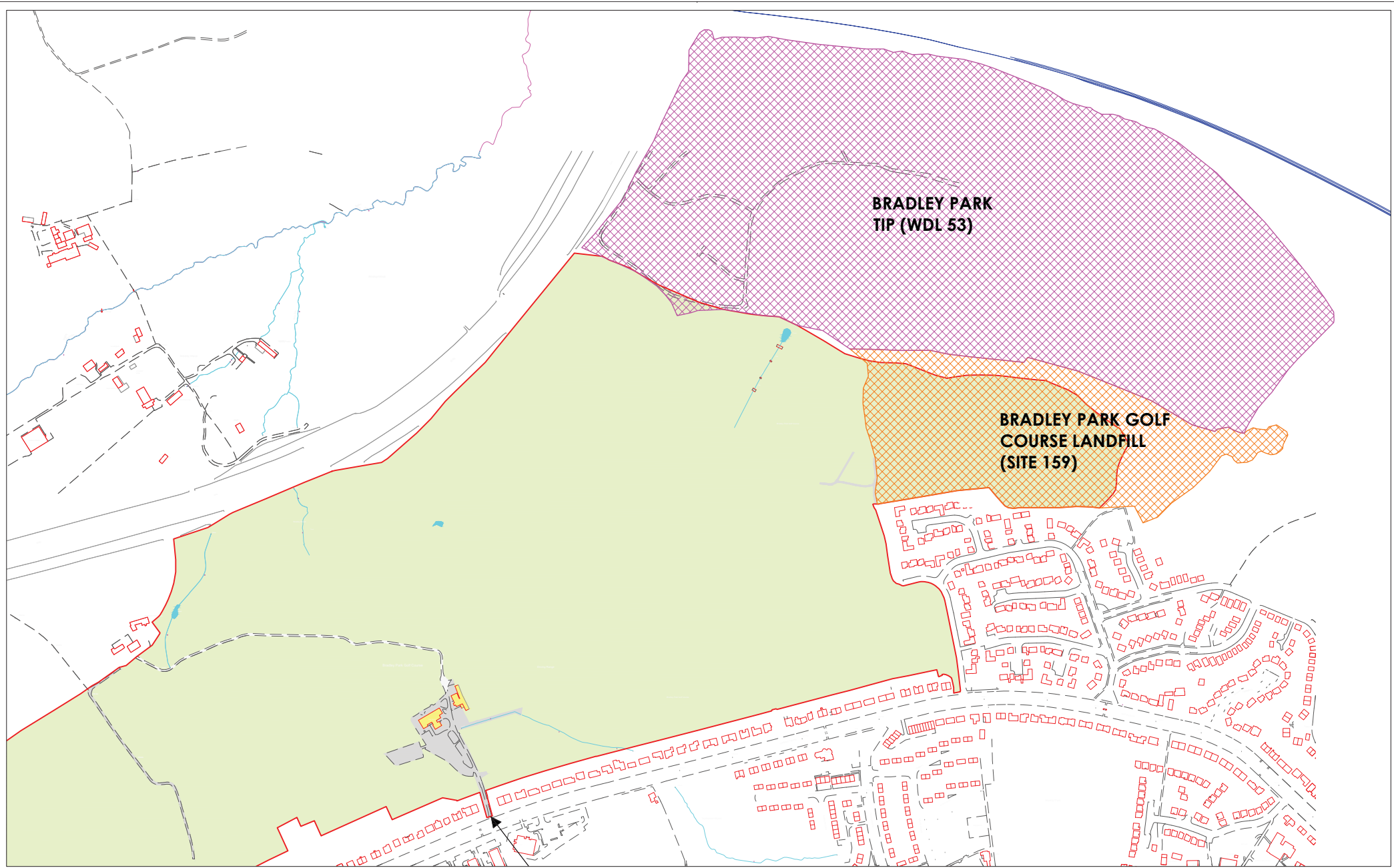
O'NEILL
ASSOCIATES

BRADLEY PARK
GOLF COURSE,
HUDDERSFIELD

ABANDONMENT PLAN -
BETTER BED COAL

DATE	BY	FOR COMMENT	FOR APPROVAL
12/01/2016	GLM		
12/01/2016	MJT		

SCALE: 1: 2000 SHEET: A1 DRAWING NO: 2311/8C



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O'NEILL
ASSOCIATES

BRADLEY PARK
GOLF COURSE,
HUDDERSFIELD

AREAS OF LANDFILL

- BRADLEY GOLF COURSE LANDFILL
- BRADLEY PARK TIP
- GRASS / LANDSCAPED AREAS
- BUILDING
- TARMAC HARDSTAND (ROAD / FOOTPATH)
- WOODLAND
- WATERCOURSE (STREAM / POND)

— APPROXIMATE SITE BOUNDARY

LANDFILL OUTLINES REPRODUCED FROM KIRKLEES COUNCIL RESPONSE (PRESENTED IN APPENDIX E TO LITHOS PRELIMINARY GEONVIRONMENTAL APPRAISAL REPORT Ref. 2311-1 DATED JANUARY 2016)

REV	DESCRIPTION	DATE

FOR COMMENT	FOR APPROVAL	GREAT	FINAL
GLM	08/01/2016		
MJT	08/01/2016		
SCALE	1:2,500		A1
PROJECT REF	2311/10		

Appendix C
Commission

002/2311/REG

11th November 2015

Mr R Wood
O'Neill Associates
Lancaster House
James Nicolson Link
Clifton Moor
York
YO30 4GR



Registered in England 07068066

Parkhill
Wetherby
West Yorkshire
LS22 5DZ

T 01937 545 330
www.lithos.co.uk

Dear Richard

Bradley Park Golf Course, Huddersfield

Further to your recent invitation, please find below our proposal for undertaking a geotechnical and environmental desk study appraisal of the above land. It is understood that the site consists of a single parcel of land of approximately 78 hectares and is currently predominantly used as a municipal 18 hole golf course, 9 hole Par 3 course, with practice facilities and a floodlit driving range; there is also some agricultural land in the west.

The site is bounded by housing to the south and east, but there is a specialist waste disposal facility to the north east. The majority of the site is within the ownership of Kirklees Council, with a smaller portion to the west in private ownership.

In the current UDP, 10 hectares has been allocated for housing, with the remainder being allocated as Greenbelt. However, the draft Local Plan allocation estimates that the site will ultimately accommodate around 2,000 homes.

The Council's Invitation to Quote document indicates that ground conditions are unknown, although some initial work has indicated the possible presence of a number of mine entries. Consequently, a Phase 1 Contaminated Land Study, including consideration of potential mining issues has been requested. The Phase 1 Report is required to highlight any potential development constraints, and areas that require further investigation in order that these can be reflected in the masterplan.

Brief examination of the relevant geological map suggests the site is underlain by Lower Coal Measures bedrock, with the Black Bed coal (0.8m thick) outcropping in centre-east, and the Crow coal (0.5m thick) outcropping further east.

The centre-east of this site is located within a Coal Mining Development High Risk Area, with the remainder a Low Risk Area, and therefore a mining report will be obtained. Our report will include a mining risk assessment (desk-based) that should satisfy the Coal Authority.

Due to the presence of shallow coal the Local Authority at may consider the site to lie within a Mineral Safeguarding Area. As a consequence of this and the NPPF, the Local Authority may require your Client to consider the opportunity to recover (extract) the coal. Our report will include a preliminary assessment of the feasibility of coal extraction.

Environmental search data and historical maps (obtained from Landmark or Groundsure), will be reviewed in order to determine whether any past land uses have had any effect on the proposed development. In addition we will visit site to review current operations and undertake a walkover survey.



The report will include preliminary recommendations with respect to mining, foundations, contamination and hazardous gas. Our report will be in a format familiar to Kirklees Council, and therefore suitable for submission in support of an outline planning application.

Subject to instruction by 23rd November, we will issue a final bound report by 10th December. Our lump sum fee for provision of this report is £*** plus VAT.

We will need a Promap or topo survey in CAD format, to provide a base plan for technical drawings etc. If do not have one, we could obtain at cost plus £***.

This work will be undertaken in accordance with our Standard Terms and Conditions, a copy of which are enclosed.

It is hoped the above is sufficient for your present needs. However, should you require any further information, please contact the undersigned.

Yours sincerely

A handwritten signature in black ink, appearing to read "Mark Perrin".

Mark Perrin
Director

for and on behalf of
LITHOS CONSULTING LIMITED

DEFINITIONS AND INTERPRETATION

- 1.1 In this Agreement, unless the context otherwise requires, the following words and expressions have the following meanings:

"Agreement" shall mean these Terms (entitled "Terms and Conditions for the Appointment of Lithos Consulting"), the Proposal, any document recording the Client's unequivocal acceptance of the Proposal and any other documents or parts of other documents expressly referred to in any of the foregoing;

"Client" shall mean the party for whom the Services are being provided by Lithos;

"Documents" shall mean all documents of any kind and includes plans, drawings, reports, programmes, specifications, Bills of Quantities, calculations, letters, e-mails, faxes, memoranda, films and photographs (including negatives), or any other form of record prepared or provided or received by, or on behalf of Lithos, and whether in paper form or stored electronically or on disk, or otherwise;

"Lithos" shall mean Lithos Consulting Limited whose registered office is at Parkhill, Walton Road, Wetherby, West Yorkshire, LS22 5DL.

"Intellectual Property" includes all rights to, and any interests in, any patents, designs, trade marks, copyright, know-how, trade secrets and any other proprietary rights or forms of intellectual property (protectable by registration or not) in respect of any technology, concept, idea, data, programme or other software (including source and object codes), specification, plan, drawing, schedule, minutes, correspondence, scheme, programme, design, system, process logo, mark, style, or other matter or thing, existing or conceived, used, developed or produced by any person;

"Parties" shall mean the Client and Lithos

"Project" shall mean the project described in the Proposal and any enquiry from the Client on which Lithos has based its Proposal;

"Proposal" means the offer document prepared by Lithos in response to an enquiry or otherwise, in connection with the proposed provision of the Services;

"Services" means the work and services relating to the Project to be provided by Lithos pursuant to the Agreement and as set out in the Proposal and shall include any additions or amendments thereto made in accordance with these Terms;

"Terms" means these terms entitled "Lithos Consulting Terms of Appointment".

- 1.2 Words importing the singular only shall also include the plural and vice versa, where the context requires.
- 1.3 Words importing persons or parties shall include firms, corporations and any organisation having legal capacity and vice versa, where the context requires; and words importing a particular gender include all genders.
- 1.4 The sub-headings to the clauses of these Terms are for convenience only and shall not affect the construction of the Agreement.
- 1.5 A reference to legislation includes that legislation as from time to time amended, re-enacted or substituted and any Orders in Council, orders, rules, regulations, schemes, warrants, by-laws, directives or codes of practice issued under any such legislation.
- 1.6 In the event of conflict between the documents forming part of the Agreement, the Proposal shall prevail, followed by the Terms.

2 APPOINTMENT

- 2.1 The Client agrees to engage Lithos and Lithos agrees to provide the Services in accordance with the provisions of the Agreement.

3 OBLIGATIONS OF LITHOS

- 3.1 Lithos shall perform the Services using the reasonable standard of skill and care normally exercised by similar professional Environmental firms in performing similar services under similar conditions.
- 3.2 Lithos shall use all reasonable endeavours to perform the Services in accordance with all relevant environmental and safety legislation.

4 OBLIGATIONS OF THE CLIENT

- 4.1 Throughout the period of this Agreement the Client shall afford to Lithos or procure the affording to Lithos of access to any site where access is required for the performance of the Services.
- 4.2 The Client accepts responsibility for ensuring that Lithos is notified in writing of all special site and/or plant conditions, including without prejudice to the generality of the foregoing, the existence and precise location of all underground services, cables, pipes, drains or underground buildings, constructions or any hazards known or suspected by the Client, which the Client shall clearly mark on the ground or identify on accurate location plans supplied to Lithos prior to the commencement of the Services. The Client shall also inform Lithos in writing of any relevant operating procedures including any site safe operating procedures and any other regulations relevant to the carrying out of the Services. The Client shall indemnify Lithos against all costs, claims, demands and expenses arising as a result of any non-disclosure in this respect, including but not limited to indemnification against any action brought by the owner of the land or otherwise.
- 4.3 If the Client discovers any conflict, defect or other fault in the information or designs provided by Lithos pursuant to the Agreement, he will advise Lithos in writing of such defect, conflict or other fault and Lithos shall have the right to rectify the same or where necessary, to design the solution for rectification of any works carried out by others pursuant to the conflicting, defective or in any other way faulty information or designs.

5 INTELLECTUAL PROPERTY

- 5.1 The copyright in all Intellectual Property prepared by or on behalf of Lithos in connection with the Project for delivery to the Client shall remain vested in Lithos.
- 5.2 The Client shall have a non-exclusive licence to copy and use such Intellectual Property for purposes directly related to the Project. Such licence shall enable the Client to copy and use the Intellectual Property but solely for its own purposes in connection with the Project and such use shall not include any licence to reproduce any conceptual designs or professional opinions contained therein nor shall it include any licence to amend any drawing, design or other Intellectual Property produced by Lithos.
- 5.3 Should the Client wish to use such Intellectual Property in connection with any other works or for any other purpose not directly related to the Project or wish to pass any Intellectual Property to any third party, it must obtain the prior written consent of Lithos. The giving of such consent shall be at the discretion of Lithos and shall be upon such terms as may be required by Lithos. Lithos shall not be liable for the use by any person of such Intellectual Property for any purpose other than that for which the same were prepared by or on behalf of Lithos.
- 5.4 Ownership of any proposals submitted to the Client that are not subsequently confirmed as part of the Services to be provided for the Client remain with Lithos and such proposals must not be used as the basis for any future work undertaken by the Client or a third party and no liability can be accepted howsoever arising from such proposals.
- 5.5 In the event of the Client being in default of payment of any fees or other amounts due, Lithos may suspend further use of the licence on giving 2 days' notice of the intention to do so. Use of the licence may be resumed on receipt of the outstanding amounts.

6 TITLE

- 6.1 Lithos shall transfer only such title or rights in respect of the Documents as it has, and if any part is purchased from a third party Lithos shall transfer only such title or rights as that party had and has transferred to Lithos.
- 6.2 Title in the Documents shall remain with and shall not pass to the Client until the amount due under the invoice(s) (including interest and costs) has been paid in full.
- 6.3 Until title passes, the Client shall hold the Documents as bailee for Lithos and shall store or mark them so that they can at all times be identified as the property of Lithos.
- 6.4 At any time before title passes (save and except where payment is not due), but only after prior consultation with the Client, Lithos may without any liability to the Client repossess and use or sell all or any of part of the Documents and by doing so terminate the right of the Client to use, sell or otherwise deal in the Documents.
- 6.5 Lithos may maintain an action for the price of the Documents notwithstanding that title in them has not passed to the Client.

7 CONFIDENTIALITY

- 7.1 Lithos undertakes not to divulge or disclose to any third party without the written consent of the Client information which is designated confidential by the Client or which can reasonably be considered to be confidential and arises during the performance of the Services unless required to do so by law or necessary in the proper performance of its duties in relation to the Project, or in order to make full frank and proper disclosure to its insurers or intended insurers, or to obtain legal or accounting advice.
- 7.2 Subject to the above, Lithos shall be permitted to use information related to the Services it provides in connection with the Project for the purposes of marketing its services and in proposals for work of a similar type.

8 THIRD PARTIES

- 8.1 The Agreement or any part thereof or any benefit or interest thereunder may not be assigned by the Client without the prior written consent of Lithos. The giving of such consent shall be at the discretion of Lithos and Lithos will only agree to an assignment on its terms and in return for payment of a fee by the Client to Lithos to cover Lithos's legal and other costs associated with any assignment.
- 8.2 The Agreement shall not confer and shall not purport to confer on any third party any benefit or any right to enforce any term of this Agreement for the purposes of the Contracts (Rights of Third Parties) Act 1999 or otherwise.
- 8.3 Lithos will consider and may consent to any request from the Client for Lithos to enter a collateral warranty with a third party with regard to the Services provided under the Agreement. The giving of such consent shall be at the discretion of Lithos and Lithos will only enter a collateral warranty on its terms and in return for payment of a fee by the Client to Lithos to cover Lithos's legal and other costs associated with any collateral warranty.

9 INSURANCE

- 9.1 Lithos warrants to the Client that there is in force a policy of Professional Indemnity insurance covering its liabilities for negligence under this Agreement, with a limit of indemnity of £5,000,000 (FIVE MILLION POUNDS) any one claim, save for pollution and contamination claims and asbestos claims both of which carry £2,000,000 (TWO MILLION) in the aggregate cover. This policy is annually renewable and whilst renewal is not automatic, Lithos agrees to use reasonable endeavours to maintain such insurance at all times until six years from the date of the completion (or termination) of the Services under the Agreement, provided such insurance is available at commercially reasonable rates having regard, inter alia, to premiums required and policy terms obtainable.
- 9.2 If for any period such insurance is not available at commercially reasonable rates, Lithos shall forthwith inform the Client and shall obtain in respect of such period such reduced level of Professional Indemnity insurance as is available and as would be fair and reasonable in the circumstances for Lithos to obtain.

10 LIMITATIONS ON LIABILITY

- 10.1 Unless otherwise agreed in writing, Lithos's liability under or in connection with the Agreement whether in contract, tort, negligence, breach of statutory duty or otherwise (other than in respect of personal injury or death) shall be limited to and shall not exceed the lesser of either five million pounds in the aggregate (unless it is a pollution, contamination or asbestos claim in which case it is two million pounds in the aggregate) or 10 times the total value of invoices issued to the Client for consultancy work instructed under the Agreement.
- 10.2 No action or proceedings under or in respect of the Agreement whether in contract, tort, negligence, under statute or otherwise shall be commenced against Lithos after the expiry of a period of six years from the date of the completion (or termination) of the Services under the Agreement.
- 10.3 Whilst Lithos will scan all potential exploratory locations with a Cable Avoidance Tool, Lithos shall not be liable for any damage to underground services, cables, pipes, drains or underground buildings, constructions and the like which were either not marked on site or for which accurate plans were not provided.
- 10.4 Lithos shall not be liable for the cost of rectifying any defect, conflict or other fault in the information or designs provided by Lithos or for the cost of designing a solution for and rectifying any subsequent works carried out by others pursuant to the conflicting, defective or in any other way faulty information or designs, unless Lithos has been advised in writing of the same by the Client and has been given the opportunity to rectify the same or where necessary, to design the solution for rectification of any subsequent works carried out by others pursuant to the same.

11 PAYMENT

- 11.1 Invoices for services rendered will be submitted for payment in accordance with the Proposal.
- 11.2 The due date for payment is the date of the invoice and the final date for payment is 28 days from the date of the invoice.
- 11.3 If the Client disputes the amount included for payment in an invoice a written notice must be served on Lithos by the Client not later than 14 days before the final date for payment. If no notice is given the amount due shall be the amount stated in the invoice.
- 11.4 In the event of failure on the part of the Client to pay any monies in accordance with the foregoing payment provisions, Lithos will be entitled to charge interest on any monies owed to it by the Client, such interest to be at a rate of 8% above the base rate of a clearing bank from time to time calculated from the final date for payment to the date of actual payment on a compound basis.

12 DELAY

- 12.1 Lithos will comply with any timescale agreed for completion of the Services unless delayed or prevented by circumstances beyond its reasonable control and in the event of any such circumstances arising Lithos undertakes to complete the Services within a reasonable period, but will not be liable to the Client for any delay as a result.

13 TERMINATION

- 13.1 The Agreement may be determined by either party in the event of the other making a composition or arrangement with its creditors, becoming bankrupt, or being a company, making a proposal for a voluntary arrangement for a composition of debts, or has a provisional liquidator appointed, or has a winding-up order made, or passes a resolution for voluntary winding-up (except for the purposes of a bona fide scheme of amalgamation or reconstruction), or has an administrator or an administrative receiver appointed to the whole or any part of its assets. Notice of determination must be given to the party which is insolvent by the other party.
- 13.2 If for any reason the performance of the Services by Lithos is suspended for a period in excess of three calendar months then Lithos shall be entitled to determine its appointment in respect of the Services by seven days written notice to the Client.
- 13.3 If the Client shall fail to pay in full any sum due under the terms of the Agreement by the final date for payment for that sum and no effective notice of intention to withhold payment has been issued, Lithos may serve written notice on the Client demanding payment within 14 days of such notice. If the Client shall fail to comply with such notice, Lithos shall be entitled to terminate its employment under the Agreement forthwith.
- 13.4 Any determination of the appointment of Lithos howsoever caused shall be without prejudice to the right of Lithos to require payment for all services performed up to the date of such determination including but not limited to payment of a fair and reasonable proportion of any figure identified in the Proposal or otherwise for fees in respect of a particular service which Lithos has started, but not completed.

14 NOTICES

- 14.1 Any notice provided for in the Agreement shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post to the address of the relevant party as may have been notified by each party to the other or, in the absence of notification, to the address of Lithos set out above or to the registered address of the Client.
- 14.2 Such notice shall be deemed to have been received on the day of delivery if delivered by hand or on the second working day after the day of posting if sent by first class post.

15 ENTIRE AGREEMENT

- 15.1 The Agreement constitutes the complete and entire agreement between the Client and Lithos with respect to the Services and supersedes any prior oral and/or written warranties, terms, conditions, communications and representations, whether express or implied and any claim against Lithos in respect of the Services can only be made in contract under the provisions of the Agreement and not otherwise under the law or tort or otherwise.
- 15.2 No amendments, modifications or variation of the Agreement shall be valid unless made in writing and agreed to by both the Client and Lithos; such agreement must be recorded in writing by at least one of the Parties.
- 15.3 Lithos will not be bound by any standard or printed terms or conditions furnished by the Client in any of its documents unless Lithos specifically states in writing separately from such documents that it intends such terms and conditions to apply.

16 DISPUTES AND GOVERNING LAW

- 16.1 The Agreement shall be governed by and construed in accordance with English law and the Parties irrevocably and unconditionally submit to the jurisdiction of the English Courts.
- 16.2 Where the Housing Grants, Construction and Regeneration Act 1996 applies, any dispute between the Parties may be referred to adjudication in accordance with the Scheme for Construction Contracts Regulations 1998 or any amendment or modification thereof being in force at the time of the dispute, as applicable to England, Wales, Scotland and Northern Ireland.

Reg

Subject: FW: Bradley Masterplan

From: Richard Wood [<mailto:R.Wood@oneill-associates.co.uk>]

Sent: 09 December 2015 11:09

To: Reg

Subject: Bradley Masterplan

Dear Reggie

Further to our telephone conversation on Monday I am confirming that we have been successful with the Bradley Masterplan bid for Kirklees Council.

Please accept this email as **instructions** to proceed on the basis of your letter of 11th November 2015 with an output of a Phase 1 Contaminated Land Study for a fee of £*** plus VAT. I will send out in due course an appointment letter and sub-consultancy agreement. As previously advised this will tie in to Kirklees Council Terms and Conditions

The overall **timescale** has been extended with the submission of the final masterplan options by the end of January 2016. Whilst this timescale has been extended it remains tight considering the need to undertake technical appraisal work and generate masterplan options. To help everyone in the team undertake their task I am requesting that we work to the following timetable:

- Identification/flagging up of any fundamental/key constraints and opportunities for the masterplanners by 22nd December to help start shaping the masterplan options
- Production of a draft phase 1 contaminated land study by 8th January 2016
- Production a final report by 22nd January for submission as final output to the client.

Kirklees Council are stressing the **very significant sensitivities** around this site and its allocation in the Local Plan. The Council have stated that **all site visits need to be notified** and co-ordinated through the regeneration team who will **need to get approval** from Kirklees Active Leisure.

A **site visit** is currently being arranged for Tuesday 15th December – current attendees include ourselves and the materplanning, transport and landscape consultants.

I look forward to working with you on this project.

Kind regards
Richard



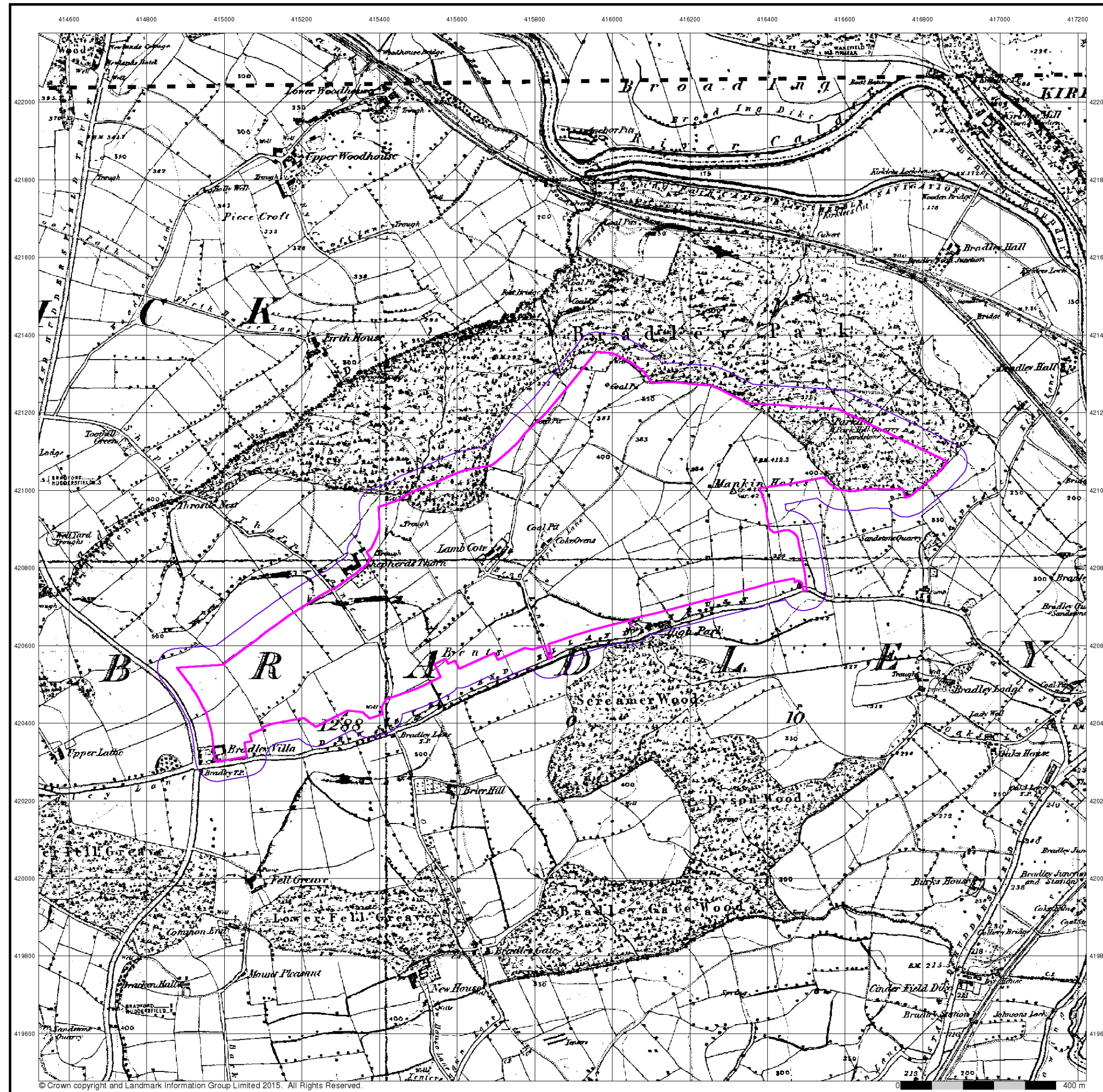
Richard Wood

www.oneill-associates.co.uk

Lancaster House
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Clifton Moor
York YO30 4GR
01904 692313

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Appendix D
Historical OS Plans



Yorkshire

Published 1854

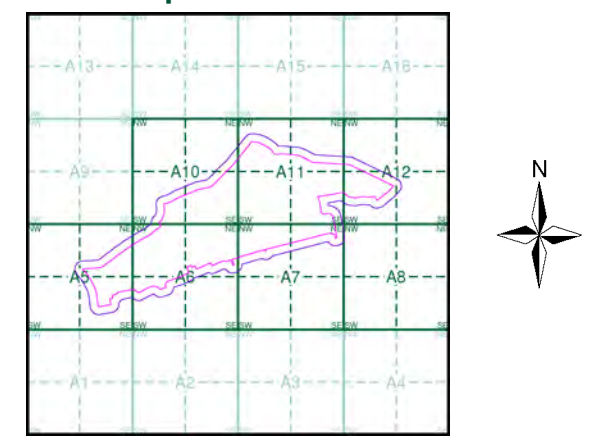
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

23100	1854	1:10,560
24600	1854	1:10,560

Historical Map - Slice A



Order Details

Order Number: 76826195_1_1
 Customer Ref: 2311 Bradley Park, Huddersfield
 National Grid Reference: 415860, 420850
 Slice: A
 Site Area (Ha): 78.24
 Search Buffer (m): 50

Site Details

Site at 415500, 420600



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Yorkshire

Published 1930 - 1931

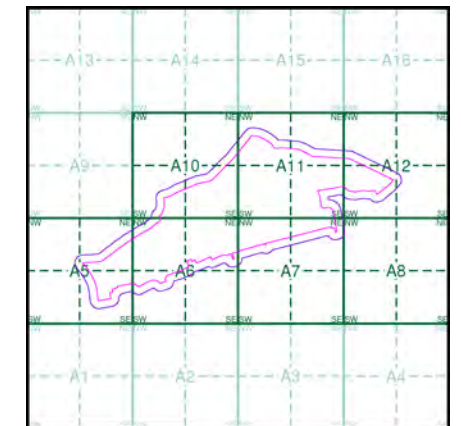
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

231SE	1931	1:10,560
246NE	1930	1:10,560

Historical Map - Slice A



Order Details

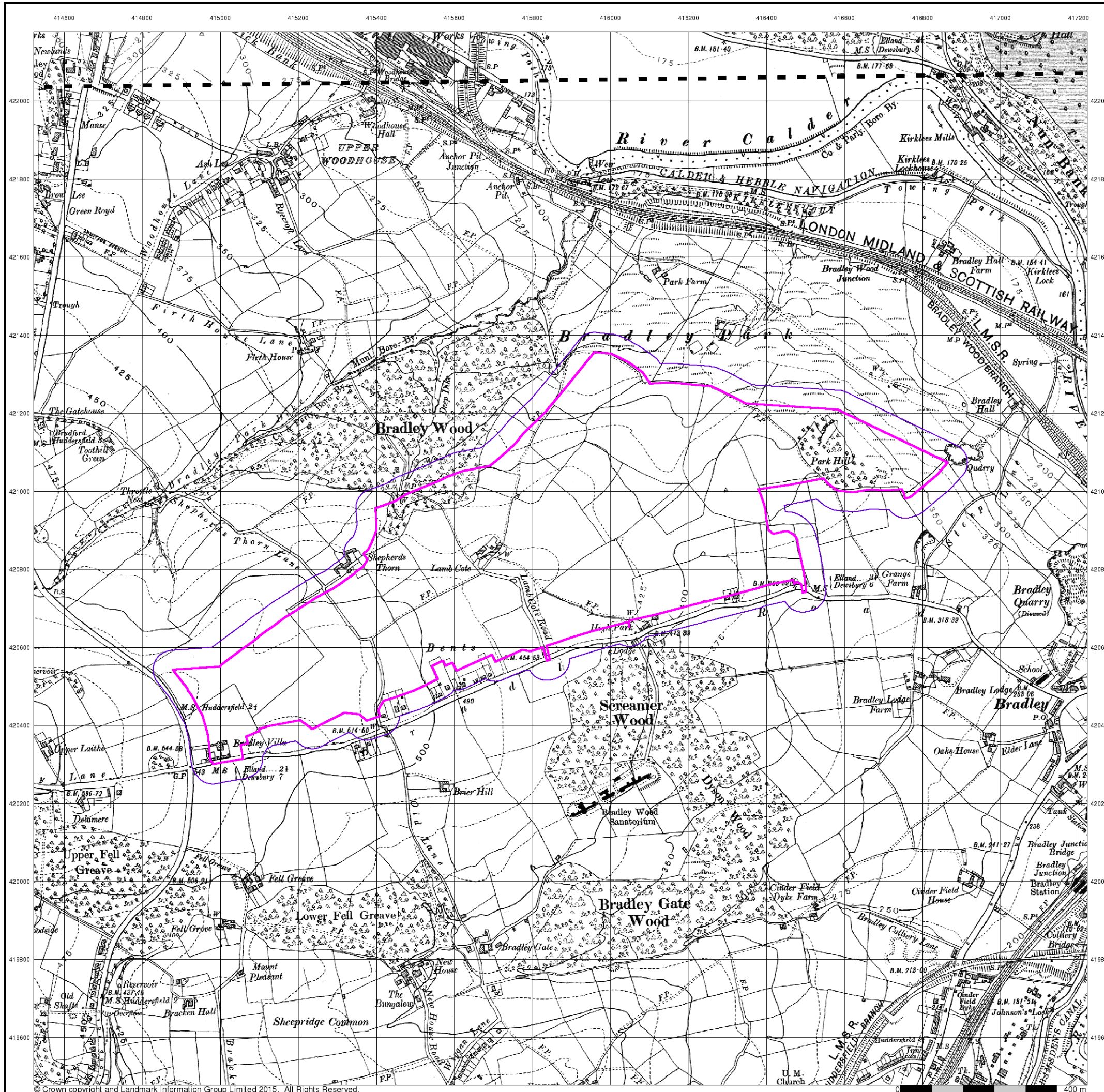
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 National Grid Reference: 415860, 420850
 Slice: A
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 Search Buffer (m): 50

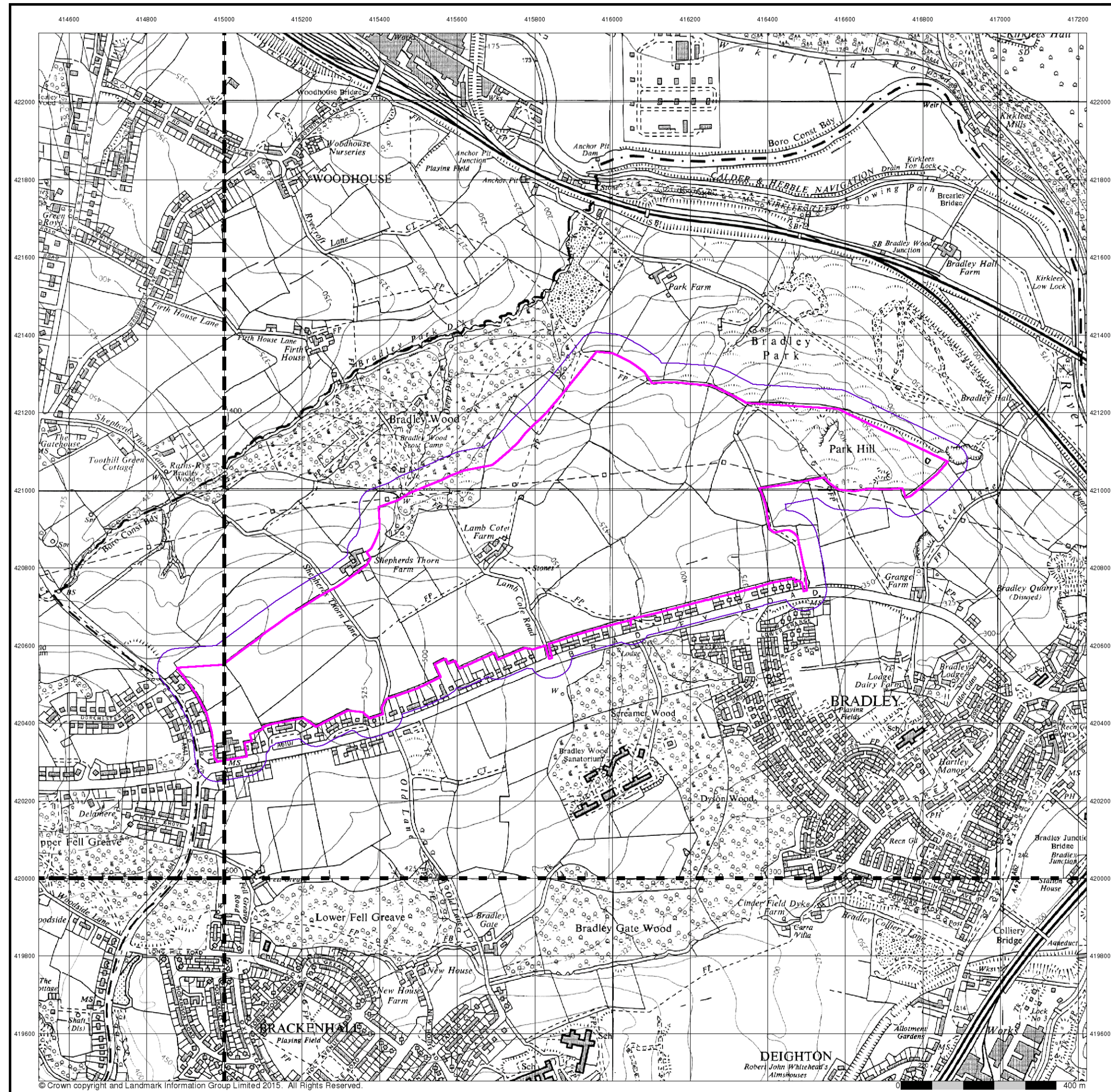
Site Details

Site at 415500, 420600



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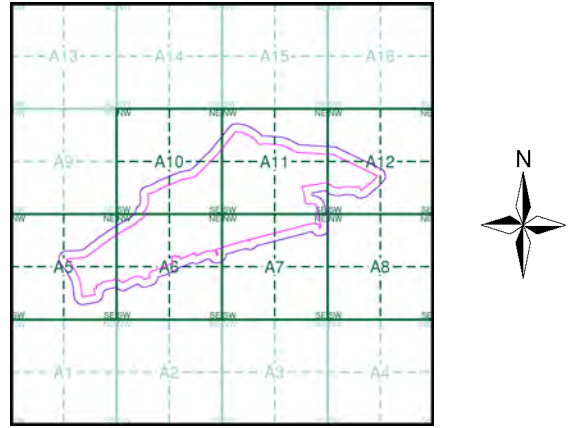
Ordnance Survey Plan
Published 1965 - 1969
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE12SW 1969 1:10,560	SE12SE 1966 1:10,560
SE11NW 1966 1:10,560	SE11NE 1965 1:10,560

Historical Map - Slice A



Order Details

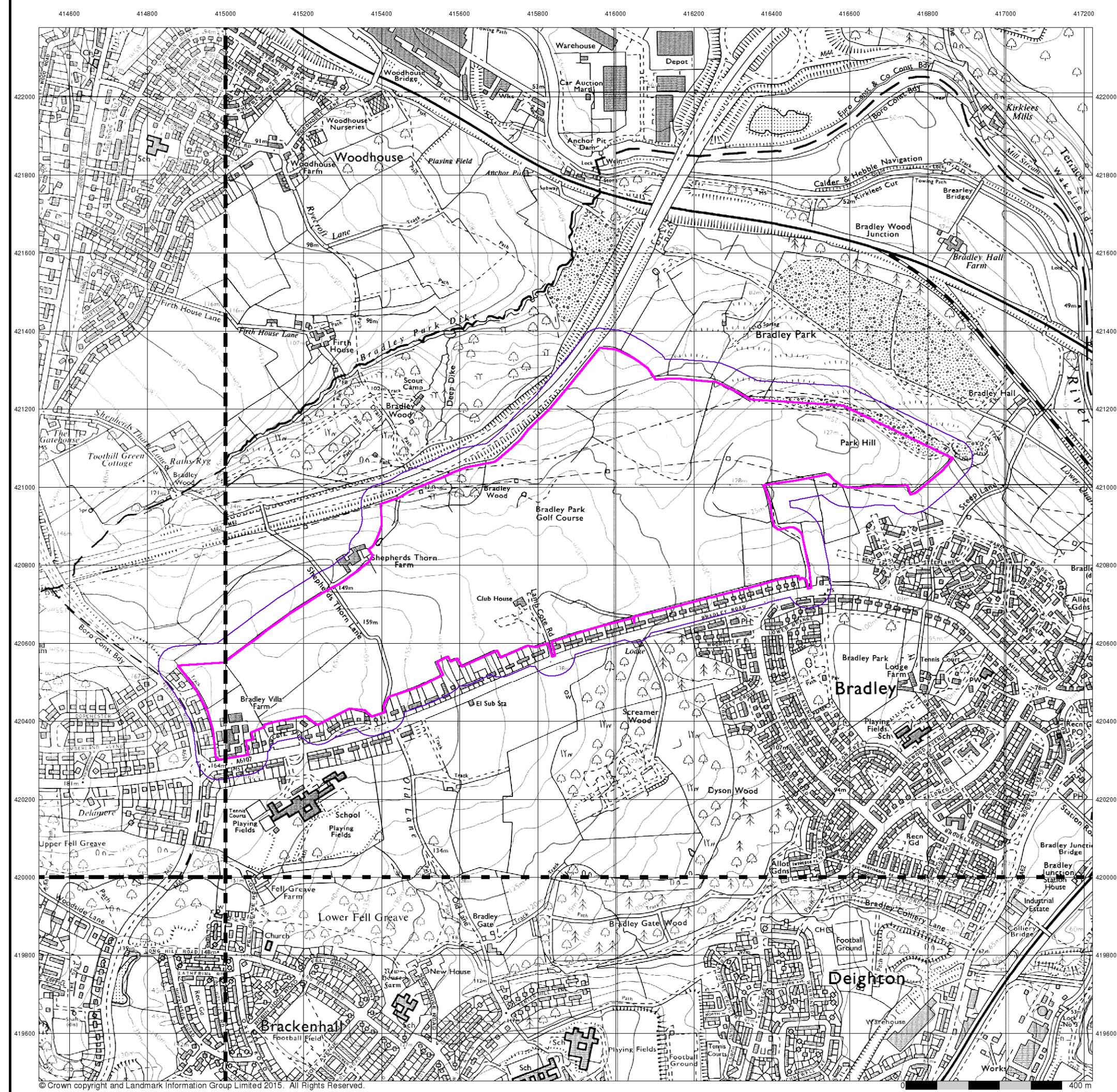
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 Customer Ref: 2311 Bradley Park, Huddersfield
 National Grid Reference: 415860, 420850
 Slice: A
 Site Area (Ha): 78.24
 Search Buffer (m): 50

Site Details

Site at 415500, 420600



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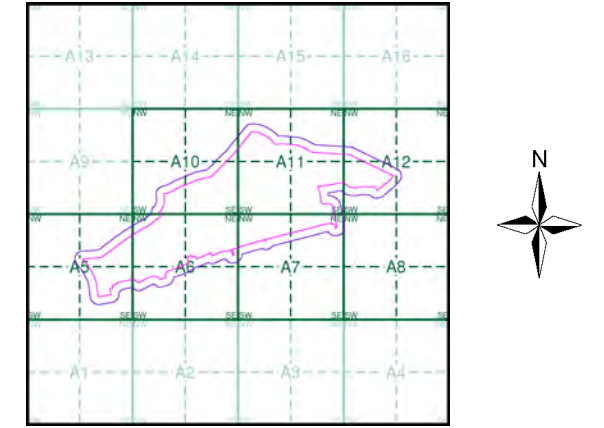
Ordnance Survey Plan
Published 1982 - 1989
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE12SW	SE12SE
1982	1988
1:10,000	1:10,000
SE11NW	SE11NE
1987	1989
1:10,000	1:10,000

Historical Map - Slice A



Order Details

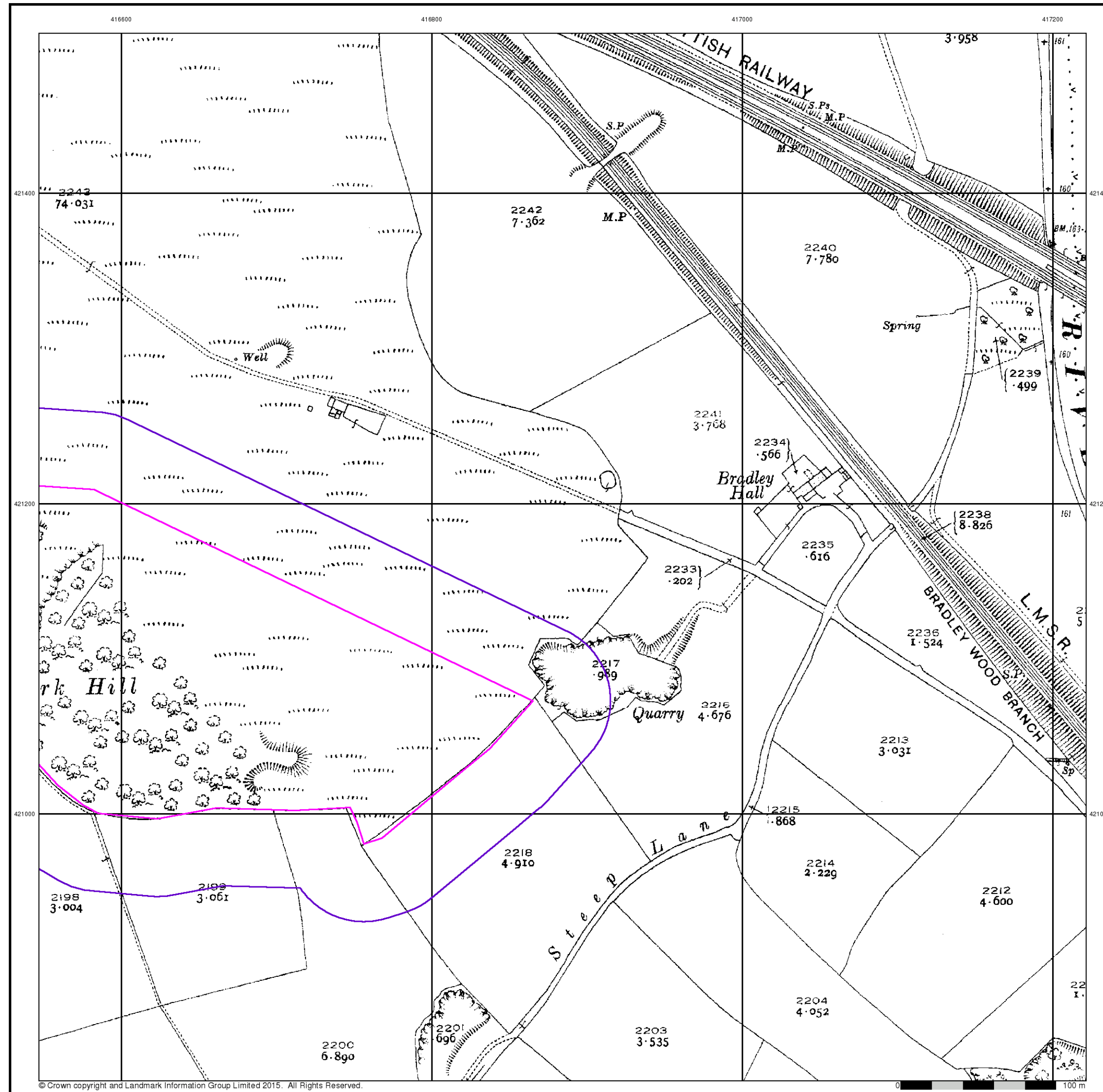
Order Number: 76826195_1_1
 Customer Ref: 2311 Bradley Park, Huddersfield
 National Grid Reference: 415860, 420850
 Slice: A
 Site Area (Ha): 78.24
 Search Buffer (m): 50

Site Details

Site at 415500, 420600



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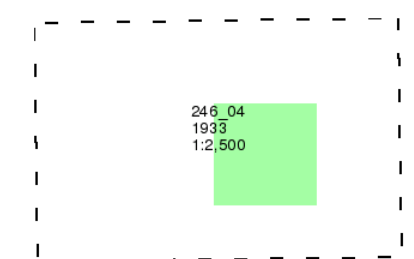
Yorkshire

Published 1933

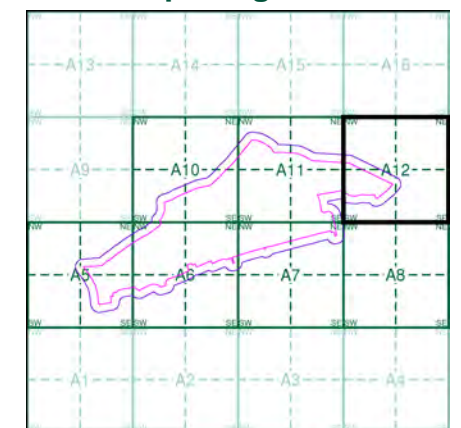
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A12



Order Details

Order Number: 76826195_1_1
 Customer Ref: 2311 Bradley Park, Huddersfield
 National Grid Reference: 415860, 420850
 Slice: A
 Site Area (Ha): 78.24
 Search Buffer (m): 50

Site Details

Site at 415500, 420600



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Ordnance Survey Plan

Published 1959 - 1962

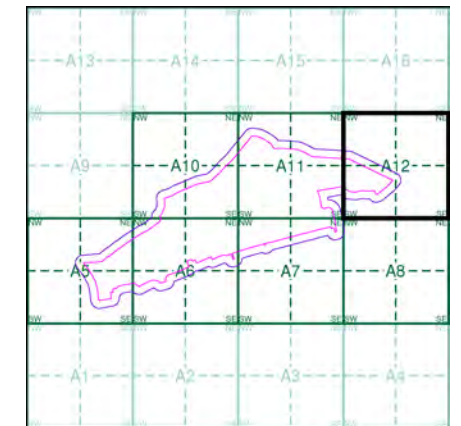
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SE 1621 1962 1:2,500	SE 1721 1962 1:2,500
SE 1620 1959 1:2,500	SE 1720 1959 1:2,500

Historical Map - Segment A12



Order Details

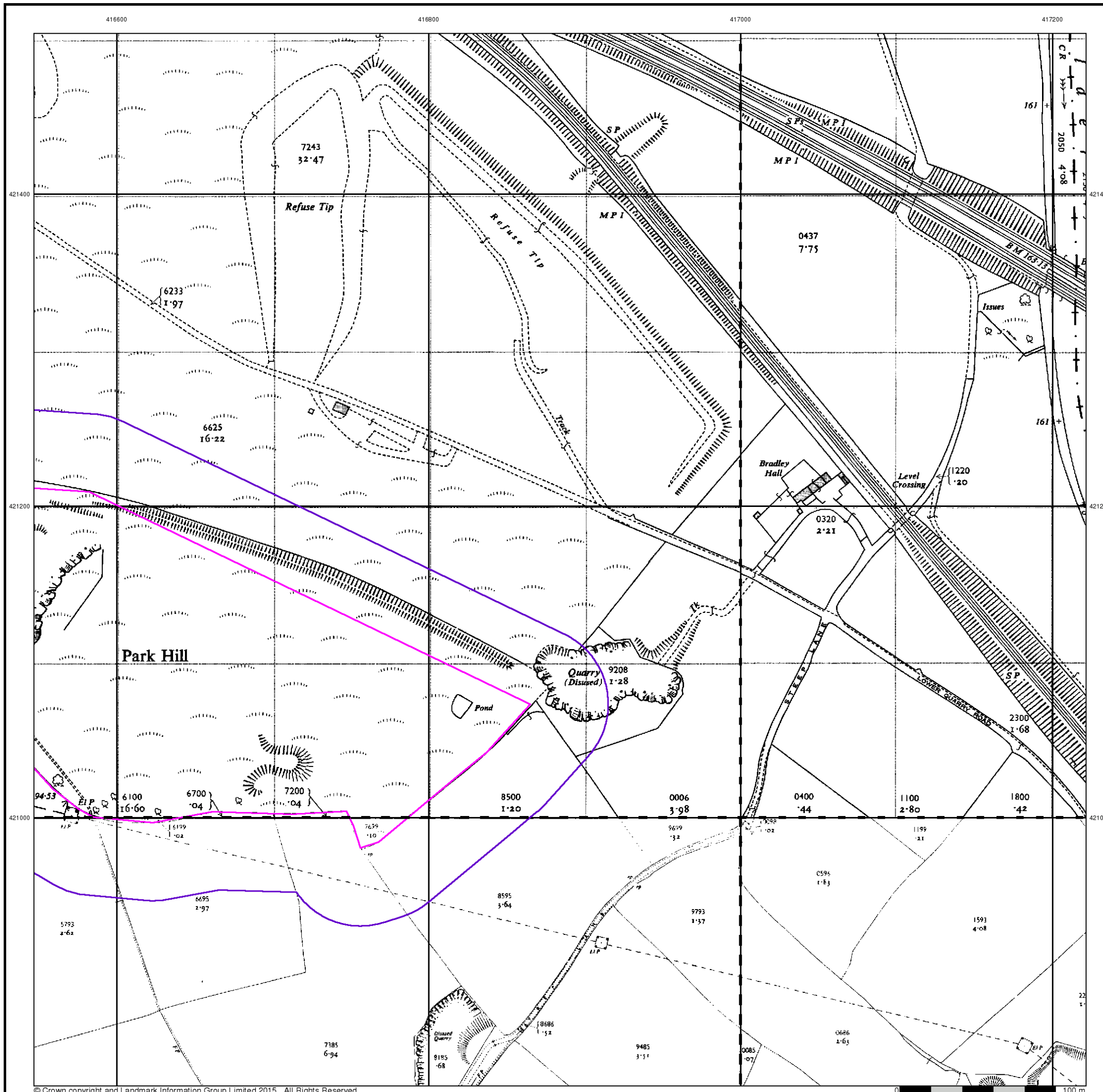
Order Number: 76826195_1_1
 Customer Ref: 2311 Bradley Park, Huddersfield
 National Grid Reference: 415860, 420850
 Slice: A
 Site Area (Ha): 78.24
 Search Buffer (m): 50

Site Details

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Supply of Unpublished Survey Information

Published 1974 - 1975

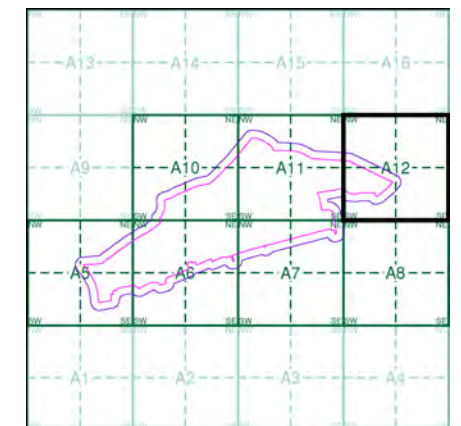
Source map scale - 1:2,500

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SE1621 1974 1:2,500	SE1721 1975 1:2,500
---------------------------	---------------------------

Historical Map - Segment A12



Order Details

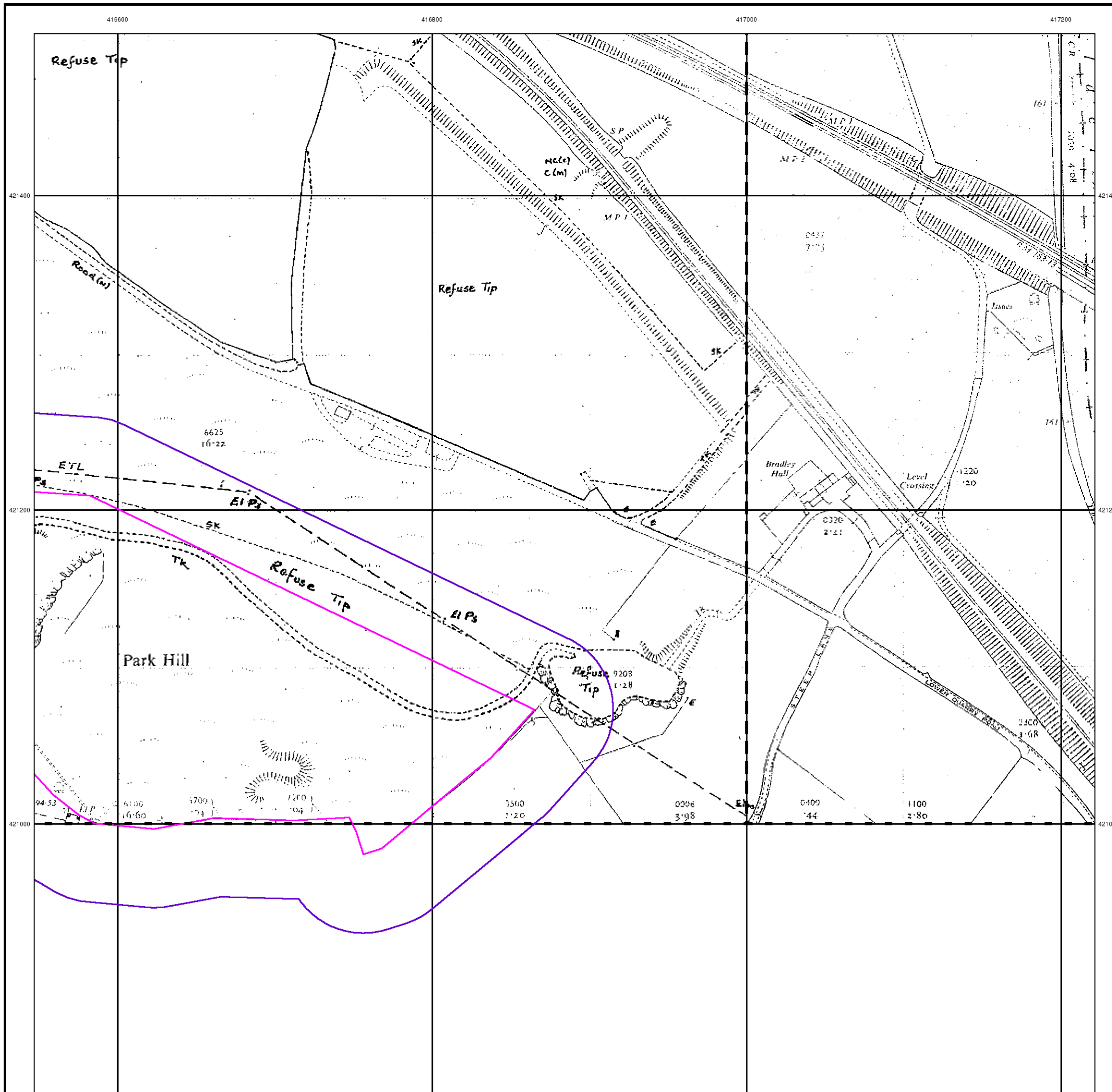
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 Customer Ref: 2311 Bradley Park, Huddersfield
 National Grid Reference: 415860, 420850
 Slice: A
 Site Area (Ha): 78.24
 Search Buffer (m): 50

Site Details

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Appendix E
Search Responses



Envirocheck[®] Report:

Datasheet

Order Details:

Order Number:

76826195_1_1

Customer Reference:

2311 Bradley Park, Huddersfield

National Grid Reference:

415860, 420850

Slice:

A

Site Area (Ha):

78.24

Search Buffer (m):

50

Site Details:

Site at 415500, 420600

Client Details:

Mr G Morton
Lithos Consulting Ltd
Parkhill
Walton Road
Wetherby
LS22 5DZ

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	6
Hazardous Substances	-
Geological	7
Industrial Land Use	16
Sensitive Land Use	17
Data Currency	18
Data Suppliers	22
Useful Contacts	23

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination. For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Site of Special Scientific Interest, National Nature Reserve, Ramsar, Special Protection Area, Special Conservation Area, Marine Nature Reserve data (derived from Ordnance Survey 1:10000 raster) is provided by, and used with the permission of, Natural England who retain the copyright and Intellectual Property Rights for the data.

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Radon Potential dataset Copyright Notice

Information supplied from a joint dataset compiled by The British Geological Survey and Public Health England.

Report Version v50.0

Data Type	Page Number	On Site	0 to 50m (*up to 250m)
Agency & Hydrological			
Contaminated Land Register Entries and Notices			
Discharge Consents	pg 1		4
Enforcement and Prohibition Notices			
Integrated Pollution Controls			
Integrated Pollution Prevention And Control			
Local Authority Integrated Pollution Prevention And Control			
Local Authority Pollution Prevention and Controls			
Local Authority Pollution Prevention and Control Enforcements			
Nearest Surface Water Feature		Yes	
Pollution Incidents to Controlled Waters	pg 2	1	
Prosecutions Relating to Authorised Processes			
Prosecutions Relating to Controlled Waters			
Registered Radioactive Substances			
River Quality			
River Quality Biology Sampling Points			
River Quality Chemistry Sampling Points			
Substantiated Pollution Incident Register			
Water Abstractions	pg 2		4
Water Industry Act Referrals			
Groundwater Vulnerability	pg 3	Yes	n/a
Bedrock Aquifer Designations	pg 3	Yes	n/a
Superficial Aquifer Designations			n/a
Source Protection Zones			
Extreme Flooding from Rivers or Sea without Defences			
Flooding from Rivers or Sea without Defences			
Areas Benefiting from Flood Defences			
Flood Water Storage Areas			
Flood Defences			
Detailed River Network Lines	pg 3	Yes	
Detailed River Network Offline Drainage			

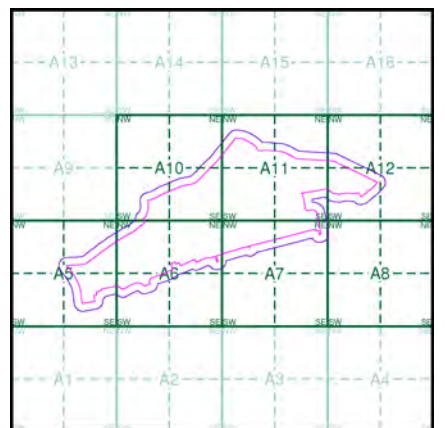
Data Type	Page Number	On Site	0 to 50m (*up to 250m)
Waste			
BGS Recorded Landfill Sites	pg 6	2	
Historical Landfill Sites	pg 6	1	
Integrated Pollution Control Registered Waste Sites			
Licensed Waste Management Facilities (Landfill Boundaries)	pg 6	1	
Licensed Waste Management Facilities (Locations)			
Local Authority Recorded Landfill Sites			
Registered Landfill Sites	pg 6	1	
Registered Waste Transfer Sites			
Registered Waste Treatment or Disposal Sites			
Hazardous Substances			
Control of Major Accident Hazards Sites (COMAH)			
Explosive Sites			
Notification of Installations Handling Hazardous Substances (NIHHS)			
Planning Hazardous Substance Consents			
Planning Hazardous Substance Enforcements			
Geological			
BGS 1:625,000 Solid Geology	pg 7	Yes	n/a
BGS Estimated Soil Chemistry	pg 7	Yes	Yes
BGS Recorded Mineral Sites	pg 13	3	
BGS Urban Soil Chemistry			
BGS Urban Soil Chemistry Averages			
Brine Compensation Area			n/a
Coal Mining Affected Areas	pg 13	Yes	n/a
Mining Instability	pg 13	Yes	n/a
Man-Made Mining Cavities			
Natural Cavities			
Non Coal Mining Areas of Great Britain			
Potential for Collapsible Ground Stability Hazards	pg 13	Yes	
Potential for Compressible Ground Stability Hazards	pg 14	Yes	Yes
Potential for Ground Dissolution Stability Hazards			
Potential for Landslide Ground Stability Hazards	pg 14	Yes	Yes
Potential for Running Sand Ground Stability Hazards	pg 15	Yes	Yes
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 15	Yes	
Radon Potential - Radon Affected Areas			n/a
Radon Potential - Radon Protection Measures			n/a

Data Type	Page Number	On Site	0 to 50m (*up to 250m)
Industrial Land Use			
Contemporary Trade Directory Entries	pg 16		2
Fuel Station Entries	pg 16		1
Sensitive Land Use			
Areas of Adopted Green Belt	pg 17	1	
Areas of Unadopted Green Belt			
Areas of Outstanding Natural Beauty			
Environmentally Sensitive Areas			
Forest Parks			
Local Nature Reserves			
Marine Nature Reserves			
National Nature Reserves			
National Parks			
Nitrate Sensitive Areas			
Nitrate Vulnerable Zones			
Ramsar Sites			
Sites of Special Scientific Interest			
Special Areas of Conservation			
Special Protection Areas			



- General**
- Specified Site
 - Specified Buffer(s)
 - Bearing Reference Point
 - Map ID
 - Several of Type at Location
- Agency and Hydrological**
- Contaminated Land Register Entry or Notice (Location)
 - Contaminated Land Register Entry or Notice
 - Discharge Consent
 - Enforcement or Prohibition Notice
 - Integrated Pollution Control
 - Integrated Pollution Prevention Control
 - Local Authority Integrated Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control Enforcement
 - Pollution Incident to Controlled Waters
 - Prosecution Relating to Authorised Processes
 - Prosecution Relating to Controlled Waters
 - Registered Radioactive Substance
 - River Network or Water Feature
 - River Quality Sampling Point
 - Substantiated Pollution Incident Register
 - Water Abstraction
 - Water Industry Act Referral
- Waste**
- BGS Recorded Landfill Site (Location)
 - BGS Recorded Landfill Site (Buffered Point)
 - EA Historic Landfill (Buffered Point)
 - EA Historic Landfill (Polygon)
 - Integrated Pollution Control Registered Waste Site
 - Licensed Waste Management Facility (Landfill Boundary)
 - Licensed Waste Management Facility (Location)
 - Local Authority Recorded Landfill Site (Location)
 - Local Authority Recorded Landfill Site
 - Registered Landfill Site
 - Registered Landfill Site (Location)
 - Registered Landfill Site (Point Buffered to 100m)
 - Registered Landfill Site (Point Buffered to 250m)
 - Registered Waste Transfer Site (Location)
 - Registered Waste Transfer Site
 - Registered Waste Treatment or Disposal Site (Location)
 - Registered Waste Treatment or Disposal Site
- Hazardous Substances**
- COMAH Site
 - Explosive Site
 - NIHHS Site
 - Planning Hazardous Substance Consent
 - Planning Hazardous Substance Enforcement
- Geological**
- BGS Recorded Mineral Site
- Industrial Land Use**
- Contemporary Trade Directory Entry
 - Fuel Station Entry

Site Sensitivity Map - Slice A



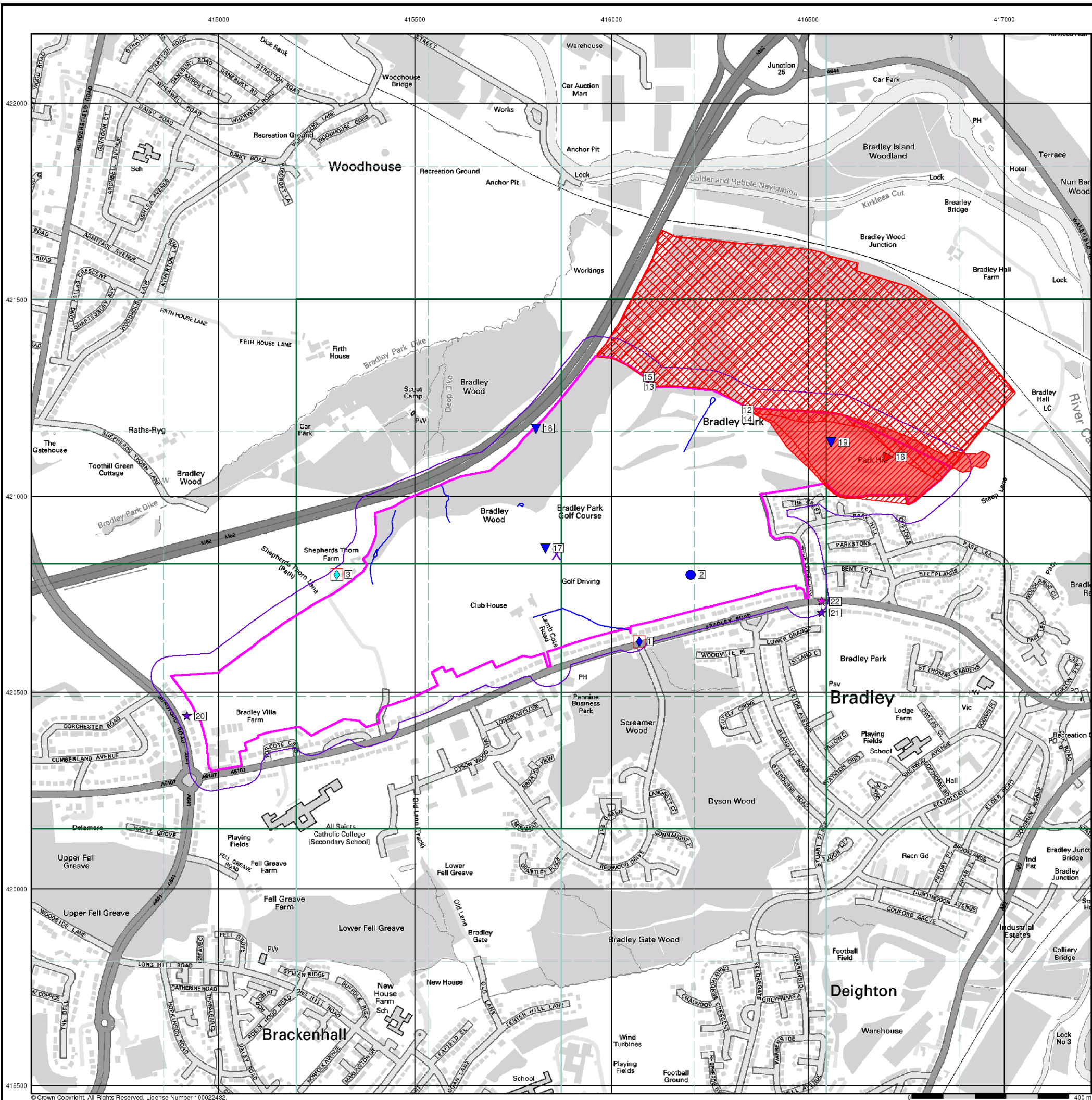
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Order Number: 76826195_1_1
 Customer Ref: 2311 Bradley Park, Huddersfield
 National Grid Reference: 415860, 420850
 Slice: A
 Site Area (Ha): 78.24
 Search Buffer (m): 50

Site Details

Site at 415500, 420600

Landmark Information Group
 Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



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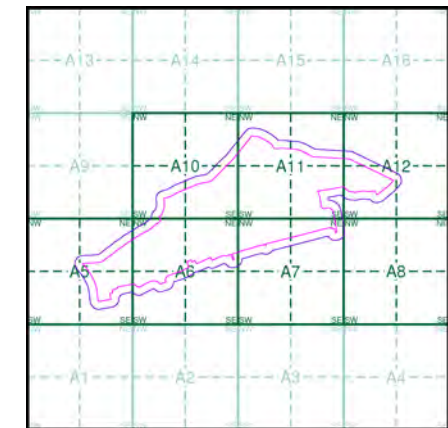
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

Order Number: 76826195_1_1
 Customer Ref: 2311 Bradley Park, Huddersfield
 National Grid Reference: 415860, 420850
 Slice: A
 Site Area (Ha): 78.24
 Search Buffer (m): 50

Site Details

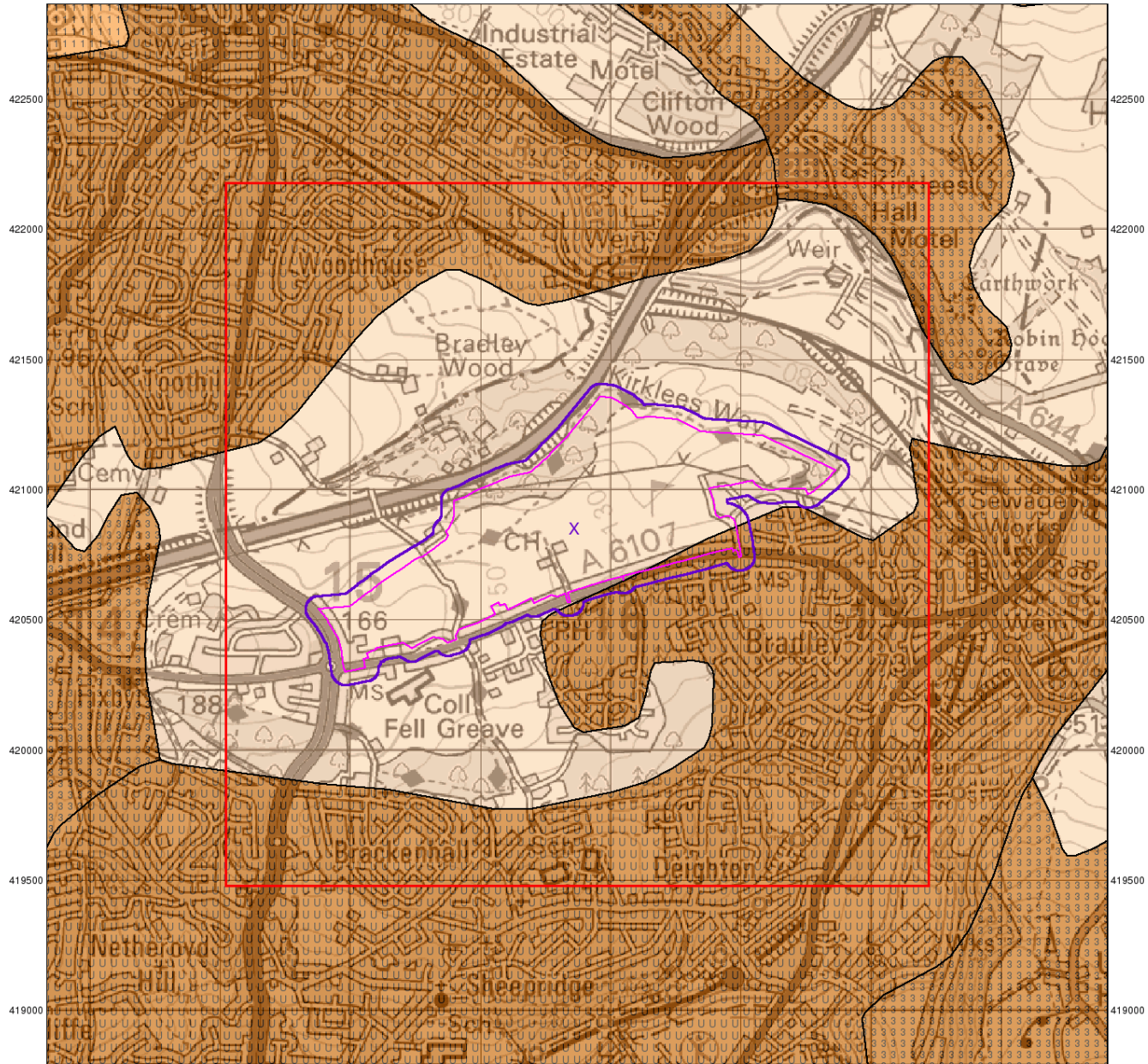
Site at 415500, 420600



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414000 414500 415000 415500 416000 416500 417000 417500



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0 1 km



Groundwater Vulnerability

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

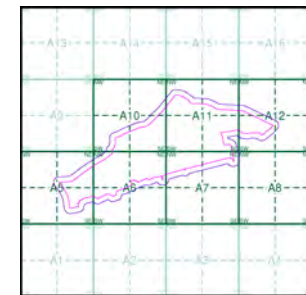
Agency and Hydrological

Geological Classes

- | | | |
|---|--|-----------------------|
| Major Aquifer (Highly Permeable) | | High (H) 1, 2, 3, U |
| | | Intermediate (I) 1, 2 |
| | | Low |
| Minor Aquifer (Variably Permeable) | | High (H) 1, 2, 3, U |
| | | Intermediate (I) 1, 2 |
| | | Low |
| Non Aquifer (Negligibly Permeable) | | |
| Water or Sea | | |
| Drift Deposit | | |

Soil Classes

Site Sensitivity Context Map - Slice A



Order Details

Order Number: 76826195_1.1
 Customer Ref: 2311 Bradley Park, Huddersfield
 National Grid Reference: 415860, 420850
 Slice: A
 Site Area (Ha): 78.24
 Search Buffer (m): 50

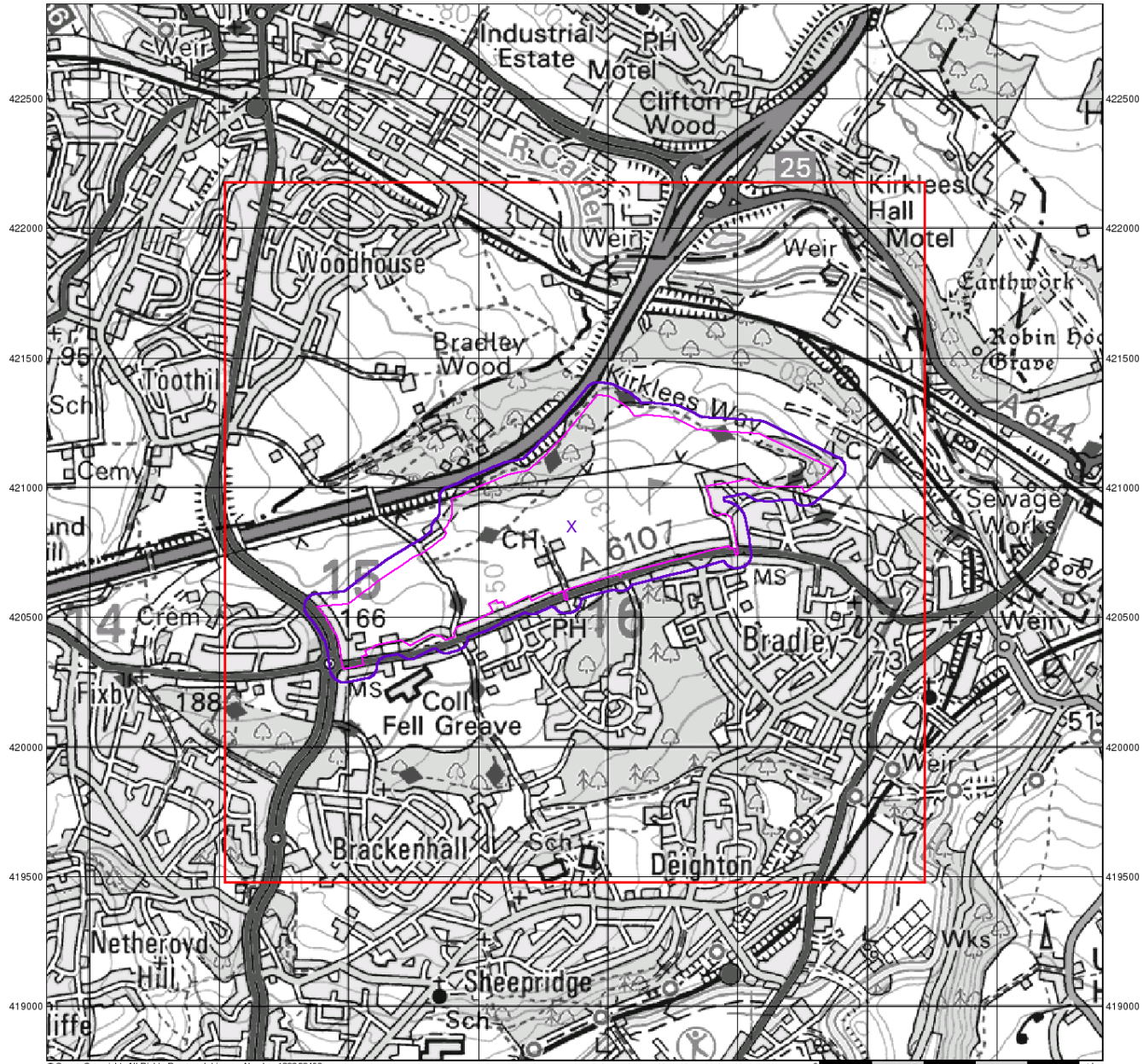
Site Details

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Source Protection Zones

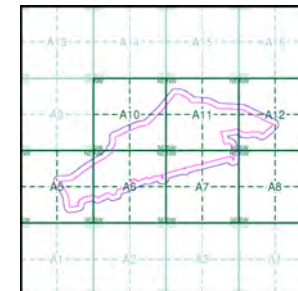
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



Order Details

Order Number: 76826195_1_1
 Customer Ref: 2311 Bradley Park, Huddersfield
 National Grid Reference: 415860, 420850
 Slice: A
 Site Area (Ha): 78.24
 Search Buffer (m): 50

Site Details

Site at 415500, 420600



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

Our Ref: WK/201526718
Your Ref: 2311/GLM
If calling please ask for: Michael Pogson

Date: 24th December 2015

Lithos Consulting
Parkhill Business Centre
Walton Road
Wetherby
LS22 5DZ

FAO: George Morton

Dear Sir / Madam

Site of Interest: Bradley Park, Bradley Road, Huddersfield

I refer to your recent enquiry regarding an Environmental Audit at the above site.

The following has been obtained from our records, but it should be noted that this information is not exhaustive.

Please find attached information pertaining to your request held by Kirklees Council.

The Environment Agency may hold further information regarding site ref: EA0053. The Environment Agency can be contacted on 03708 506 506.

I hope that this information is sufficient for you enquiry, but if you require any further information then please contact me.

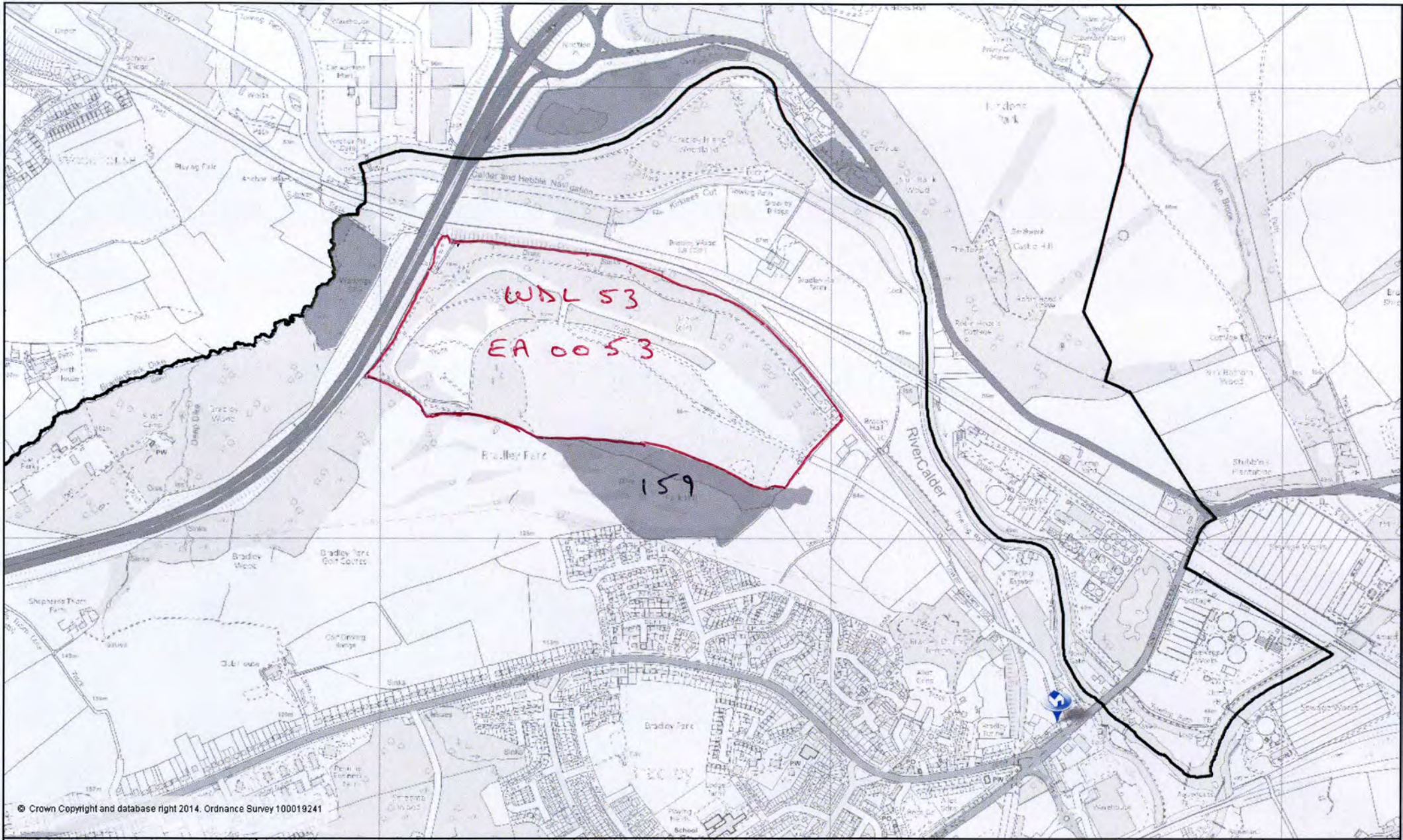
An invoice for providing this information will follow shortly.

Yours faithfully



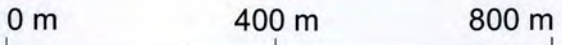
MICHAEL POGSON
Graduate Environmental Health Officer

Enclosures: Landfill Site Plan
Site 53 Information
Site 159 Information



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~~1, Lower Quarry Road, Bradley,~~
Huddersfield, HD5 0RR, UPRN=83089703



ADDRESS: Bradley Park Tip
Occupation Road
Off Lower Quarry Road
Bradley
Huddersfield

LICENCE HOLDER: Zeneca
Leeds Road
Huddersfield

LICENCE ISSUED: 13.6.1977

LICENCE CANCELLED:

INITIAL CAPACITY: 7.5 million m³

REMAINING CAPACITY:

WASTE TYPE:		tonnes / day
Inert non-flammable industrial wastes.		8
Contaminated demolition waste		30
Ash		5
Iron oxide		7.5
Asbestos		1.5
Gypsum		180
Effluent treated sludge		72
Settling Pit sludge		8
Solid still residues		8
Chemically contaminated rubbish		47
Filtration materials		2
Empty used containers		0.3
Laboratory waste		0.4
Mixed organic compounds		3
Sodium Carbonate		3.5
Tankered Sedimentation Tank Gypsum		20
Contaminated packaging		2
Inert construction & demolition waste		100
Foundry sand		20
Imported cover material		100

COMMENTS: Tipping started around 1945
A small area was leased to WYWM Oct 85 - June 86 for CA site waste disposal.
All of the area on the Golf Course slope is lined and capped.
New leachate lagoon installed 1992 - 1993
First site in country to use Asphaltic Concrete as cover.

GEOLOGY Residual clay over Clifton Rock

GRID REFERENCE SE 416558 421102	
LAND OWNERSHIP (2009) Kirklees MC (Cultural & Leisure Services).	
PREVIOUS LANDFORM Unknown.	
CURRENT LAND USAGE (2009) Golf course.	
TIPPING HISTORY	
Waste Disposal Licence:	No record of a Waste Disposal Licence having been issued for this site.
Waste type:	Thought to be industrial and household.
Depth of waste:	Unknown.
Quantity of waste:	Unknown.
Date of filling:	Started 1955, completion date unknown.
Landfill gas controls:	It is unlikely that any were installed here.
Leachate controls:	It is unlikely that any were installed here.
LANDFILL GAS GENERATION Shallow spike surveys carried out on the tipped area between 1990 and 1993. (results summary below)	
LEACHATE GENERATION The site was not monitored for leachate generation.	

Shallow spike surveys**Max Values % v/v**

DATE	CH4 % v/v	CO2 % v/v
30.12.93	< 0.1	1.0
12.9.91	0.1	
28.2.91	0.5	
21.8.90	< 0.1	
26.3.90	0.9	



CLOSED LANDFILL SITE 159
APPROXIMATE PLAN EXTENT OF TIPPING



Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

**LANDMARK INFORMATION GROUP
LIMITED
SOWTON INDUSTRIAL ESTATE
ABBAY COURT
UNIT 5/7 EAGLE WAY
EXETER
DEVON
EX2 7HY**

Our reference: **51001054942001**
Your reference: **76826195_2|**
Date of your enquiry: **11 December 2015**
Date we received your enquiry: **11 December 2015**
Date of issue: **11 December 2015**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

SITE AT 415500, 420600, WEST YORKSHIRE,

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.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

The property is in the likely zone of influence from workings in 2 seams of coal at shallow to 100m depth, and last worked in 1917.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

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

The property is not in an area that is likely to be affected at the surface from any planned future workings.

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

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

Within, or within 20 metres of, the boundary of the property there are 15 mine entries, the approximate positions of which are shown on the attached plan.

There is no record of what steps, if any, have been taken to treat the mine entries.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

For an additional fee, the Coal Authority will provide a supplementary Mine Entry Interpretive Report. The report will provide a separate assessment for the mine entry (entries) referred to in this report. It will give details based on information in the Coal Authority's possession, together with an opinion on the likelihood of mining subsidence damage arising from ground movement as a consequence of the existence of the mine entry/entries. It will also give details of the remedies available for subsidence damage where the mine entry was sunk in connection with coal mining.

Please note that it may not be possible to produce a report if the main building to the property cannot be identified from Coal Authority plans (ie. for development sites and new build).

For further advice on how to order this additional information visit www.groundstability.com or telephone 0345 7626 848.

Coal mining geology

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

Opencast coal mining

Past

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

Present

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

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

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.

Coal mining subsidence

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

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

The 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.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

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.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

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

Working facilities orders

The property is not in an area for which 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.

Payments to owners of former copyhold land

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

Comments on Coal Authority information

The attached plan shows the approximate location of the disused mine entry/entries referred to in this report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence act 1991*). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and the obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by telephoning 0345 762 6848.

If you wish to discuss the relevance of any of the information contained in this report you should seek the advice of a qualified mining engineer or surveyor. If you or your adviser wish to examine the source plans from which the information has been taken these are normally available at our Mansfield office, free of charge, by prior appointment, telephone 01623 637225. Should you or your adviser wish to carry out any physical investigations that may enter, disturb or interfere with any disused mine entry the prior permission of the owner must be sought. For coal mine entries the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). Our emergency telephone number at all times is 01623 646333.

*Note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

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.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

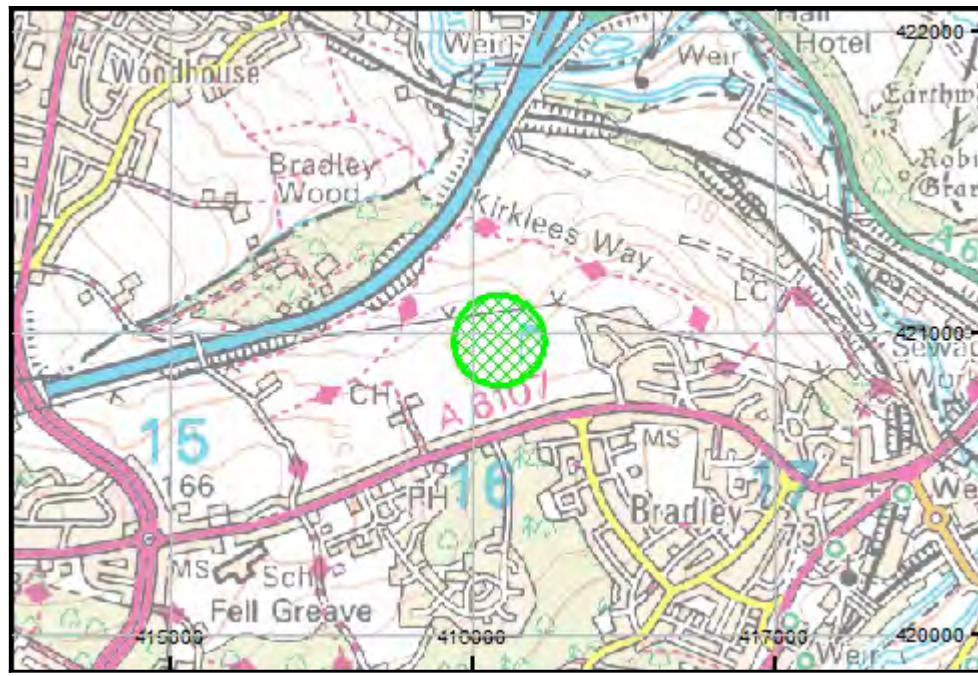
Additional Remarks

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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Location map

Approximate position of enquiry



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This plan shows the approximate location of the disused mine entry / entries referred to in the attached mining report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence Act 1991). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by telephoning 0345 762 6848.

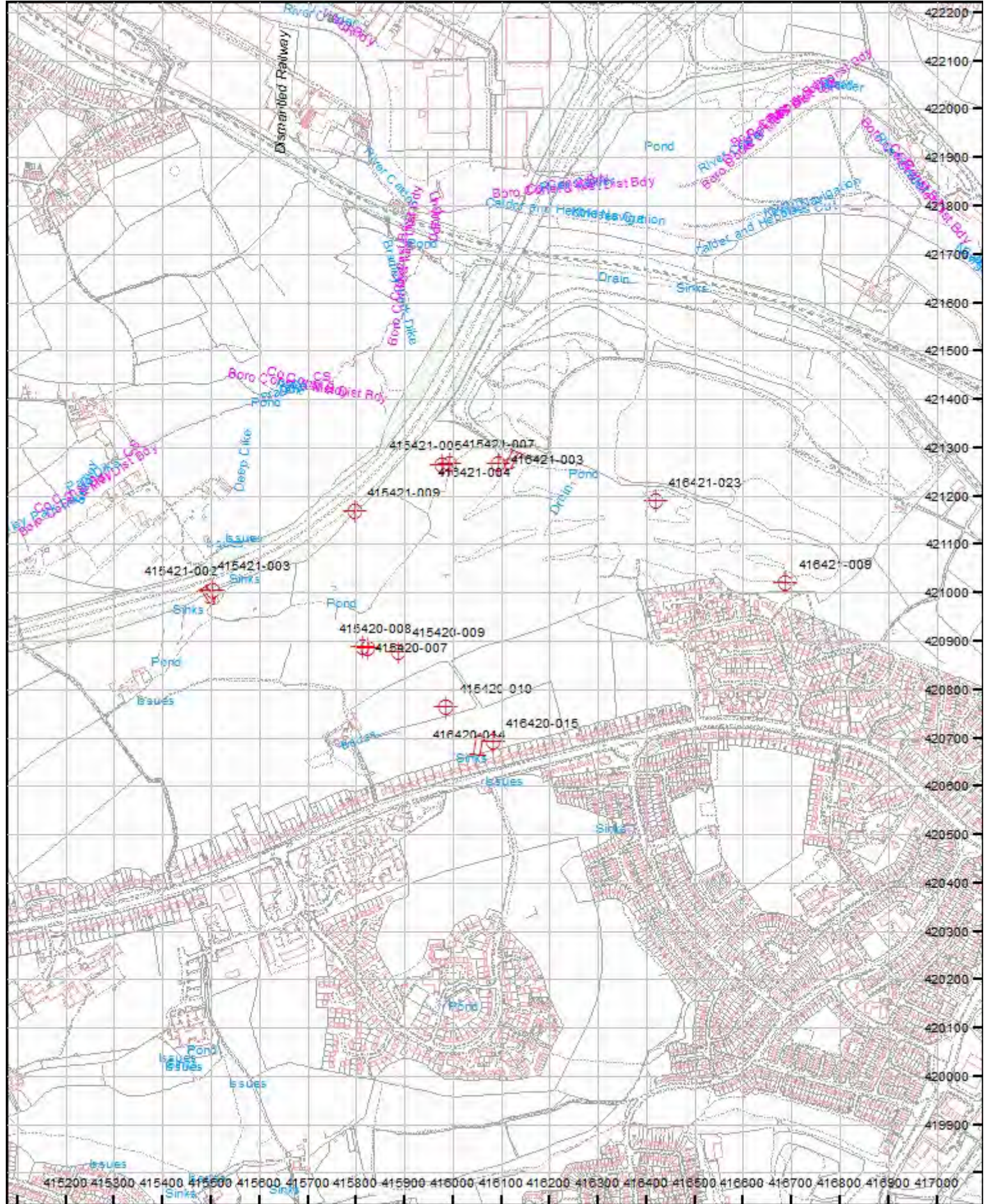
If you wish to discuss the relevance of any of the information contained in the attached report you should seek the advice of a qualified mining engineer or surveyor. If you or your advisor wish to examine the source plans from which the information has been taken these are available at our Mansfield office, free of charge by prior appointment, telephone 01623 637225. Should you or your advisor wish to carry out any physical investigations that may enter, disturb or interfere with any disused mine entry the prior permission of the owner must be sought. For coal mine entries the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries).

Our emergency telephone number at all times is 01623 646333.

Key

Disused Adit or Mineshaft





The Coal
Authority

Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

**LITHOS CONSULTING
45 HIGH STREET
SOUTH MILFORD
LEEDS
WEST YORKSHIRE
LS25 5AF**

Our reference: **51001056446001**
Your reference: **po10046 glm 2311**
Date of your enquiry: **16 December 2015**
Date we received your enquiry: **16 December 2015**
Date of issue: **21 December 2015**

This report is for the property described in the address below and the attached plan.

Shaft Plan and Data Sheets

BRADLEY ROAD, HUDDERSFIELD, HD2 1PZ

I refer to the enquiry dated 16 December 2015, received 16 December 2015, in connection with the above.

As requested I enclose the mine entry data sheet(s) held for the mine entry/entries referred to.

Mine Entry Data

Shaft/adit:	Shaft
Reference:	415420-007
Source:	Ab plans 11045/6 FGB273
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	415815
Northing:	420886
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	415420-010
Source:	Ab plan 11045/6
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	415988
Northing:	420762
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	415420-008
Source:	Ab plans 11045/6 FGB273. 1st and 2nd Ed. Geological.
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	45.7
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	415827
Northing:	420885
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	415420-009
Source:	Ab plan 11045/6
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	415890
Northing:	420877
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	415421-009
Source:	1st Ed. Geological
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	415798
Northing:	421167
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	415421-007
Source:	1st Ed. Geological
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	415995
Northing:	421266
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	415421-005
Source:	Ab plan 11045/8
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	415980
Northing:	421263
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Adit
Reference:	415421-003
Source:	Ab plan 6710
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	149
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	415484
Northing:	421009
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	415421-002
Source:	Ab plan 6710
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	3.3
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	415506
Northing:	421004
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	416420-015
Source:	Abn plan 11045/6
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	416084
Northing:	420690
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Adit
Reference:	416420-014
Source:	Ab plan 11045/6
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	9
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	416050
Northing:	420666
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Adit
Reference:	416421-004
Source:	Ab plan 11045/6. 2nd Ed. Geological.
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	206
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	416129
Northing:	421290
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	416421-003
Source:	Ab plan 11045/6
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	416095
Northing:	421264
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	416421-023
Source:	Ab plan 11058/22nd Ed. Geological.
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	416421
Northing:	421188
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	416421-009
Source:	Ab plan 11045/11. 2nd Ed. Geological.
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	416689
Northing:	421018
Other information:	None