Claycliffe Road, Barugh, Barnsley
Phase 1B Site Investigation

Prepared for

EON UK

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Summary

S M Foster Associates Limited undertook a site investigation at the former Peaking Plant site at Claycliffe Road, Barugh, Barnsley. The investigation consisted of the excavation of 4 trial pits and laboratory testing of 2 soil samples.

The investigation confirmed the presence of Made Ground including coke works fill materials, across the site. No evidence of significant hydrocarbon contamination in ground or groundwater was identified.

The site is located in an area of relatively low environmental sensitivity with respect to surface water and groundwater resources. Due to the absence of any significant hydrocarbon source it is concluded that the site represents low environmental risk and that no remedial action is necessary.

1 Introduction

1.1 S M Foster Associates Limited carried out a trial pitting investigation at the Barugh Peaking Plant Site under instruction from Power Technology and on behalf of EON UK plc. The investigation was commissioned following a Phase I desk study assessment undertaken by the Asset Management team of EON UK (Appendix I) which identified two small areas of surface hydrocarbon staining on hard standing at the northern side of the site.

1.2 The site comprises a rectangular compound with dimensions of approximately 41.5m by 26.4m. Approximately 60% of the site is underlain by areas of concrete hard standing which formerly supported 3 no. diesel engines together with fuel oil and coolant storage facilities. The remaining area of the site comprises areas of gravel hard standing. Whilst operational, fuel oil, engine oil and engine coolant were stored on site. The site was disconnected from the National Grid on 1st September 2004 and subsequently decommissioned. All plant and equipment has been removed from the site.

2 Site Investigation

2.1 A series of 4 trial pits were excavated on the 29th March 2006 using a machine excavator ('mini digger'). The locations of the pits are shown on Figure 1.

2.2 All four trial pits were located co-incident with areas where minor surface staining of the ground with hydrocarbons was evident as indicated on Figure 1. A walkover survey of the site indicated no evidence of hydrocarbon contamination at any other location within the site boundary.

2.3 One disturbed soil sample from each of trial pits 1, and 3 was tested for total petroleum hydrocarbons (TPH) and total poly-aromatic hydrocarbons (PAH) at a UKAS accredited laboratory.

3 Results of the Site Investigation

3.1 Geology

3.1.1 The general geology of the site is indicated on BGS Sheet 100 which shows the area to be underlain by Coal Measures without drift cover. The trial pits (Appendix II) encountered Made Ground consisting of gravel/hardcore above fill materials as follows:

- Made Ground was encountered in all of the pits although the depth varied considerably. In general Made Ground consisted of a 0.1m layer of clean gravel over grey hardcore to a depth of between 0.2m and 0.67m. Underlying fill materials appear to consist of coke works waste which is consistent with the historical use of the site (see Phase 1 report)

- Trial pit 1 terminated in stiff silty/sandy black brown clay which was encountered at a depth of 0.53mBGL.

3.1.2 As materials removed from all four trial pits consisted of clean Made ground deposits there was no justification to excavate to greater depth, particularly as the upper level at the site appears to have been constructed on a significant thickness of fill material.

3.2 Groundwater

3.2.1 Groundwater was not encountered in any of the four trial pits constructed at the site. Local topographic information indicates that the site is likely to be elevated well above the level of any local groundwater table which is likely to be related to the level of the River Dearne approximately 1km to the north.

3.2.2 The Coal Measures at Barugh are classified at Minor Aquifer. The presence of little or no drift results in a 'high vulnerability' classification by the Environment Agency.

3.3 Contamination

3.3.1 The areas of surface staining were highly localised and restricted to two small areas at the edge of hard standing. During the investigation there was no olfactory evidence of the presence of hydrocarbons and, with the exception of surface staining, no visual evidence of the presence of hydrocarbon contamination in any of the four trial pits.

3.3.2 The results of the laboratory analyses of disturbed soil samples (Appendix III) are summarised in Table 1 below. Samples were obtained from trial pits 1 and 3 and have been subject to analysis for total petroleum hydrocarbon and polyaromatic hydrocarbon content.

Table 1. Summary of Laboratory Analyses

Trial Pit	Sample Depth (m)	TPH (mg/kg)	PAH (mg/kg)	Comments
1	0.53	75	15	Located at area of surface staining
3	0.82	125	29	Located at area of surface staining

3.3.3 The results listed in Table 1 above are also plotted on Figure 1. The analytical results closely match the on-site observations and confirm that in general there is no significant hydrocarbon contamination at the site.

3.3.4 As indicated in the trial pit logs, with the exception of surface staining, there was no evidence of the presence of hydrocarbons in material excavated from any of the trial pits.

4 Risk Assessment

4.1 A qualitative risk assessment has been undertaken for the site and is summarised in tabular form as Table 2. Definitions used for the risk assessment are provided in Appendix IV.

4.2 The site is located in an area of relatively low environmental sensitivity and was formerly part of an industrial area, adjacent to Barugh Coke and By-products works which was subsequently redeveloped as an electrical transformer station.

4.3 The site investigation programme has provided evidence to indicate that there is no significant hydrocarbon contamination at the site. Localised surface staining resulting from spillage at the engine oil fill location does not represent hydrocarbon accumulation below the surface and is not considered to represent a contaminant source.

Table 2: Qualitative Risk Assessment – Petroleum Hydrocarbon Contamination

RECEPTOR	PATHWAY(S)	SOURCE- PATHWAY-RECEPTOR LINKAGE PROBABILITY	POTENTIAL IMPACT	RISK	COMMENTS
Groundwater					
Shallow groundwater in Made Ground	Infiltration through unsaturated zone	Unlikely	Negligible, local	Low	No source and no groundwater encountered. Site likely to be isolated from groundwater in Coal Measures by fill materials and clay deposits.
Coal Measures Minor Aquifer	Migration of free-phase of dissolved phase through overlying clay deposits	Unlikely	Low	Low	No source. No evidence to indicate potential for contaminant migration to Coal Measures groundwater
Surface Water	Lateral migration through unsaturated zone in Made Ground	Unlikely	Moderate	Low	No evidence of hydraulic connection to surface water system.
Human Health	Direct contact, ingestion, inhalation	Unlikely	Serious	Low	Industrial land use
Buildings and infrastructure	Migration of free-phase or dissolved phase	Unlikely	Low	Low	

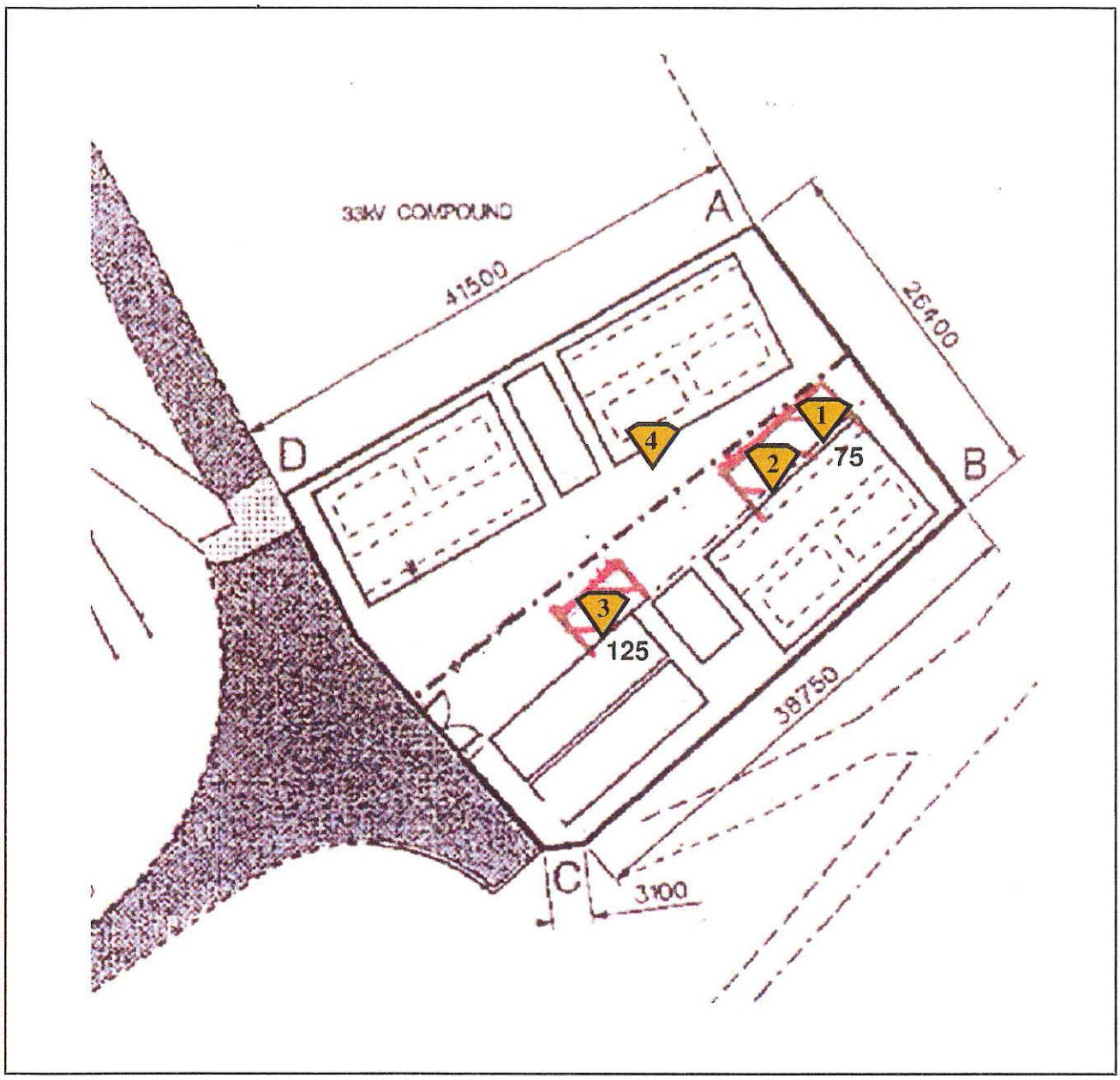
5 Site Remediation Proposals

5.1 The trial pit investigation was focused on areas of surface staining plus a series of other locations intended to provide representative coverage of the rest of the site. With the exception of localised surface spillage no significant hydrocarbon contamination of ground or groundwater was identified at the site. There is therefore no basis for proposing any ground or groundwater remediation.

6 Conclusions

- A series of 4 No. trial pits were excavated at the Barugh site. The investigation proved the presence of Made Ground with a thick ness of 0.53m to 0.82m. With the exception of localised surface spillage no hydrocarbon contamination of ground or groundwater was identified at the site.

- The site is located in an area of relatively low environmental sensitivity with respect to surface water and groundwater resources. Due to the absence of any significant hydrocarbon source it is concluded that the site represents low environmental risk and that no remedial action is necessary.



KEY

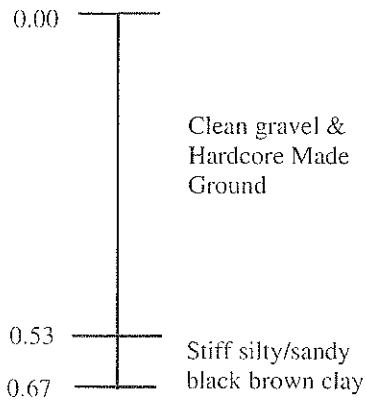
Area of surface staining

3
125

Trial pit location and TPH value

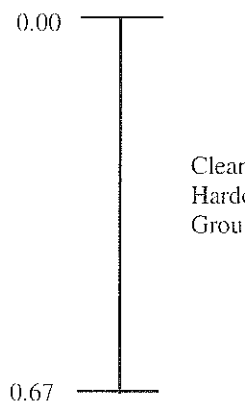
REF: Peaking Plant Phase 1B	DATE: JUNE 2006	FIGURE 1 BARUGH: Trial Pit Location Plan
ORIGIN:	APPROVED:	SMF S M FOSTER ASSOCIATES LIMITED *Hydrological Assessment and Management Consultants*

TP1


0.00
Clean gravel &
Hardcore Made
Ground
0.53
Stiff silty/sandy
black brown clay
0.67

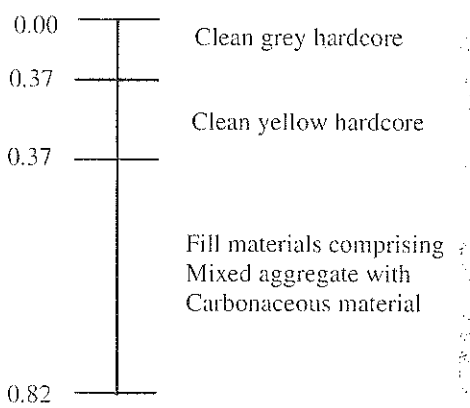


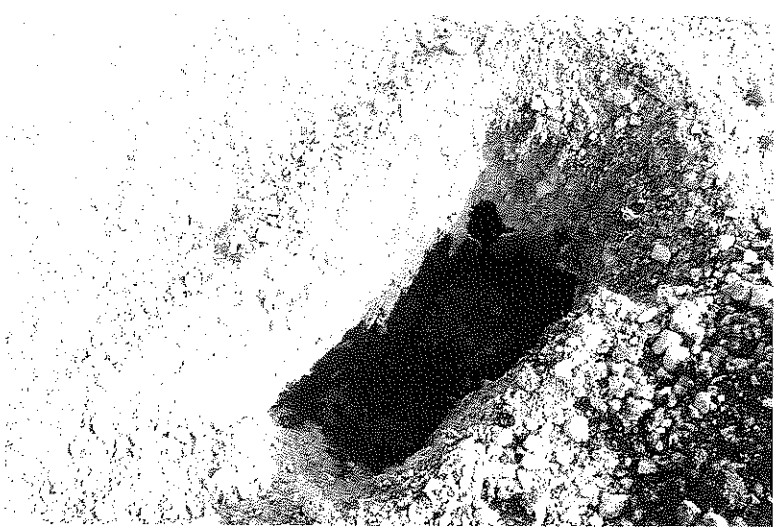
TP2


0.00
Clean gravel &
Hardcore Made
Ground
0.67



TP3


0.00
Clean grey hardcore
0.37
Clean yellow hardcore
0.37
Fill materials comprising
Mixed aggregate with
Carbonaceous material
0.82



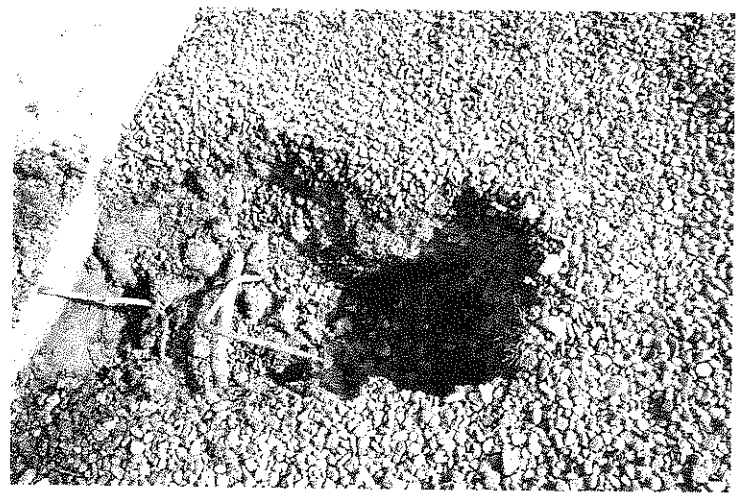
TP5

0.00 — Clean gravel

0.10 — Clean yellow hardcore

0.20 — Fill materials comprising Mixed aggregate with Carbonaceous material

0.60





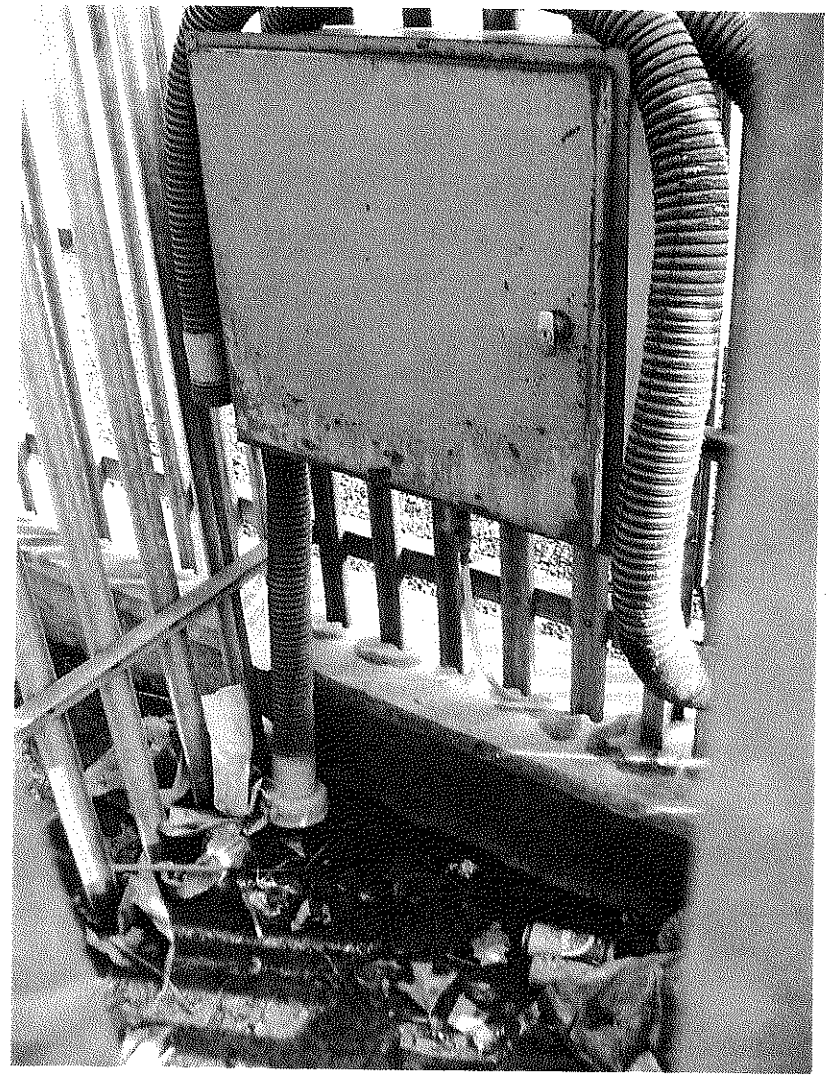


Barugh Figures 1 and 2
Peaking Plant Survey 19/04/05



Barugh Figure 3
Peaking Plant Survey 19/04/05





Barugh Figure 4 and 5
Peaking Plant Surveys 19/04/05



Barugh Figure 6
Peaking Plant Surveys 19/04/05

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APPROVED SIGNATORY

D R Credland
Team Leader

CERTIFICATE OF ANALYSIS

ISSUED BY : **E-ON UK plc**
DATE OF ISSUE : **03/11/2008** CERTIFICATE NUMBER : **06-255b**

Title	**ANALYSIS OF GROUNDWATER SAMPLES EX WARREN LANE/MONKTON ROAD/ECCLESFIELD/BARUGH/BRIGHOUSE**
To	N. Wildgust. Power Technology Ratcliffe – on - Soar Nottingham NG11 0EE
FAO	
Other Distribution	File (Environmental)
Date Received *Date of Analysis*	10 April 2006 10-20 April 2006
Our Reference *Job Number*	A2006255 R232
Description	The analysis has been sub contracted to a third party laboratory. **TPH:** The samples were solvent extracted, reduced in volume, spiked with an internal standard and analysed by Gas Chromatography utilising Flame Ionisation Detection (GC-FID). **PAHs:** The samples were solvent extracted, reduced in volume, spiked with an internal standard and analysed by Gas Chromatography Mass Spectrometry (GC/MS) against the EPA 16 suite of Polycyclic Aromatic Hydrocarbons (PAHs) plus Coronene.

CERTIFICATE OF ANALYSIS

ISSUED BY : **E-ON UK plc**
DATE OF ISSUE : **03 November 2008** CERTIFICATE NUMBER : **06-255b**

Non Speciated Analysis

TPH content of solids

Location	Laboratory Reference	TOTAL PETROLEUM HYDROCARBON (TPH) CONTENT (mg/kg)
Ecclesfield 29/3/06 No 1	$A2006-255-021	2370
Ecclesfield 29/3/06 No 2	$A2006-255-022	245
Ecclesfield 29/3/06 No 4	$A2006-255-023	22
Ecclesfield 29/3/06 No 7	$A2006-255-024	480
Barugh 29/3/06 No 1	$A2006-255-025	75
Barugh 29/3/06 No 3	$A2006-255-026	125
Brighouse 30/3/06 No 1	$A2006-255-027	3060
Brighouse 30/3/06 No 2	$A2006-255-028	96
Brighouse 30/3/06 No 5	$A2006-255-029	220
Brighouse 30/3/06 No 6	$A2006-255-030	19

PAH content of solids

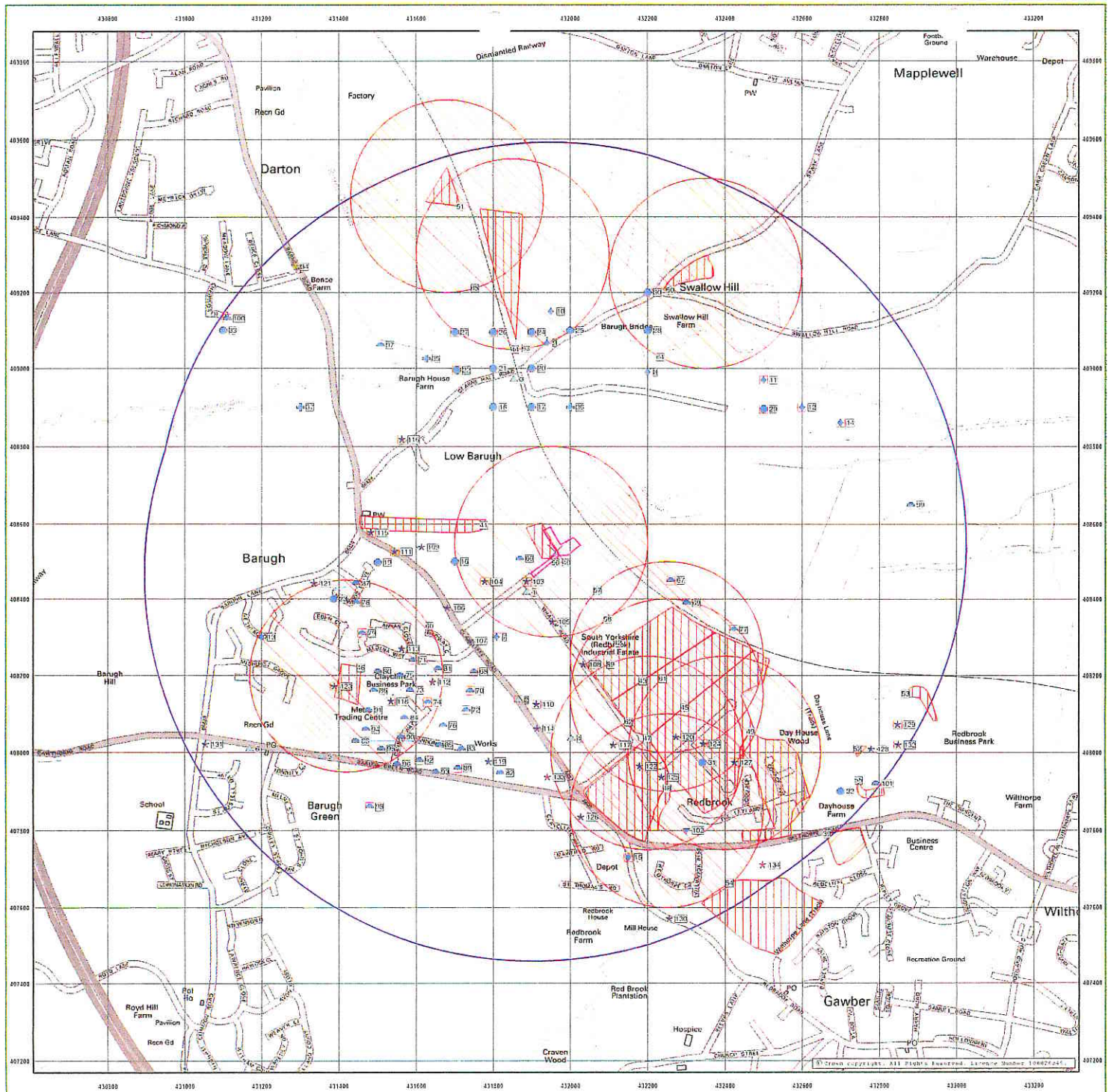
Location	Laboratory Reference	POLYCYCLIC AROMATIC HYDROCARBON (PAH) CONTENT (EPA16) (mg/kg)
Ecclesfield 29/3/06 No 1	$A2006-255-021	< 5
Ecclesfield 29/3/06 No 2	$A2006-255-022	13
Ecclesfield 29/3/06 No 4	$A2006-255-023	8
Ecclesfield 29/3/06 No 7	$A2006-255-024	13
Barugh 29/3/06 No 1	$A2006-255-025	15
Barugh 29/3/06 No 3	$A2006-255-026	29
Brighouse 30/3/06 No 1	$A2006-255-027	< 5
Brighouse 30/3/06 No 2	$A2006-255-028	< 5
Brighouse 30/3/06 No 5	$A2006-255-029	< 5

CERTIFICATE OF ANALYSIS

ISSUED BY : **E-ON UK plc**
DATE OF ISSUE : **03 November 2008** CERTIFICATE NUMBER : **06-255b**

Brighouse 30/3/06 No 6	$A2006-255-030	< 5

Any opinions and interpretations expressed are outside the scope of UKAS accreditation.
Determinations marked $ were sub-contracted.
Unless otherwise stated, Power Technology was not responsible for sampling.



Envirocheck®

A Landmark® product

CLIENT DETAILS Envirocheck Order No. EC10901121_1_1

Customer Ref: Mr A Black,PP / Barugh / EC1
E.on
Westwood Way Westwood Business Park
Coventry
Warwickshire CV4 8LG

SITE DETAILS Grid Reference 431960 408530

Barugh Peaking Plant
Claycliffe Road
Barugh
Barnsley
Yorkshire S75 1LT

KEY TO THE LEGEND DATABASE

General

- Specified Site
- Bearing Reference Point
- Buffer (1000m)
- Reference Number
- Several of Type at Location

Agency and Hydrological

- Air Pollution Control
- Air Pollution Control Enforcement
- Point Location of Contaminated Land Register Entry or Notice
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement Or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Pollution Incident to Controlled Waters
- Substantiated Pollution Incident Register
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Quality Sampling Point
- Water Abstraction
- Water Industry Act Referral

Waste

- Point Location of BGS Recorded Landfill Site
- BGS Recorded Landfill Site
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facilities (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Point Location of Local Authority Recorded Landfill Site
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Point Location of Registered Waste Transfer Site
- Registered Waste Transfer Site
- Point Location of Registered Waste Treatment or Disposal Site
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Geological

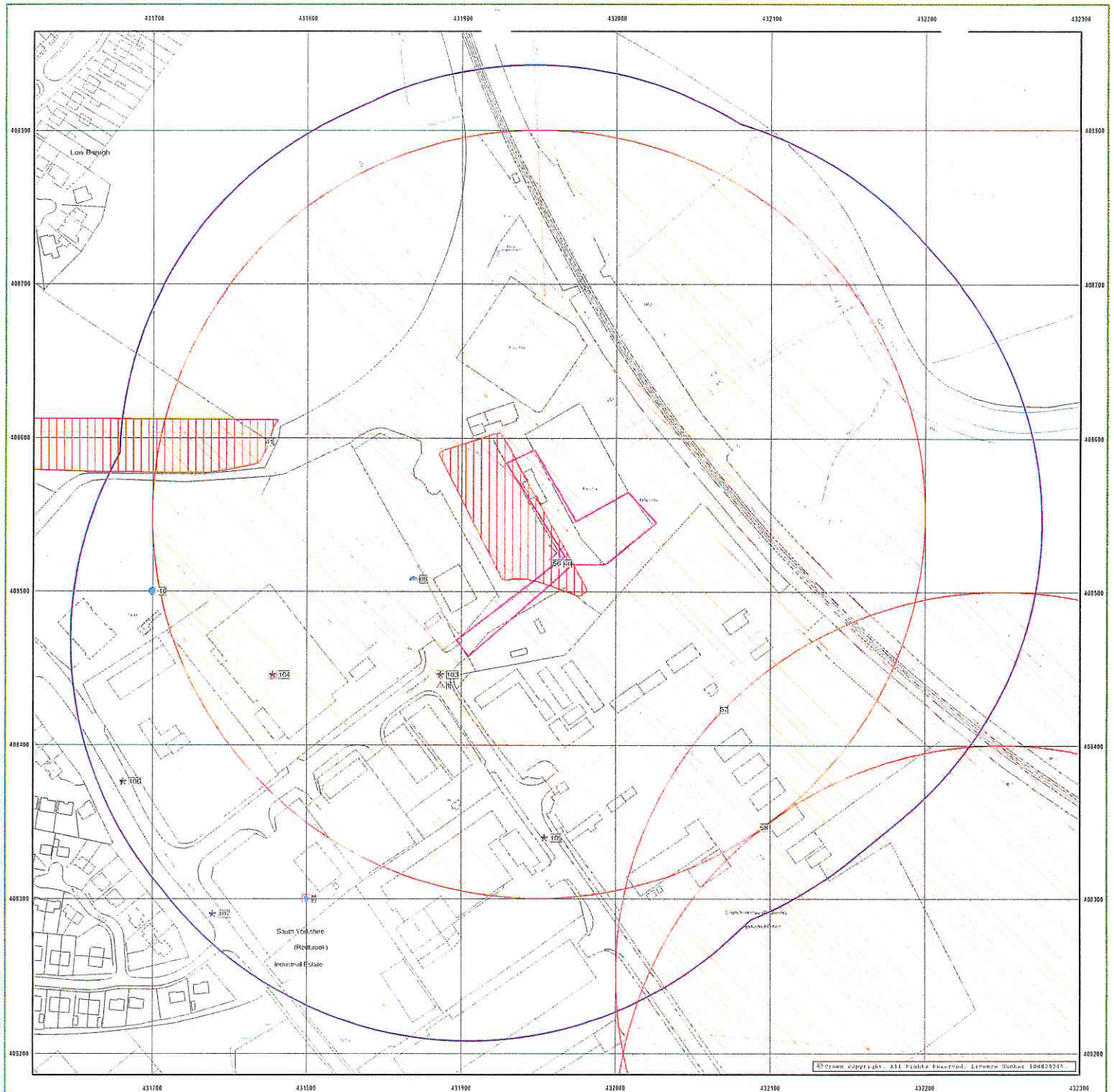
- BGS Borehole
- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

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Envirocheck®

A Landmark product

CLIENT DETAILS Envirocheck Order No. EC10901121_1_1

Customer Ref: Mr A Black,PP / Barugh / EC1
E.on
Westwood Way Westwood Business Park
Coventry
Warwickshire CV4 8LG

SITE DETAILS Grid Reference 431960 408530

Barugh Peaking Plant
Claycliffe Road
Barugh
Barnsley
Yorkshire S75 1LT

KEY TO THE LEGEND DATABASE

General

- Specified Site
- Bearing Reference Point
- Buffer (250m)
- Reference Number
- Several of Type at Location
- Pylon
- Overhead Transmission Line

Agency and Hydrological

- Air Pollution Control
- Air Pollution Control Enforcement
- Point Location of Contaminated Land Register Entry or Notice
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement Or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Pollution Incident to Controlled Waters
- Substantiated Pollution Incident Register
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Water Abstraction
- Water Industry Act Referral

Waste

- Point Location of BGS Recorded Landfill Site
- BGS Recorded Landfill Site
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facilities (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Point Location of Local Authority Recorded Landfill Site
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Point Location of Registered Waste Transfer Site
- Registered Waste Transfer Site
- Point Location of Registered Waste Treatment or Disposal Site
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Geological

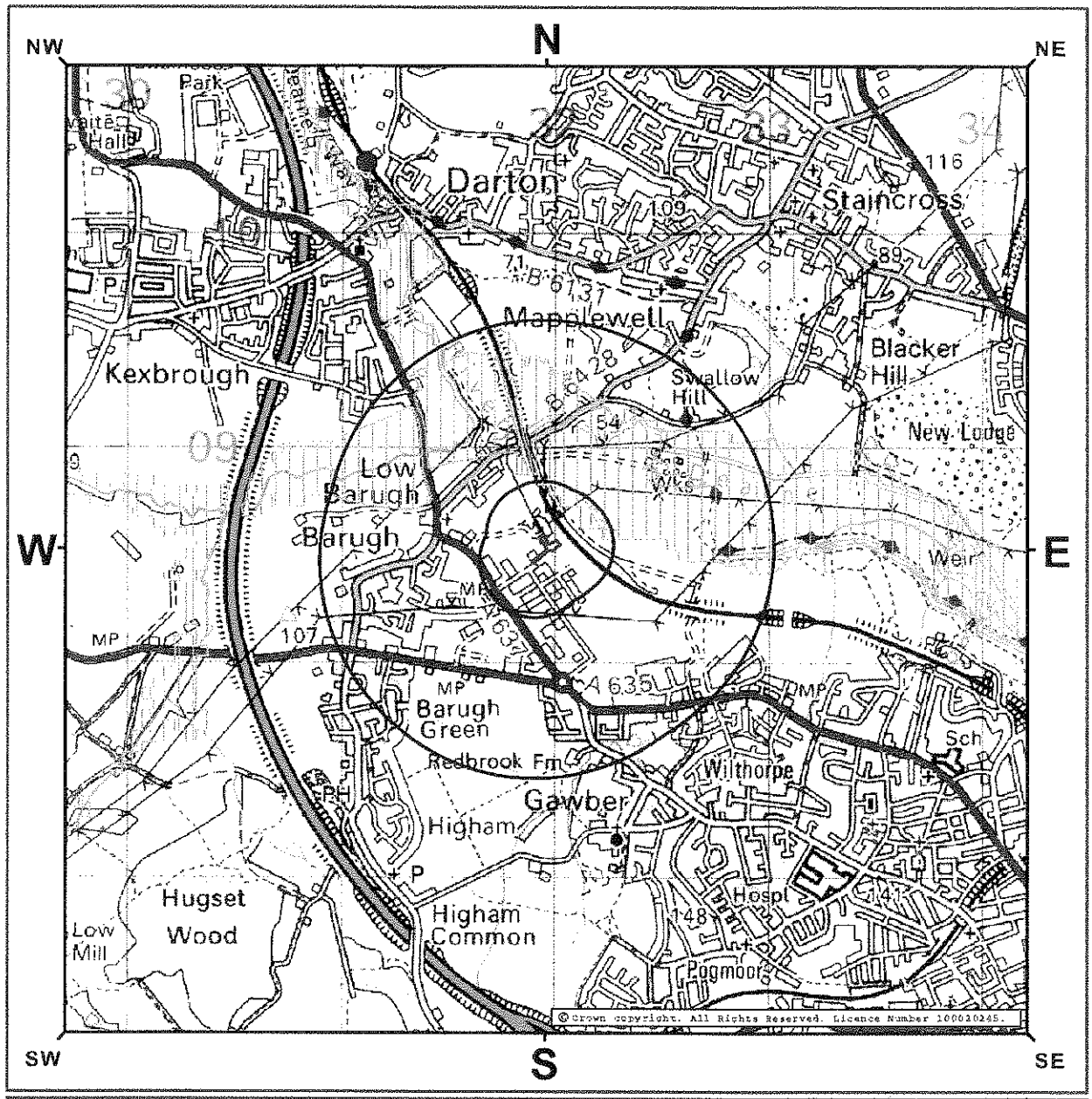
- BGS Borehole
- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

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KEY

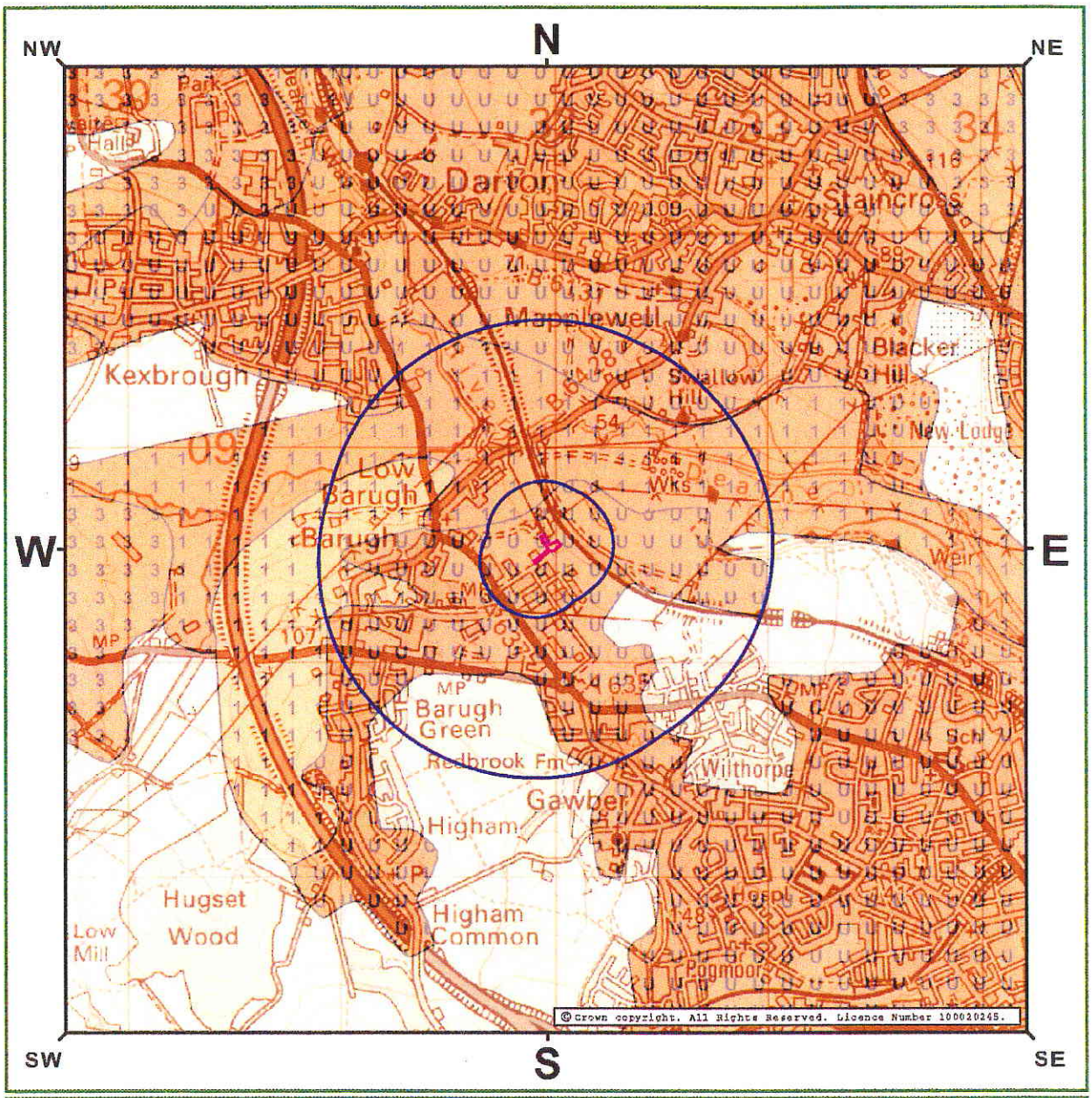
General

- Specified Site
- Bearing Reference Point
- Buffer

Agency & Hydrological

Environment Agency Indicative Floodplain

- Indicative Fluvial Floodplain
- Indicative Tidal Floodplain



KEY

General

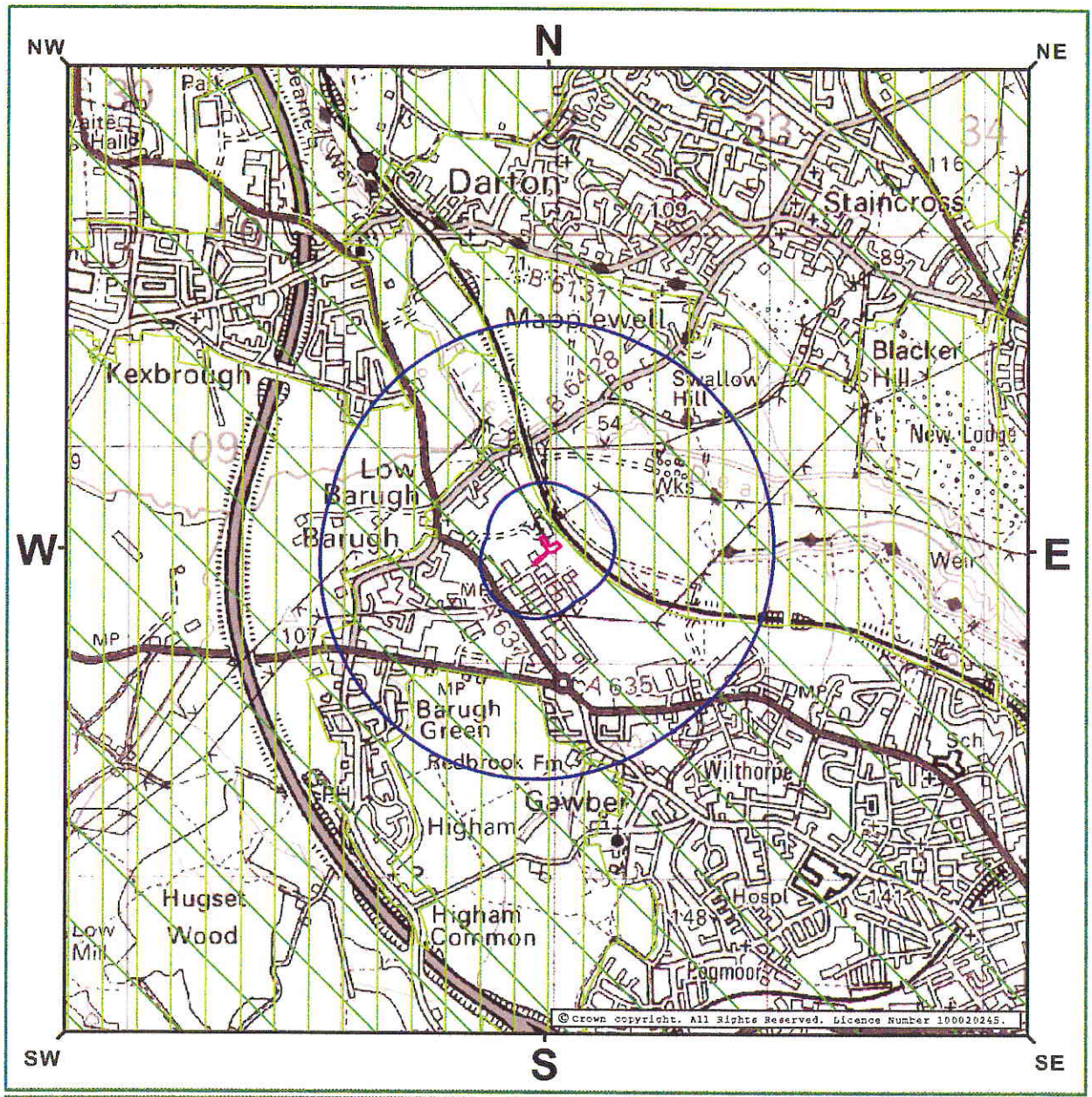
- Specified Site
- Bearing Reference Point
- Buffer

Groundwater Vulnerability

Geological Classes

Soil Classes

Major Aquifer (High Permeable)	High (H) 1, 2, 3, U	Drift Deposit
	Intermediate (I) 1, 2	
	Low	
Minor Aquifer (Variable Permeable)	High (H) 1, 2, 3, U	
	Intermediate (I) 1, 2	
	Low	
Non Aquifer (Negligibly Permeable)		



KEY

General

- Specified Site
- Bearing Reference Point
- Buffer

Sensitive Land Uses

- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- National Scenic Area
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area