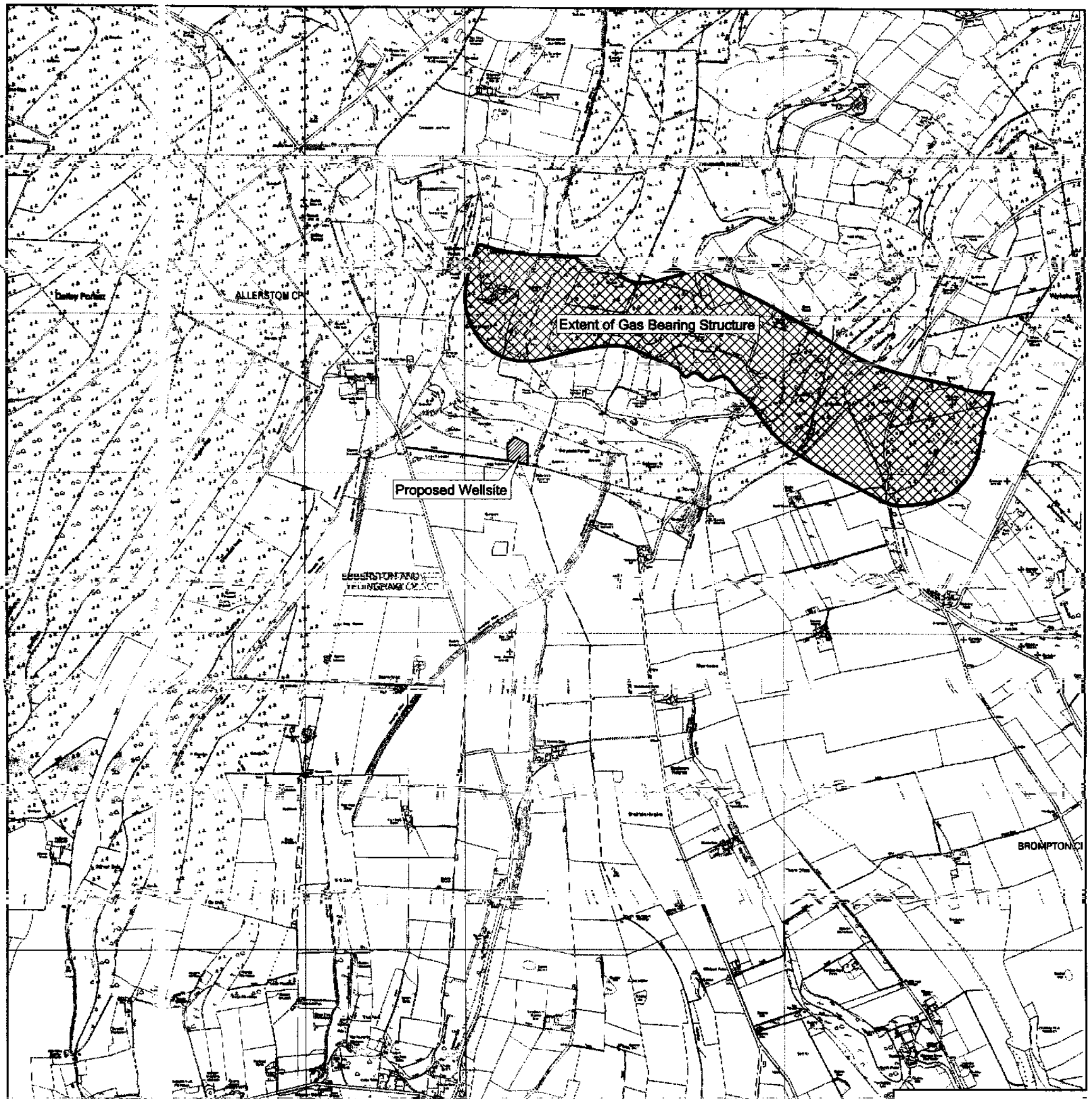
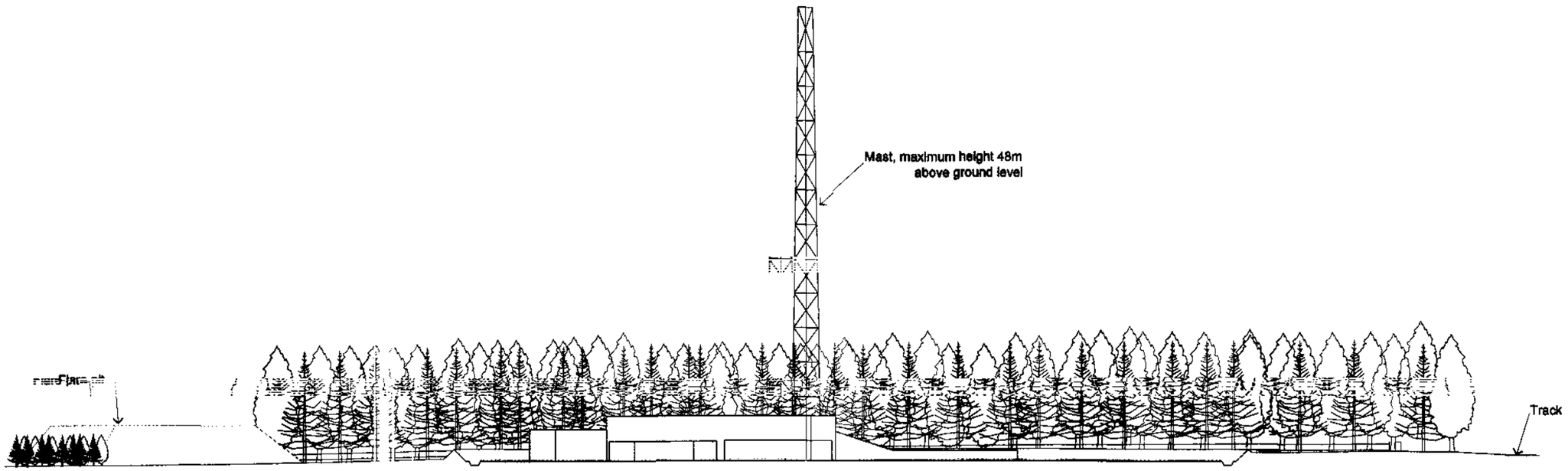


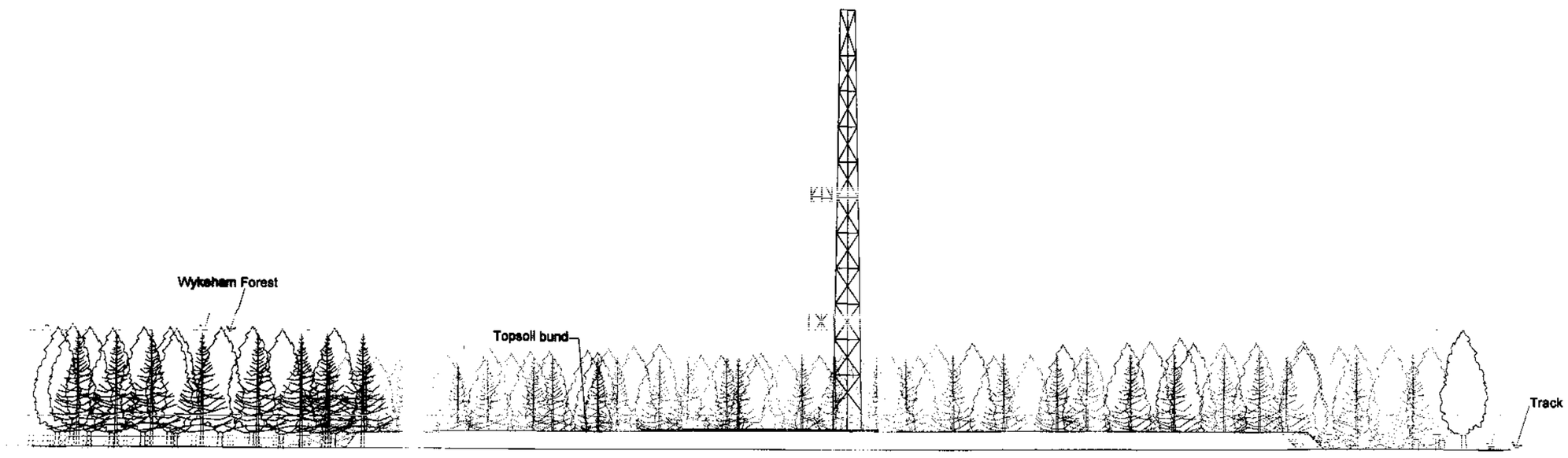
Client	Warwick Energy Exploration & Production Limited
	D Langham FRTPI ~~Consultant Chartered~~ Town Planner (01969) 625800
Job Title	PEDL 120 Ebberston Prospect ~~Ebberston Moor~~ North Yorkshire
Drawing Title	Proposed Target Area
Scale	1:25,000
Date	August 2007
Drawn by	MDWB
Drawing No.	WE/EB2/01
Rev.	

YM / 2007 / 11901 / 51

NYM/ 2007 / 0901 / FL



SectionA - A
Scale 1500



Section AA - AA
Scale 1:500

Client
Warwick Energy Exploration & Production Limited

Consultant Chartered Town Planner
(01969) 625800

Job Title
PEDL 120
Ebberston Pre-Project

Ebberston Moor
North Yorkshire

Drawing Title
Site Sections A-A & AA-AA

Scale 1:500

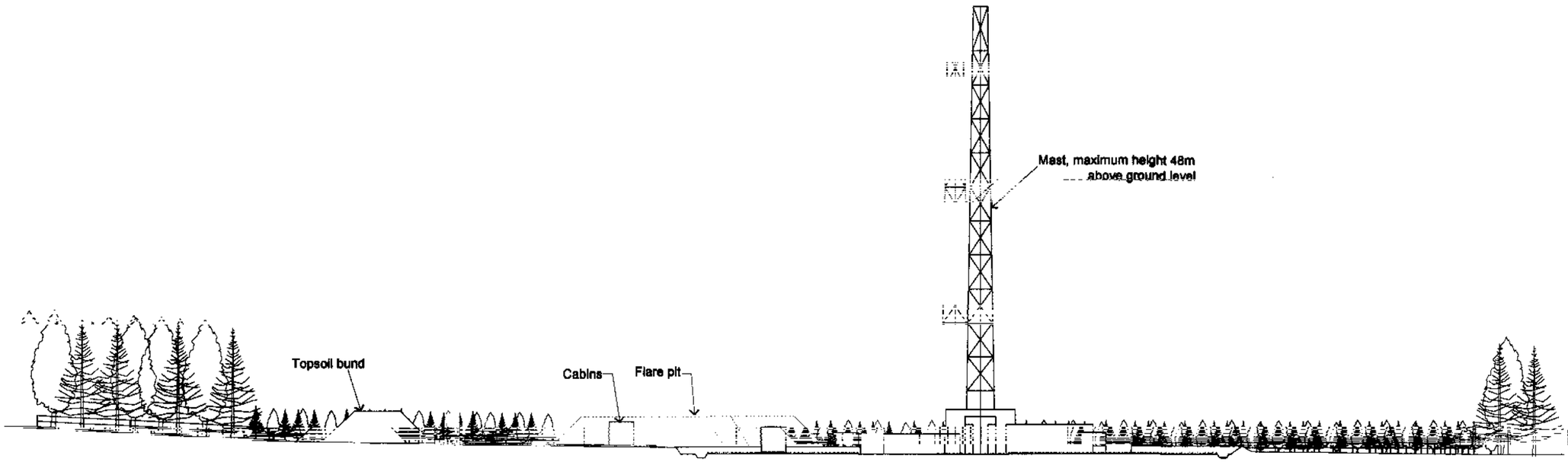
Date July 2007

Drawn by AJNE

Drawing No. WE/EB2/08a

Rev.

NYM/ 2007 / 0901 / FL



Section B - B
Scale 1:500

Client
Warwick Energy Exploration & Production Limited

D Langham FRTPI
Consultant Chartered
Town Planner
(01969) 625800

Job Title
PEDL 120
Ebberston Prospect
Ebberston Moor
North Yorkshire

Drawing Title
Site Section B-B

Scale 1:500

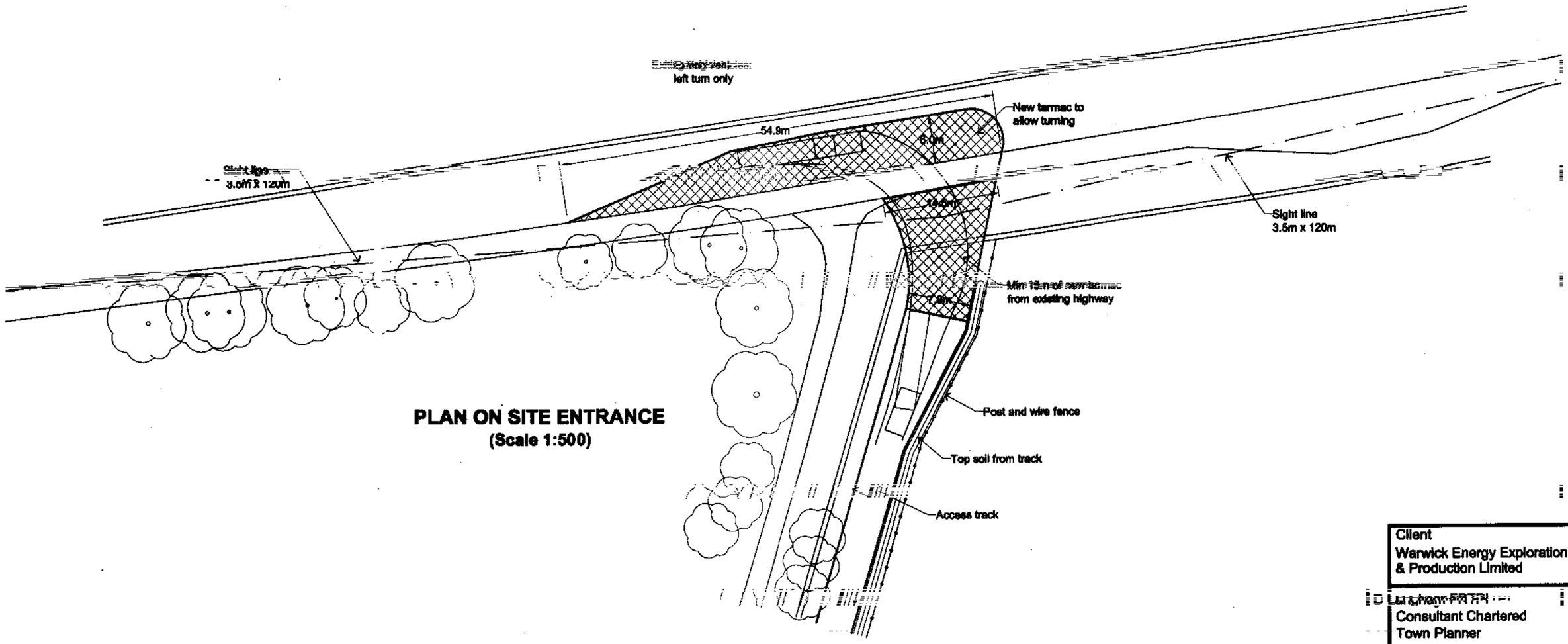
Date July 2007

Drawn by AJNE

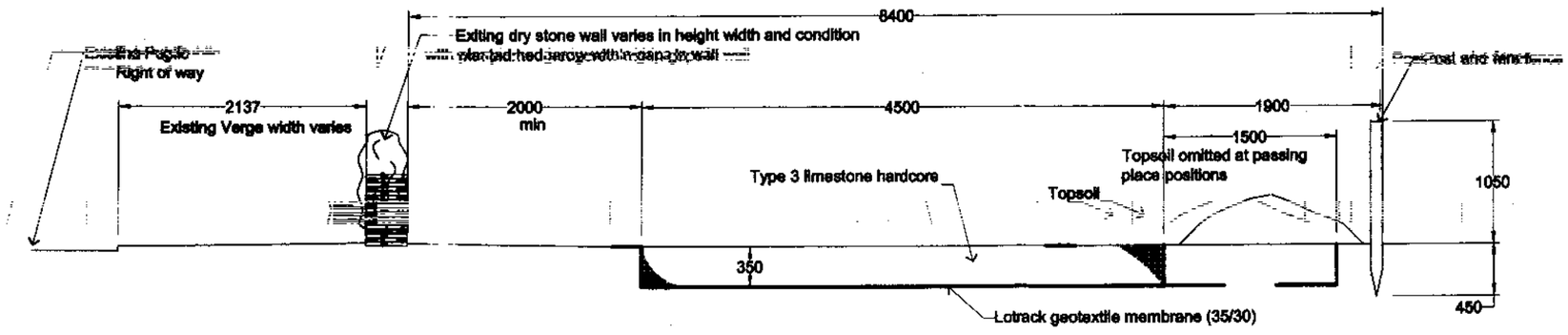
Drawing No. WE/EB2/8b

Rev.

NYM / 2007 / 0901 / FL



PLAN ON SITE ENTRANCE
(Scale 1:500)



TYPICAL SECTION THROUGH ACCESS TRACK
(Scale 1:50)

Client	Warwick Energy Exploration & Production Limited
[illegible]	Consultant Chartered Town Planner (01969) 625800
Job Title	PEDL 120 Ebberston Prospect Ebberston Moor North Yorkshire
Drawing Title	Site Entrance and Access Track Details
Scale	1:500
Date	August 2007
Drawn by	WB
Drawing No.	WE/EB2/04
Rev.	A

NYM/ 2007 / 0901 / FL

Post and Wire Fence

4.5m

Topsoil Bund

Subsoil Bund

Huts
&
Car Parking

21m

73m

Change Cabin

Shower WC

Mess

Tool Pusher

Interceptor Ditch

35m

10m

35m

Seperator

Generator

Generator

Test Choke Meter

Run Out

Rig

Mix Tank

Choke Manifold

Mud Tank

Mud Tank

FBG

CF

FBG

Storage
47m

12.5m

Flare Pit

Flare Line

Client
Warwick Energy Exploration & Production Limited

Consultant Chartered Town Planner
(01969) 625800

Job Title
PEDL 120
Exploration Project
Ebberston Moor
North Yorkshire

Drawing Title
Site Layout
(Full Site Application Only)

Scale
1:500

Date
August 2007

Drawn by
WB

Drawing No.
WE/EB2/06

Rev.

NYM/ 2007 / 0901 / FL

Post and Wire Fence

4.5m

Topsoil Bund

Subsoil Bund

Office
&
Car Parking

73m

21m

Interceptor Ditch

35m

10m

35m

Site
Office

Wireline Unit

Crane

Coil Tubing Unit

Coil Tubing Unit

Choke

Heater

Separat

Flare
Line

Flare
Pit

Storage

47m

Fire tank

24m

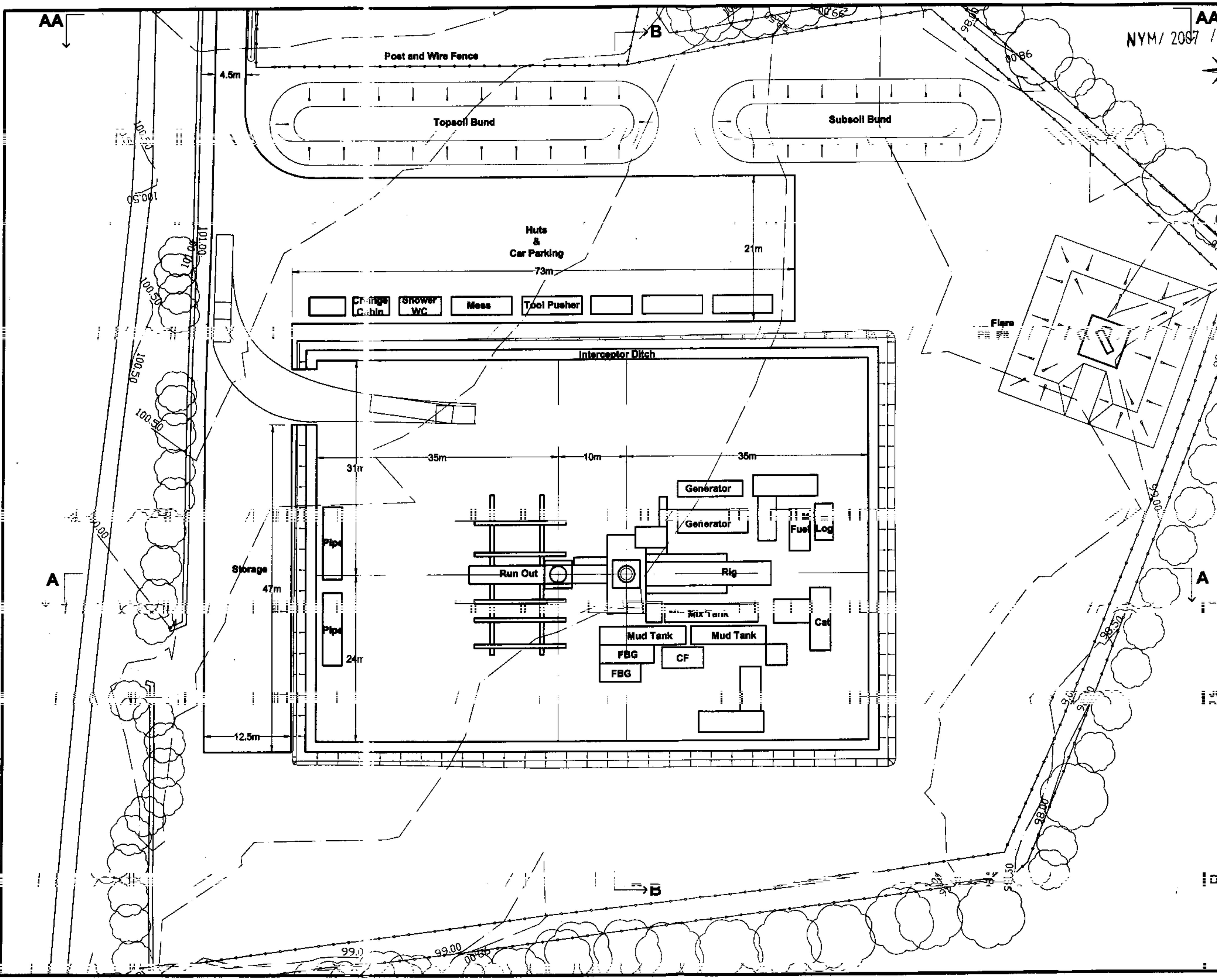
Fire tank

12.5m

Storage Tank

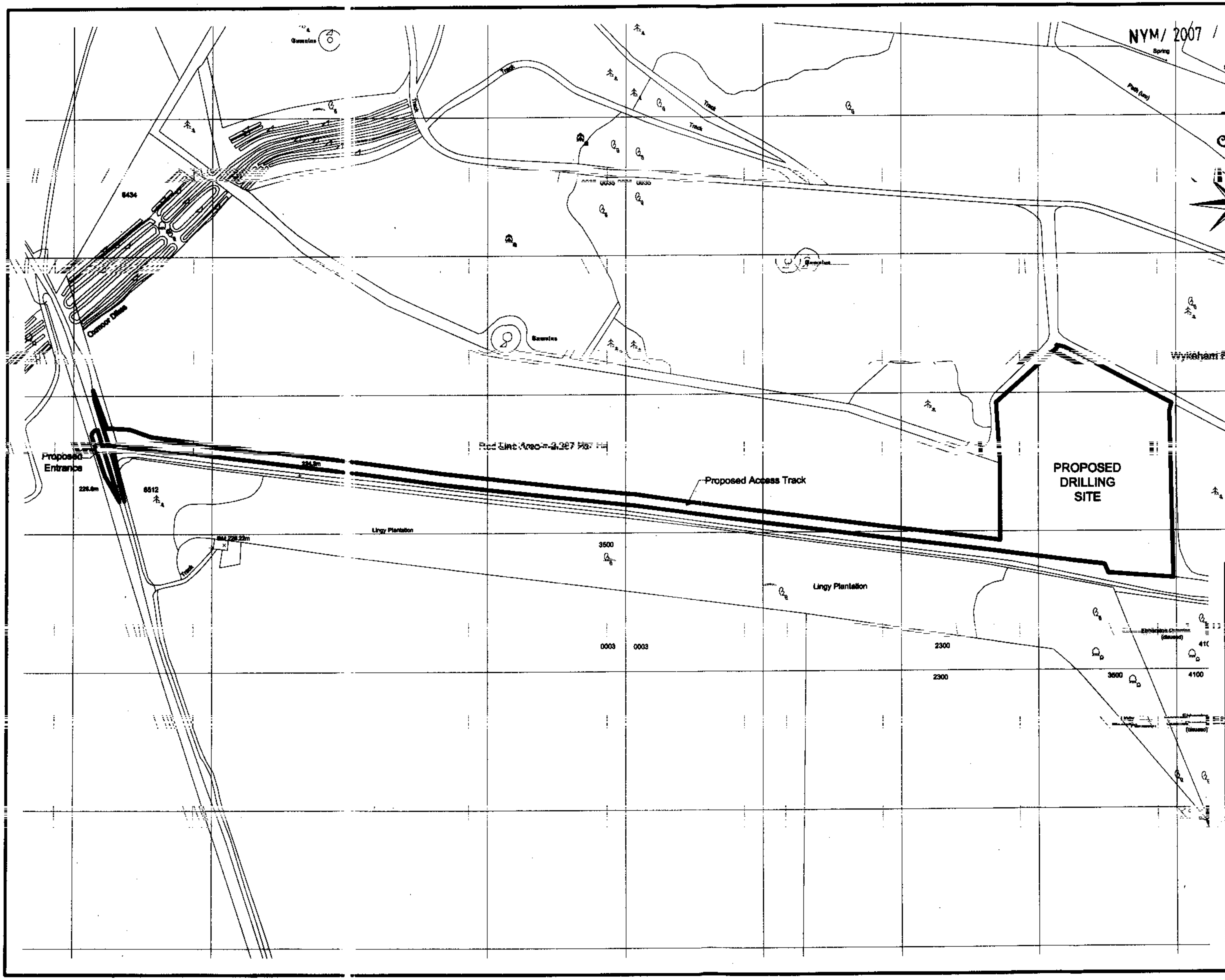
Client	Wirex Energy Exploration & Production Limited
	D Langham FRTPI Consultant Chartered Town Planner (01969) 625800
Job Title	PEDL 120 Ebberston Prospect Ebberston Moor North Yorkshire
Drawing Title	Site Layout (Production Testing Mode)
Scale	1:500
Date	August 2007
Drawn by	WB
Drawing No.	WEB2007
Rev.	

NYM/ 2007 / 0901 / FL



Client	Warwick Energy Exploration & Production Limited
D Langham FRTPI Consultant Chartered Town Planner (01969) 625800	
Job Title	PEDL 120 Ebberston Prospect Ebberston Moor North Yorkshire
Drawing Title	Site Layout (Drilling Mode)
Scale	1:500
Date	August 2007
Drawn by	WB
Drawing No.	WE/EB2/05
Rev.	

NYM/2007/0901/FL



Client	Warwick Energy Exploration & Production Limited
	Consultant Chartered Town Planner (01969) 625800
Job Title	PEDL 120 Ebberston Moor North Yorkshire
Drawing Title	Site of Application
Scale	1:2,500
Date	June 2007
Drawn by	WB
Drawing No.	WE/EB2/03
Rev.	

LERSTON CP

EBBERSTON 2
WELLSITE LOCATION

EBBERSTON AND
YEDINGHAM CP

To A170
(Ebberston)

Client	Warwick Energy Exploration & Production Limited
	D Langham FRTPI Consultant Chartered Town Planner (01969) 625800
Job Title	PEDL 120 Ebberston Prospect Ebberston Moor North Yorkshire
Drawing Title	Site Location Plan
Scale	1:10,000
Date	August 2007
Drawn by	WB
Drawing No.	WE/EB2/02
Rev.	

NYM/2007/0901/FL

NYM/ 2007 / 0901 / FL

North York Moors National Park

Planning Application Form

Please read the booklet *How to fill in your Planning Application* before completing this form.

For office use only

Ref:

Admin Ref:

Date Valid:

Grid ref:

SECTION 1 YOUR DETAILS

1. Applicant

Name Warwick Energy Exploration and Production Limited.

Address Wellesbourne House.
Wellesbourne
Warwickshire

Post Code CV35 9JB

Tel No [redacted]

2. Agent

Name D. Langham FRTPI

Address Thornborough Hall
Leyburn
N. Yorkshire

Post Code DL8 5AB

Tel No [redacted]

3. Applicant's interest in the land

Prospective Lessee

SECTION 2 YOUR PROPOSAL

4. Full postal address or location of the application site

Land off Ebberston Common Lane, Givendale Head Farm, Ebberston.

5. Applicant's interest in adjoining land

N/a

6. Brief description of proposed development

See Supporting Statement (Section 6)

SECTION 3 YOUR APPLICATION

7. Type of application (please tick **ONE** box only)

- [x] **A.** Full application including building works — *go to Question 12*
- [ ] **B.** Application for change of use (no building works) — *go to Question 12*
- [ ] **C.** Outline application — *go to Question 8*
- [ ] **D.** Reserved matters application — *go to Question 9*
- [ ] **E.** Removal or variation of condition — *go to Question 10*
- [ ] **F.** Renewal of temporary permission — *go to Question 11*

8. Outline Application

What is the area of the site?

Please tick those details which you wish the Planning Committee to consider normally at this stage.

☐ Siting ☐ Design ☐ External appearance ☐ Means of access ☐ Landscaping ☐ None

go to Question 12

NYM/ 2007 / 0 9 0 1 / F L

9. Reserved Matters Application

Date of outline permission ______________ Application No ______________

Please tick those details which you wish the Planning Committee to consider formally at this stage.

☐ Siting ☐ Design ☐ External appearance ☐ Means of access ☐ Landscaping

go to Question 12

10. Removal or variation of condition

Date condition imposed ______________ Application No ______________

Condition No ______________

go to Question 12

11. Renewal of temporary permission

Date permission granted ______________ Application No ______________

12. Use

What is the building/land used for at present? Agriculture

If it is unused at present, what was its last use? ______________

and on what date did it stop being used for this? (if known) ______________

13. Access

Does your proposal require new or altered access? YES/NO (delete as appropriate)
If **YES**, please tick the relevant boxes:

New access to a road ☑ Vehicular ☐ Pedestrian
Altered access to a road ☐ Vehicular ☐ Pedestrian

14. Water Supply and Drainage See Supporting Statement
Please state (please tick one box in each section) the method of:

Water Supply ☐ Mains ☐ Private existing/proposed*
Surface Water Disposal ☐ Public Surface Water Sewer ☐ River/Stream
☐ Soakaway ☐ Other existing/proposed*
Foul Sewage ☐ Public Foul Sewer ☐ Septic Tank ☐ Cesspit ☐ Other
existing/proposed*
*delete as appropriate

Note: If foul drainage is not to be via a public foul sewer, a drainage assessment will be required. Please see Question 14 in the accompanying booklet.

15. Trees

Does the application involve: Felling or lopping trees/hedgerows ~~YES~~/NO (delete as appropriate)
Planting trees ~~YES~~/NO (delete as appropriate)

16. Materials

Walls N/a

Roof N/a

17. Is your application for business, retail or other commercial use?

~~YES~~/NO (delete as appropriate)

If **NO** go to Section 5
If **YES** please complete Questions 18-23 of Section 4 on page 4 of this form

SECTION 5 WHAT YOU NEED TO INCLUDE WITH YOUR APPLICATION

24. Plans

Please list below the plans which will accompany this application.
WE/EB2/01 - 03 inclusive, WE/EB2/04-A and WE/EB2/05-08a & b inclusive.

25. Certificate of Ownership and Agricultural Holdings Certificate

You are required by law to complete **either** Certificate A **or** Certificate B (Ownership) **and the** Agricultural Holdings Certificate. It is an offence knowingly to make a false declaration.

CERTIFICATE OF OWNERSHIP: A

Complete if you are the owner of the building/land, along with Agricultural Holdings Certificate below.

I certify that: On the 21 days before the date of the accompanying application nobody, except the applicant, was the owner of any part of the land to which this application relates.

Signed ______________________ (Applicant/Agent)

* On behalf of ______________________ (Applicant)

Date ______________________

CERTIFICATE OF OWNERSHIP: B

Complete if you do not own any or all of the building/land, along with Agricultural Holdings Certificate below.

I certify that: I have/~~the applicant has~~ given the requisite notice to everyone else who, on the 21 days before the date of the accompanying application, was the owner of any part of the land to which the application relates, as listed below.

Owner's name: See following Schedule

Address at which notice served: " " "

Date on which notice was served: " " "

Signed [redacted] (Applicant/Agent)

*On behalf of Warwick Energy Exploration and Production Limited (Applicant)

Date 29 October 2007.

AGRICULTURAL HOLDINGS CERTIFICATE

This section MUST be completed. Delete either A or B and complete C.

A. I certify that none of the land to which this application relates is, or forms part of, an agricultural holding.

B. I have/the applicant has given requisite notice to every person other than myself/himself who, 20 days before the date of the application was a tenant of any agricultural holding any part of which was comprised in the land to which this application relates:

Name of tenant ______________________

Address ______________________

Date notice was served ______________________

C. Signed [redacted] (Applicant/Agent)

On behalf of Warwick Energy Exploration and Production Limited (Applicant)

Date 29 October 2007

26. I/~~We~~ hereby apply for planning permission or approval of reserved matters as described in this application and the accompanying plans. I/~~We~~ attach:

- the necessary plans, numbered See Question 24
- completed, dated and signed Certificate of Ownership (A or B above).
- completed, dated and signed Agricultural Holdings Certificate.
- the fee of £ 6,095 by cheque/~~postal order no~~

Signed [redacted] (Applicant/Agent)

On behalf of Warwick Energy Exploration and Production Limited (Applicant)

Date 29 October 2007.

* delete as appropriate

NYM/ 2007 / 0901 / FL

TOWN AND COUNTRY PLANNING (GENERAL DEVELOPMENT PROCEDURE) ORDER 1995

Certificate B under Article 7

Owner's Name	Address at which Notice was served	Date Notice Served
i) Messrs R.E. and S.E Gwilliam	Givendale Head Farm Snainton Scarborough YO13 9PU	26 October 2007
ii) M. Roberts Esq., Head of Highways	North Yorkshire County Council County Hall Racecourse Lane Northallerton DL7 8AD	26 October 2007

NYM/ 2007 / 0 9 0 1 / F L

PROPOSED APPRAISAL BOREHOLE,
EBBERSTON MOOR, NORTH YORKSHIRE.

SUPPORTING STATEMENT
TO THE APPLICATION.

1. INTRODUCTION

1.1 Warwick Energy Exploration and Production Limited (WEEP) is a wholly owned subsidiary of Warwick Energy Limited, a privately owned UK registered energy company. Warwick is an operator of gas fields as well as being a developer of renewable energy schemes.

1.2 Under the provisions of the Petroleum Regulations, the Secretary of State for Trade and Industry awarded a licence to WEEP in 2002, known as a Petroleum Exploration and Development Licence or PEDL. The licence (PEDL 120) allows WEEP to "search for and get petroleum" within the licence area, subject of course to the granting of planning consent for the necessary works to be carried out. The proposals to which this licence relates fall within this licence area. WEEP holds 100% interest in this licence and is the designated operator

2. LICENCE HISTORY

2.1 The licence is adjacent to the producing gas accumulations known collectively as the Ryedale Gas Fields. Home Oil of Canada made the first discovery in this area in 1966, - the Lockton gas field. This was followed by the discovery of the Wykeham and Malton fields. Lockton was developed in 1971 via a pipeline to a gas processing plant at Pickering, with sales to British Gas.

2.2 After encouraging early production, water production in Lockton increased rapidly and the processing plant was unable to handle the volumes of formation water produced. The field was subsequently abandoned with significant quantities of gas remaining in the reservoir.

2.3 The Kirby Misperton gas field was discovered by Taylor Woodrow Exploration Limited (TWEL). Kelt UK Limited, the successor to TWEL, subsequently discovered the Marishes gas field in 1988 and the Pickering gas field in 1992. Kelt then subsequently developed the Malton, Kirby Misperton, Marishes and Pickering gas fields (known

collectively as the Ryedale Gas Fields) with the gas being produced through a gas gathering system to a gas fired turbine generator at Knapton.

2.4 Kelt sold its interests to Tullow and Edinburgh Oil and Gas (EOG), and subsequently Tullow acquired the interest held by EOG. Tullow carried out only limited work and gas production gradually declined. Eventually Tullow sold its interest to Viking UK Gas Limited, who since their acquisition of the Ryedale Gas Fields, have undertaken an active drilling and workover programme to restore production to initial levels.

2.5 Although the Lockton gas field was developed, the adjacent (but separate) Wykeham gas accumulation was not produced other than on a short term test. Geological mapping indicates that PEDL 120 contains a significant portion of the Wykeham gas reserves. The licence location map showing the relationship of PEDL 120 to the oil & gas fields in the area is shown as figure 2.5. WEEP and Viking were considering a joint evaluation of the Wykeham reserves within PEDL 120. However commercial negotiations were not concluded and this application is being submitted by WEEP as sole licensee of PEDL 120.

3. EXPLORATION POTENTIAL

3.1 The stratigraphy of the area (the geological province known as the Cleveland Basin) is shown in figure 3.1. The above discoveries were made predominantly within a section of Permian Zechstein carbonates known as the Kirkham Abbey Formation. Typically the natural gas found here is sour (that is, it consists predominantly of methane with small quantities of hydrogen sulphide).

3.2 Although close to the abandoned Lockton gas field, seismic and well data indicate the Wykeham accumulation to be geologically separated by faulting, as shown in figure 3.2. Consequently any development of the gas reserves would require separate borehole drainage points. Indicative reserve estimates only were ascertained from the original exploratory well test and further evaluation is now required to determine the commercial significance of this gas discovery. This same figure shows that the Wykeham gas accumulation is an east-west trending structure, fault-bounded to the north. Figure 3.2 also shows the proposed surface and bottom hole locations of the well, indicating that the well is targeted to the westerly crestal area of the structure.

Licence PEDL 120
Proposed Well Location

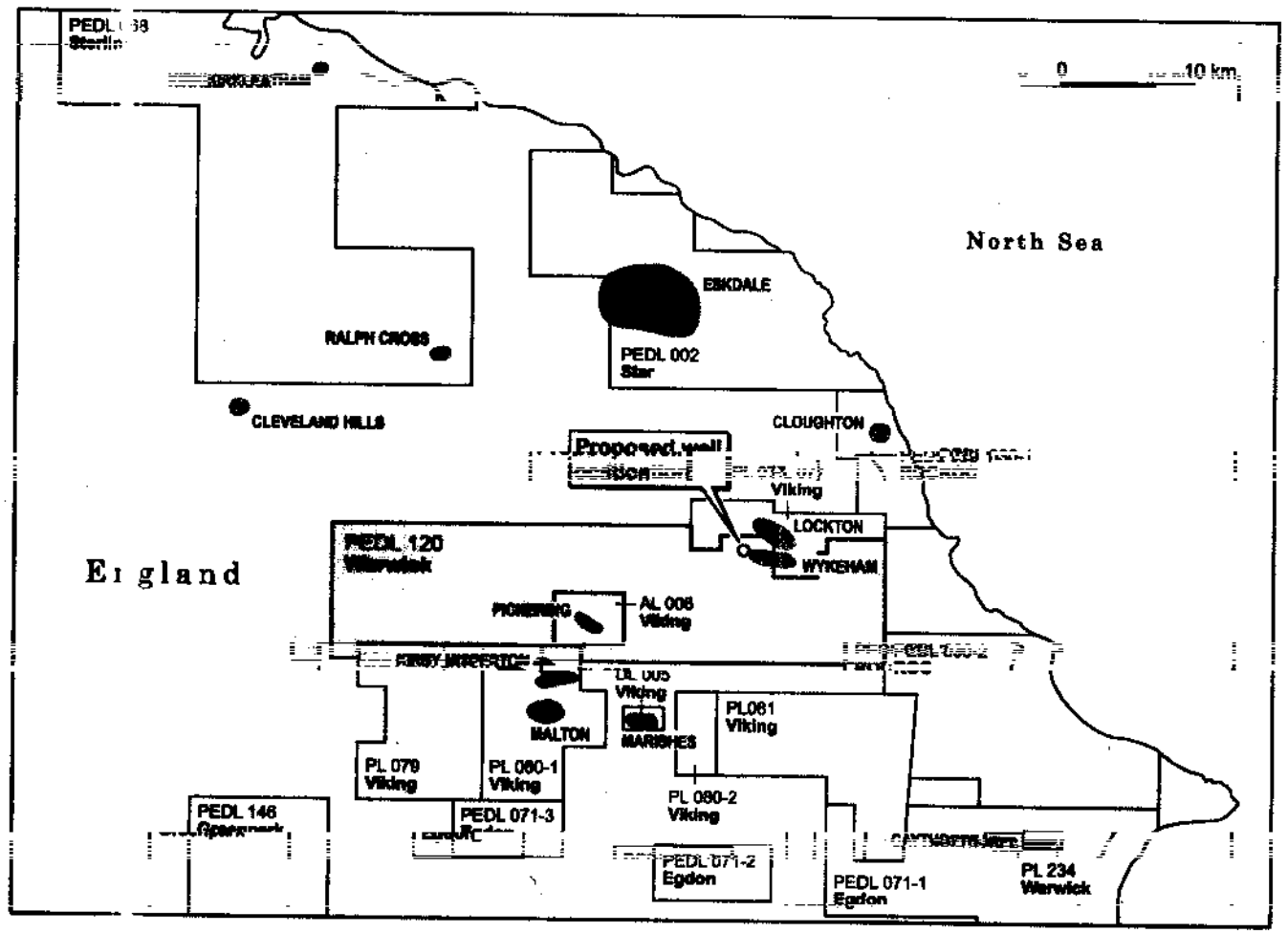


Figure 2.5

Licence PEDL 120
Cleveland Basin Stratigraphy

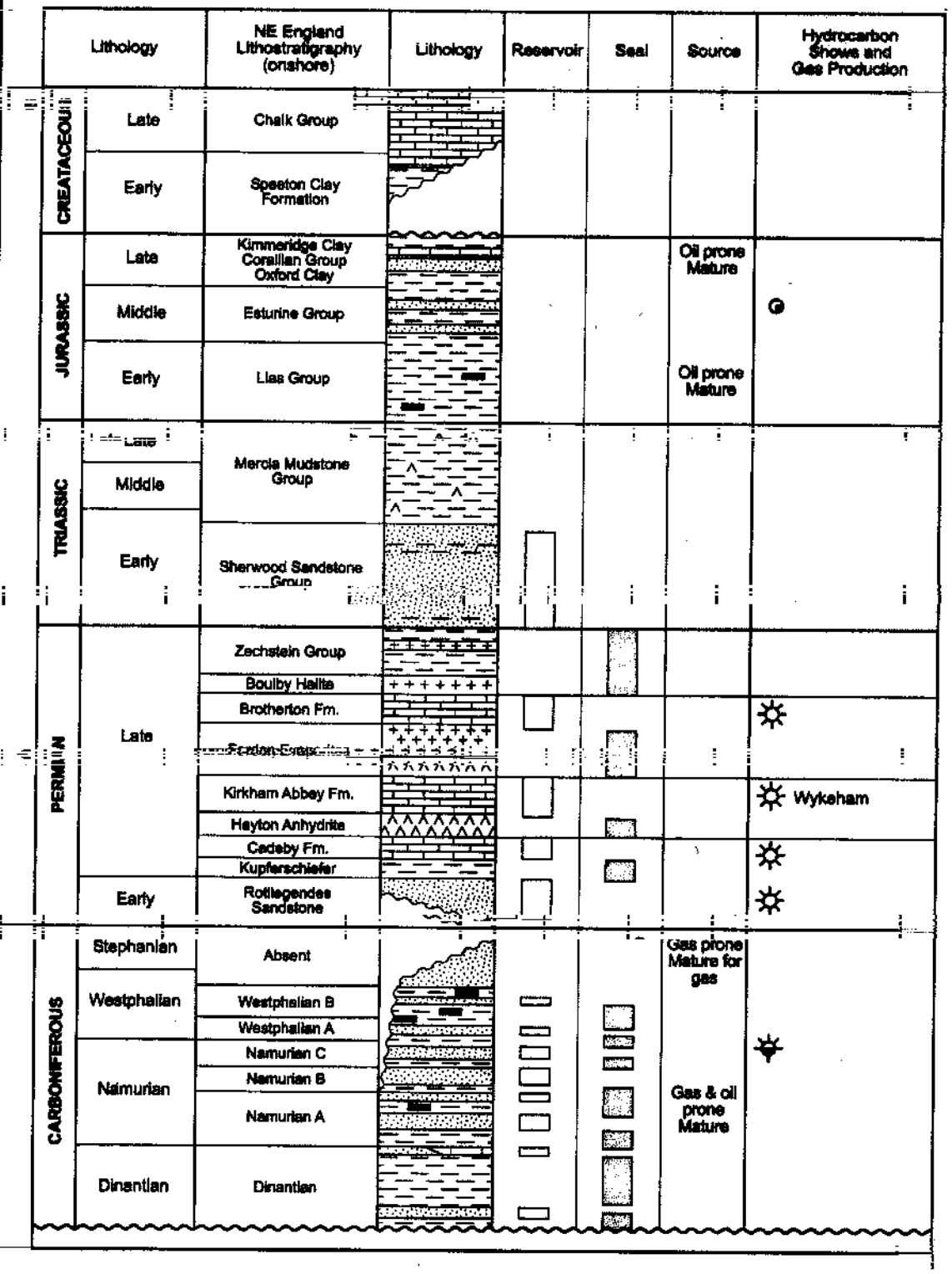


Figure 3.1

Licence PEDL120

Wykeham Gas Discovery – Top Structure Map

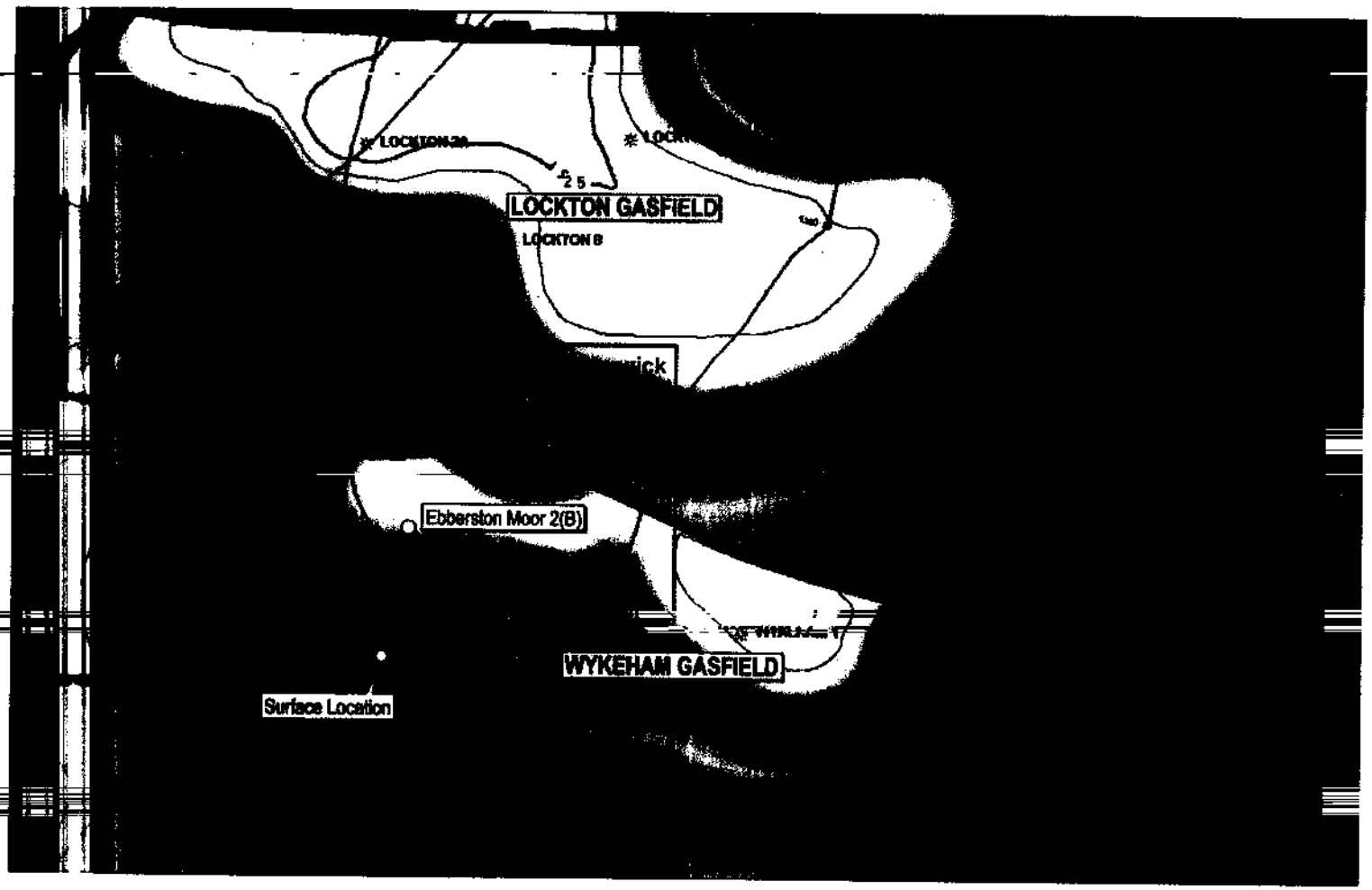


Figure 3.2

3.3 The remaining un-produced Lockton gas reserves and the balance of the Wykeham reserves lie within an area licensed to Viking. It is considered that the combination of these two reserves justify a renewed exploratory programme. The location and extent of the Wykeham gas field is indicated on dwg. no. WE/EB2/01.

4. SITE SELECTION

4.1 The geological structure is known with a reasonable degree of certainty from a combination of seismic and nearby well data. The objective for an exploratory well is to enter the reservoir structure at the crest (that is the shallowest point for the structure) where the potential thickness of gas bearing reservoir rock will be a maximum. A degree of flexibility in site selection is provided by the use of modern directional drilling techniques which allow the surface location to be vertically offset from the determined bottom hole location. Figure 4.1.1 shows the proposed well path projected on to the north-south trending seismic line whilst figure 4.1.2 shows the expected stratigraphy to be encountered by the well.

4.2 Within the technical constraints imposed by the drilling techniques the selection of the surface site is then dictated by a number of key inter-related environmental and technical considerations:- access, natural habitat, archaeology, visual impact, residential amenity, and the ability to export gas should gas production viability be proven.

Licence PEDL 120

Ebberston Moor 2(B) Seismic Cross Section

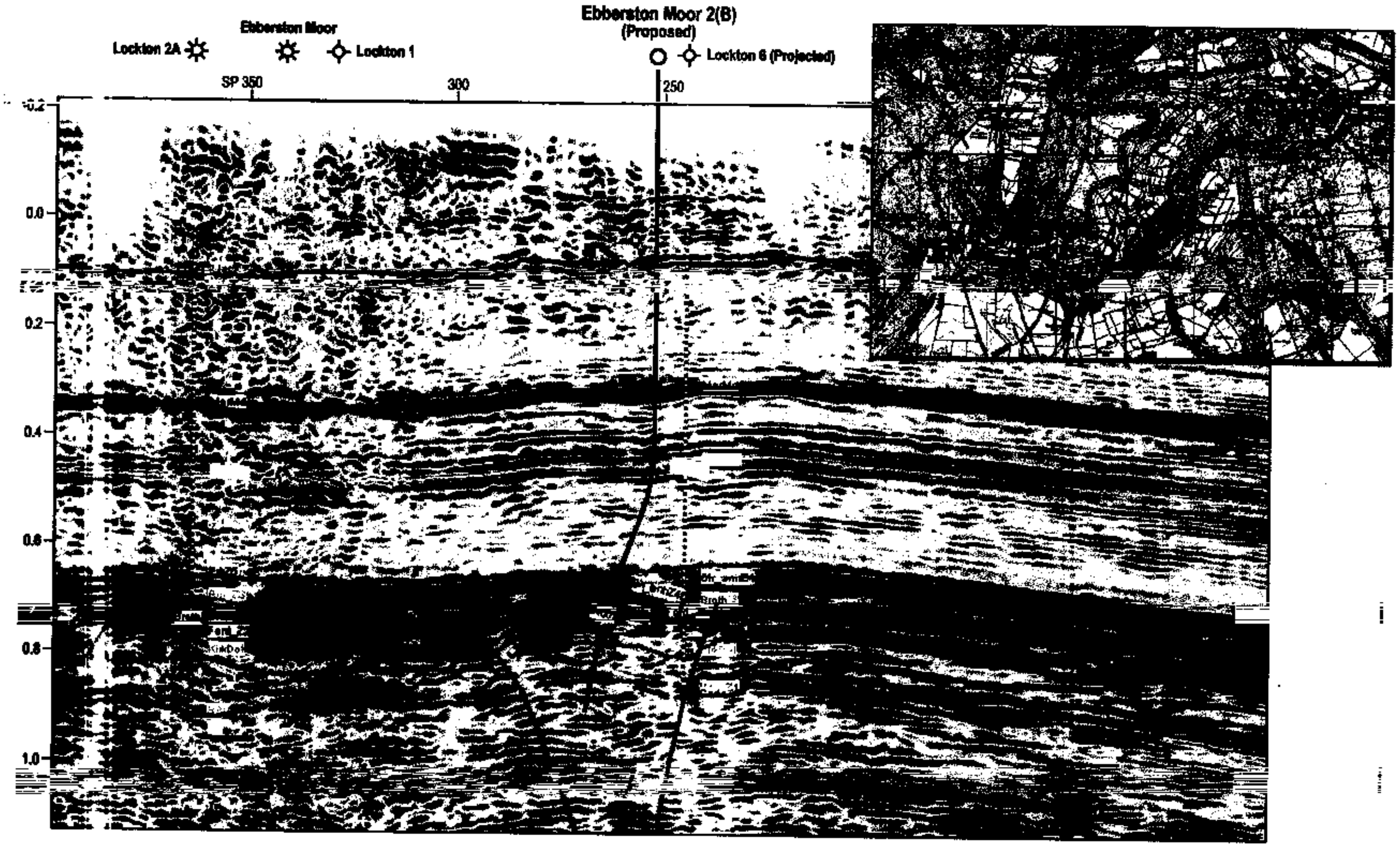
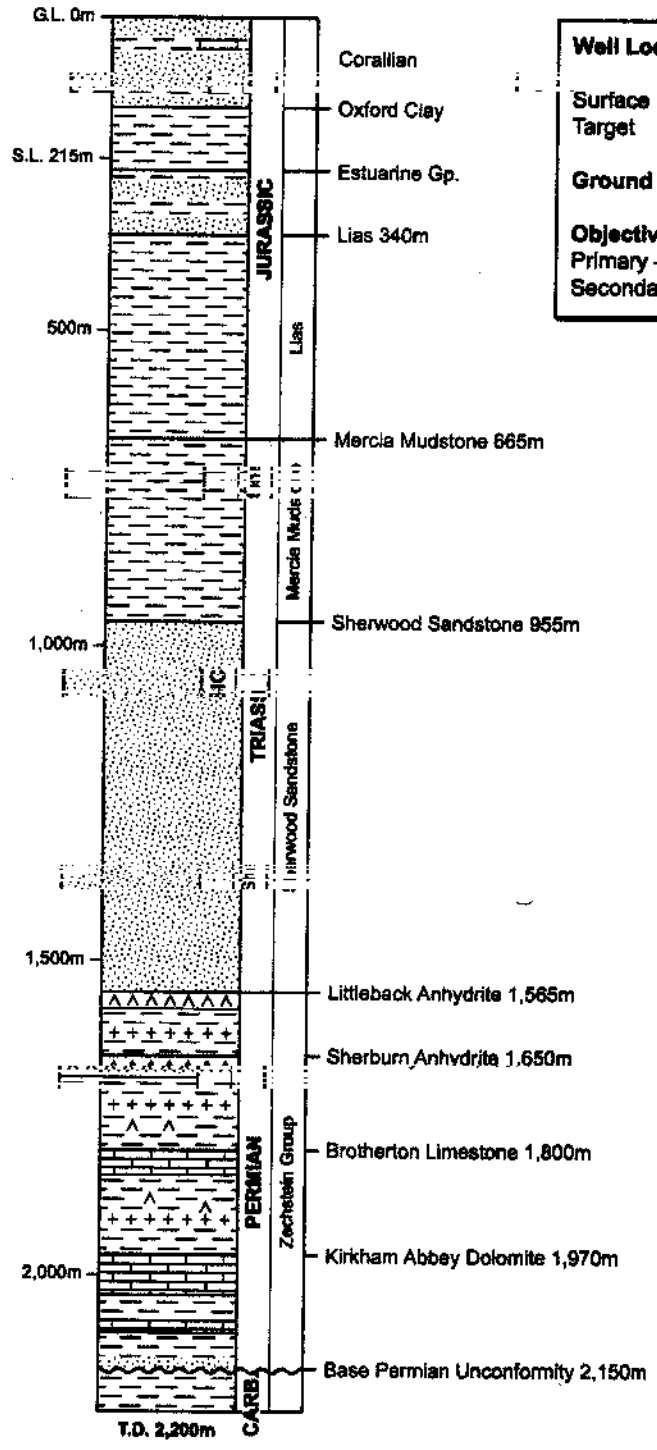


Figure 4.1.1

NYM/ 2007 / 0901/F

Licence PEDL 120

Eaberston Moor-2 (B) Well Prognosis



Well Location Co-ordinates:

	X	Y
Surface	490 360.00	487 170.91
Target	490 515.00	487 937.96

Ground Elevation: 215m

Objectives:
Primary – Kirkham Abbey Dolomite
Secondary – Brotherton Limestone

Figure 4.1.2

5. THE ENVIRONMENT

5.1 Location & Access

The proposed wellsite is located within the Parish of Ebberston at the edge of Wykeham Forest some 4km to the north of the village of Ebberston, (see dwg. no. WE/EB2/02). It occupies the eastern end of a long, narrow field which forms part of the landholding of Givendale Head Farm.

Access is proposed to be derived from off the A170 Pickering to Scarborough Road via the existing highway infrastructure of Ebberston Lane and thence via a proposed new access track paralleling an existing track leading into Wykeham Forest.

The extent of the land the subject of the planning application, which includes the access track and improvements to the highway entrance on Ebberston Lane, amounts to 2.287 hectares (5.65 acres) and is shown on dwg. no. WE/EB2/03/00.

5.2 Physical Environment

The proposed site is located in a "forest and pasture" landscape where the gradual south-facing fall of the Tabular Hills is intersected by narrow, steep-sided predominantly north-south orientated valleys that for the most part open out southwards into the Vale of Pickering. Others, including Trouts Dale immediately to the north of the proposed wellsite, lead north-eastwards to the Upper Derwent Valley. Forestry dominates the landscape to the north whilst open pasture and arable land dominate views to the south.

The site is located at a height of about 230m AOD on ground that falls slightly towards the north and then steeply down to the Troutsdale valley losing 90m in height at a gradient of approximately 30%. It is bounded on 3 sides by tree planting - a young coniferous plantation to the north, more mature 10m high conifer trees to the east, - both of which form part of Wykeham Forest – and Lingy Plantation – a mixed deciduous and coniferous shelter belt approximately 6m in height – to the south. An ecological description of the site and surrounding area is included at Appendix 1.

5.3 Human Environment

The proposed site is located in an area offering evidence of extensive prehistoric activity both within the areas of open pasture and forested areas. An archaeological assessment of the surrounding area is included at Appendix 2.

Allerston, Ebberston and Snainton are the nearest communities to the site lying some 4km to the south. Isolated farmhouses typify the more immediate area. There are seven residences situated within 1km of the site, the nearest being Pump House Cottage and Keeper's Cottage, located some 450m north and 570m north east of the site respectively. Givendale Head Farm is located about 1km northwest of the site across open farmland, whilst High Scamridge Farm is slightly nearer, at 870m north west of the site. Hern Head House is situated 950m north east of the site and Cocksmoor Hall is 1km south east of the site.

There are no public footpaths or bridleways affected by the proposal, although the track immediately to the south is currently the subject. of a Public Path Creation Order under Section 26 of the Highways Act 1980

5.4 **Baseline Environmental Conditions**

Background noise measurements for the area are included at Appendix 3."Assessment of Environmental Noise Emissions".

6. **THE PROPOSAL**

Planning permission is being sought for a temporary period of 3 years to construct a drillsite together with access thereto, mobilise drilling and ancillary equipment to drill an exploratory borehole, undertake preliminary short-term "drill stem" tests (if applicable) and retain the site and wellhead valve assembly gear for evaluation and future extended test operations. Plan no's WE/EB2/01, 02, 03, 04A, 05, 06, 07 and 08a & b and Figures 2.5, 3.1, 3.2, A1.1, A1.2 and 8.4.1 comprise the deposited plans and drawings illustrating the above proposals.

7. POLICY BACKGROUND

7.1 National Policy

Government policy on oil & gas operations is set out in Minerals Policy Statement 1 (MPS1): Planning & Minerals 2006 Annex 4 and Circular 2/85. Policies are aimed to encourage exploration for oil & gas to determine the extent of national reserves. Exploitation must, however, take place in a way that protects the environment and it is for the industry to demonstrate how adverse environmental effects can be removed or reduced to an acceptable level to the local community and relevant statutory bodies and agencies.

7.2 Development Plan Policies

Planning policy is determined by the North Yorkshire County Structure Plan (NYCSP) approved October 1995 and the North York Moors Local Plan (NYMLP) adopted May 2003.

The NYMLP takes into account NYCSP Policies M12 and M13 regarding oil & gas exploration, the basic message from which is that exploration drilling and short-term testing will normally be permitted on condition that, in the context of the geological structure being investigated, site selection has been shown to have been undertaken with a view to effecting minimal impact on the environment and landscape.

Issues regarding transportation, consequences for local communities and surface and underground water protection must be reviewed and shown to be environmentally acceptable. Operational working practices, restoration and after-care are matters to be specifically detailed, all of which require a high standard of implementation. The explanatory text to the NYMLP (Policy M3) goes on to acknowledge the establishment of a national need for oil & gas in view of the Government's award of licenses within the National Park. The conclusion is drawn that development is permissible provided adverse impacts are reduced to a level appropriate to a National Park, particularly regarding the effect on the amenity of residents and visitors. The short-term nature and small scale of explorative proposals are noted as usually permissible under safeguarding controls, including reinstatement of intrinsic landscape features such as hedgerows, walls and trees (Policy ENV5) and the archaeological evaluation of developable sites (Policy AR3).

8. THE DEVELOPMENT

8.1 Programme

Development is planned to take place in 3 phases, as follows: -

1. the construction of the drillsite and its associated access,
2. the mobilisation and placement of drilling equipment at the site leading to the drilling of the exploratory borehole and,
3. the carrying out of short term testing and evaluation programme (if applicable).

The planning application contains proposals encompassing all 3 phases. However progress onto phase 3 would depend upon the nature and extent of any hydrocarbons that may be encountered.

The timing of these phases are expected to be as follows:-

Phase 1	-	access and site construction - 5 weeks.
Phase 2	-	equipment assembly and drilling operations - 5 weeks.
Phase 3	-	testing and evaluation (if applicable) - 1 to 2½ years.

8.2 Access & Site Construction

Access construction and site preparation works would take place in the working hours of 07.00 - 18.00 hrs. Monday to Friday and 07.00 - 13.00 Saturdays. No construction works would take place on Sundays or Bank Holidays.

8.2.1 Access Construction

Access into the site would be achieved by constructing a temporary track extending from Ebberston Lane, tarmacadam surfaced for the first 15 m of its length, thereafter stoned as far as the entrance point into the drillsite proper. The carriageway to Ebberston Lane is narrow and to avoid a wide entrance into the field that would affect the stone wall, it is proposed to provide a hardstanding on the opposite side of the road that would allow vehicles to enter a much smaller entrance. This would be subject to an agreement with the highway authority.

All works on the access track would be preceded by the stripping of top-soil for storage on site or alongside the track for later restoration (see dwg. no. WE/EB2/04A). The tarmac section of the track would be 7.3m wide and will narrow to 4.5 m wide along the stoned section. The stoned section of the track, together with the adjoining car-park, (the top-soil from which would also be stored on site), would be formed by applying 350 mm crushed stone over a geotextile membrane to produce an even, hard surface. Entry onto the track would be gated at the junction with Ebberston Lane. The road would be located 2m away from the field boundary to avoid disturbance to the boundary wall.

8.2.2 Site Construction

a) A 1.2 m high post and wire fence would be erected around the perimeter of the site to mark the northern, western, southern and eastern boundaries.

b) The existing top-soil (approximately 300 mm in depth) would be stripped and stored (along with other topsoil from the access track and car-park) as a temporary screening bund within the western boundary of the site to screen the site from views from Ebberston Lane. With a ground level difference of only 1m between south and north soil moving operations would be minimal. The area of the site within the interceptor ditches would be levelled and any surplus sub-soil would be stockpiled in a bund alongside, but separate from the topsoil bund.

c) The surface would be formed from crushed stone compacted on top of a geotextile layer to specifications indicated on dwg. no. WE/EB2/05 and to a fall of 1:100 from the centre of the site.

d) Drainage ditches 600 mm deep and 1.2 m wide would be excavated around the perimeter of the drilling area and lined with Bentomat SS falling to a corner sump area.

e) Steel double gates would be provided at the entrance to the drilling area.

f) The flare pit would be constructed at the north side of the site. The pit would be 6.m x 6 m in extent excavated 1 m below base level and surrounded by a bank comprising excavated sub-soil. The flare area would accommodate a specially designed burner which would stand on 300 mm of stone laid within the base of the pit. The bunds would rise to a height of 4m above the base of the flare.

8.3.3 Construction Traffic

Initially there would be movement of site preparation plant comprising 3-4 low-load articulated trucks at the outset of construction activity. The access, car-park and site would require approximately 6250 tonnes of stone (i.e. 313 lorry loads) delivered during a period of 4 weeks plus a few loads of ancillary construction materials/plant and 5-10 personnel movements per day. The above movements equate to an average of 1 vehicle movement every 25 minutes during the normal working day

8.4 Drilling Operations

8.4.1 Drilling Equipment

Whilst the borehole is being drilled the site would contain the drilling rig and ancillary equipment along with temporary office accommodation, essential 24-hour staff living accommodation and laboratories. The precise specification of the equipment would not be known until a contractor had been selected. However, the maximum height of the rig mast would not be more than 48 m above ground level. Illustrations of a typical rig elevation and its components are provided by dwg. no's WE/EB2/08a & b and Figure 8.4.1. Dwg. no. WE/EB3/05 illustrates the proposed layout during drilling operations.

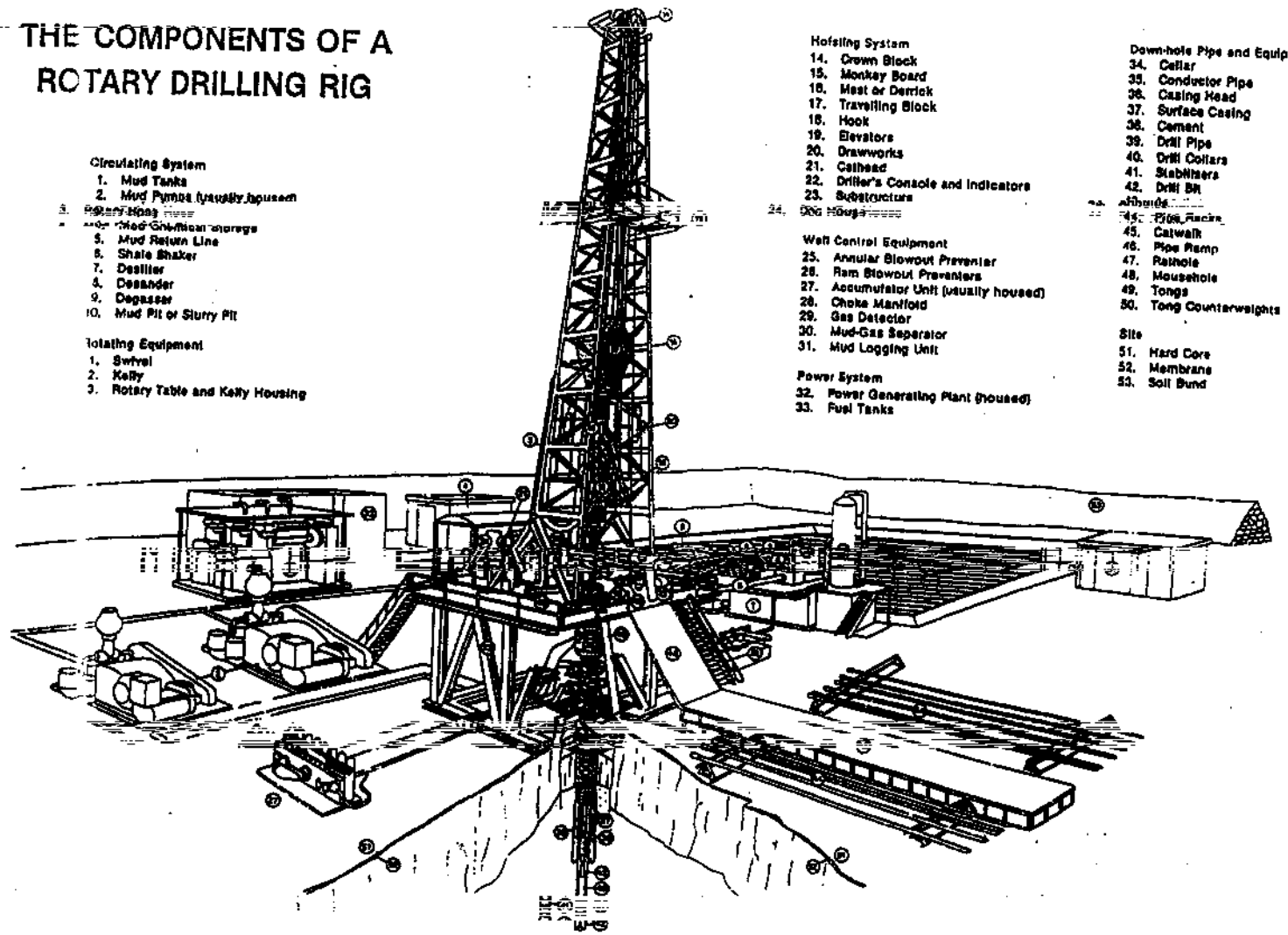
8.4.2 Drilling & Casing Programme

Once commenced, drilling and associated operations would be on a 24-hour-a-day basis over a period of 3-4 weeks. The drilling and casing programmes would be designed in accordance with standard petroleum industry practice taking into account the anticipated geology, pressures and objectives of the bore-hole. The plan would be to drill as fast as possible to the target sections, log and open hole test the borehole, set production casing and, if required, run a short-term (drill stem) production test. (See para. 8.5.1 below). The programme would be subject to Health and Safety Executive (HSE) notification and Department for Business Enterprise and Regulatory Reform (DBERR) approval prior to the commencement of operations.

8.4.3 Water Supply

Water would be required for the drilling fluids whilst drilling the borehole, for dealing with the possible loss of fluids to formation in the early drilling stage and for emergency fire-fighting contingencies. The supply of water, subject to agreement with Yorkshire Water, would be delivered by 5000 gallon capacity tanker to 2 on-site storage tanks. It is estimated there would be an initial requirement of up to 36,000 gallons per day for the first 3 days of drilling reducing to 10,000 gallons per day thereafter.

THE COMPONENTS OF A ROTARY DRILLING RIG



Circulating System
1. Mud Tanks
2. Mud Pumps (usually duplicate)
3. Rotary Hose
4. Mud Circulation Storage
5. Mud Return Line
6. Shale Shaker
7. Desilter
8. Desander
9. Degasser
10. Mud Pit or Slurry Pit

Rotating Equipment
1. Swivel
2. Kelly
3. Rotary Table and Kelly Housing

Hoisting System
14. Crown Block
15. Monkey Board
16. Mast or Derrick
17. Travelling Block
18. Hook
19. Elevators
20. Drawworks
21. Catlhead
22. Driller's Console and Indicators
23. Substructure
24. Dog House

Well Control Equipment
25. Annular Blowout Preventer
26. Ram Blowout Preventers
27. Accumulator Unit (usually housed)
28. Choke Manifold
29. Gas Detector
30. Mud-Gas Separator
31. Mud Logging Unit

Power System
32. Power Generating Plant (housed)
33. Fuel Tanks

Down-hole Pipe and Equipment
34. Cellar
35. Conductor Pipe
36. Casing Head
37. Surface Casing
38. Cement
39. Drill Pipe
40. Drill Collars
41. Stabilisers
42. Drill Bit
43. Annulus
44. Flow Sensor
45. Catwalk
46. Pipe Ramp
47. Rathole
48. Mousehole
49. Tongs
50. Tong Counterweights

Site
51. Hard Core
52. Membrane
53. Soil Bund

Figure 8.4.1

8.4.4 Waste Disposal

Semi-liquid drilling mud and rock cuttings would be collected in purpose-built tanks which would be located on either a concrete pad or in skips and transported from the site by road for disposal at an approved location. A cess-pit would be installed to collect domestic waste. Its contents would be removed periodically to an approved disposal site. The contents of the surface water collection ditch would be emptied as necessary and transported by road tanker for disposal at an approved location. A portable skip for refuse collection would be provided, its contents disposed of periodically at a licensed waste disposal site.

8.4.5 Personnel

Under normal conditions approximately 12 site personnel would be on site at any one time during operations.

8.4.6 Lighting

For safety reasons the rig is required to be illuminated at night. All other site lighting would be minimal and at low-level sufficient to permit safety of operations.

8.4.7 Operational Traffic

The following deliveries, 3 or 4 of which would be assisted by police escort, would arise at the time of rig mobilization/demobilisation: -

Derrick	1 load
Trailer with draw-works and rotary table	1 load
Sub-structure and ramp	1 load
Matting boards, Blow-out preventers & manifold	1 load
Mud pump buildings	2 loads
Mud tanks	2 loads
Light plant, accumulator & change house	1 load
Water tank and doghouse	1 load
Toolhouse and fuel tank	1 load
Catwalk, junk rack, V doors & stairs	1 load
Toolpush cabin	1 load
Forklift & washroom building	1 load
Cranes (for assembly)	2 loads
Total loads	16 loads

Additional deliveries would be required during mobilisation and demobilisation for ancillary services, as follows: -

Mud logging cabin & equipment	2 loads
Wireline logging	1 load
Drilling mud solids control equipment	1 load
Operational control cabin	1 load
Materials & chemicals	4 loads
Drill pipe & tubulars	4 loads
Accommodation modules	3 loads
Total loads	16 loads

The total number of deliveries (32) equates to 64 HGV movements over each anticipated 3 day mobilisation/demobilisation periods in terms of in-going and outgoing vehicle trips.

During drilling route deliveries of equipment and removal of drilling mud and cuttings would generate 3-4 vehicle (6-8 trips) per day over a 4 week period. 20 light vehicle trips would be generated at 0800 and 2000 hrs at personnel shift changes.

8.5 Testing Operations and Evaluation

8.5.1 Drill-Stem Test (Flow Testing).

A drill-stem test, carried out with the rig in place, initiated as required and lasting no longer than 12 daytime hours, is required to give an indication of the existence of producible hydrocarbons. The maximum estimated flow-rate would be 10 mmscfd and would take place on 3 or 4 different days. It would indicate the type of fluid contained in the reservoir, the initial reservoir pressure and the rate of flow (capacity of the reservoir to produce oil or gas). Dwg. no. WE/EB2/06 shows the layout of the additional equipment required for drill-stem testing. Appendix 4 provides details of a typical drill-stem testing programme. If gas reserves are identified, the site would be retained with hardcore base and valve gear would be installed above the bore-hole and the drilling rig would be moved off the site. During the next "evaluation" stage, the extent of any hydrocarbons discovered would be determined by means of a "production test".

8.5.2 Production Test and Evaluation

This comprises Phase 3 of the operations referred to in para. 8.1 and therefore would be undertaken within the period for which planning permission is sought. This programme also requires the prior approval of the DBERR..

A production test involves continuous flaring for limited periods up to 12 hours over a period of several days at differing flow-rates after carrying out certain preparatory flow-testing operations. Briefly the preliminary steps to be taken in the flaring programme. The proposed layout of flare testing equipment is indicated in dwg. no. WE/EB2/07. A detailed programme cannot be specified until after the results of the initial drill-stem test are known. The test would confirm the type of fluid contained in the reservoir and would provide sophisticated reservoir evaluation results from the determined initial and final reservoir pressure and the rate of flow.

In the event that evaluation of the results proved satisfactory, any proposals for a development for commercial production would be the subject of a further planning application. In the event of a decision being made to abandon the well, the necessary steps to do so would be carried out in accordance with DBERR regulations. **The applicant is aware that the granting of planning permission for an appraisal borehole required to ascertain the commercial viability of identified reserves has no bearing on any possible future gasfield developments that would naturally come to mind. Any subsequent proposals to appraise or exploit a discovery would be considered on their individual merits.**

8.6 Restoration

In the event of the well proving to be dry it would be abandoned by plugging the borehole in accordance with the DBERR's normal procedures. The steel casing would be cut approximately 1.5m below surface and capped by welding a steel plate onto the top of the exposed wellhead. The well cellar and sump-lining would be removed. Any remaining drilling mud and cutting waste would be removed along with the pit liner and perimeter ditch-lining.

The perimeter fence and the hardcore over the site and the newly constructed short section of access track would be removed, the land re-graded and deep scarified in accordance with best agricultural practice. Stored sub-soil and top-soil would be spread

over the re-graded ground and the site re-scarified. The site would be put back to agriculture at the first available growing season along the lines of the proposed reinstatement programme included at Appendix 6 to this Statement.

9. ENVIRONMENTAL CONSIDERATIONS

9.1 The construction, drilling and short-term testing of an appraisal borehole in the search for hydrocarbons is bound to have some short-term effect on the environment. It is for the industry to demonstrate how possible adverse environmental effects can be removed or reduced to acceptable level. These effects can be reduced to a minimum by careful site selection, good site design and adopting operational techniques that sympathetically respect the needs and values of the local area. The following resume of environmental issues applicable to the exploration project afore described seeks to demonstrate that potential adverse environmental effects have been duly addressed and so minimised to an acceptable level thus rendering the proposal worthy of support in planning terms.

This site specific application and the environmental issues it raises, relate specifically to the restricted, short-term exploration phase of "oilfield" development. Consideration of the environmental implications and merits or otherwise of possible future appraisal and development is not an issue at this stage and neither should such possibilities as to the future outcome influence the planning decision. **This proposal is for an exploratory drilling operation only and the environmental issues appertaining thereto are all that are relevant uninfluenced by what may or could arise in the future.**

9.2 Access and Traffic

9.2.1 Access

Proposed access/egress is derived via the public road network from the A170, which has been recently used as an access to a similar exploratory wellsite on Ebberston Low Moor, to the north of this site. There have been no reported incidents relating to the public highway as a result of the earlier development and the same access is proposed for the wellsite that is the subject of this application. **The existing highway infrastructure could adequately accommodate the traffic so generated without adverse impact on residential amenity.**

9.2.2 Traffic

Heaviest traffic flows - i.e. those occurring during the stone delivery phase of the site construction period and averaging 1 hgv movement every 30 minutes over 3 weeks - would not be excessive and would be comfortably accommodated within the road network. The A170 is a heavily trafficked road and the traffic generated by this proposed development will not result in a significant increase in that density. The junction of Ebberston Lane and the A170 is within an area controlled by a speed limit of 30mph.

Traffic levels will be significantly increased along Ebberston Lane during the construction of the site, although the route is used by the occasional heavy goods vehicle servicing the farms along the route including the recycling unit at Givendale Head Farm. Farm dwellings served by the road are set well back and would not be affected by the traffic.

Passing places previously installed along the length of Ebberston Lane provide reasonable opportunities for vehicles to pass each other and site traffic is reminded to keep speeds low by use of the appropriate signs agreed with the Highway Authority.

The earlier drillsite generated significant water tanker movements due to loss of fluids on the upper sections of the borehole, a situation that is being addressed by an application to extract water from Trouts Dale. This would be the subject of an extraction licence application to the Environment Agency, and would, if successful, meet all the needs for drilling water without the need for additional tankers. Potable water would still be brought to site from a piped supply or by smaller tanker.

The environmental effects of traffic in terms of routeing, numbers and types of vehicles, damage to verges, implications for local communities on the A170, the local tourist industry and the short term duration of the works renders the temporary increase in traffic levels acceptable.

9.3 Visual Impact

A rig mast height of 40 metres is likely to be visible either as it is above the tree line from views across Trouts Dale from the north and/or against a tree-lined background when viewed from the west and south. However this visual encroachment would be limited to a short 3-4 week period and, apart from four of the dwellings in the immediate locality, would be confined to longer distance views of the site from Ebberston Common House, some 2.1km to the north and Low Scamridge Farm, 1.4km to the south. Views from houses in the Troutsdale valley (Pump House Cottage, Keeper's Cottage and Hern Head House) would be obscured by the shoulder of the rising ground.

Ground level elements of the drillsite equipment would be obscured by the bunding from views from Ebberston Lane, as would views from the south by Lingy Plantation.

Bearing in mind the strictly limited period for drilling operations, the relative isolation of the site, plus the restoration proposals contained within the application, it is submitted that the overall visual effect on the environment would be negligible.

9.4 Archaeology

Cognizance has been taken of the importance of archaeology by following the advice given in PPG16: Archaeology and Planning. The Archaeological Assessment at Appendix 2 describes the findings of an archaeological desk-based assessment and site walkover inspection where possible. No archaeological settlement site was identified within the area of the proposed development area. Further evaluation of this site is proposed to be undertaken in agreement with the planning authority in order to mitigate potential impacts upon any surviving remains. No significant impacts upon any of the Scheduled Monuments or Listed Buildings within the vicinity of the proposed development are predicted. **This proposed action would ensure that archaeological interests would be appropriately accommodated in line with PPG16.**

9.5 Ecology

The proposed wellsite is located on cultivated farmland near adjacent woods and badger setts have been identified within Wykeham Forest close to the eastern boundary of the site. There would be no disruption to known badger setts since the proposals provide for an approximately 27 metre strip of undeveloped land between the drillsite platform and the forest boundary fence. **The study included in Appendix 3 concludes that impacts**

would not be significant and, with the adoption of appropriate mitigation measures, disruption to ecology would be negligible.

9.6 Noise

Pump House Cottage and Keeper's Cottage, both currently non-permanently occupied, are the nearest dwellings to the site. The Noise Assessment at Appendix 3 addresses anticipated noise levels at Keeper's Cottage and the nearest permanently occupied dwelling – Hern Head House – and concludes (para. 6) that noise from 24 hour/day drilling operations would not be a nuisance to noise sensitive receptors. **Noise pollution would not be an issue.**

9.7 Drainage & Pollution Control

9.7.1 Drainage

All surface run-off within the site would fall to the surrounding ditch described in para. 8.2.2.. Spill kits designed for all materials and substances used on site would be available to deal with any emergencies that could arise. During testing any accidental spillage from the produced fluid storage tanks would be contained within purposely designed container bunds. **The natural drainage of the land would not be impeded.**

9.7.2 Water Resources

The top-hole section of the borehole would be drilled with the use of freshwater drilling mud. Thereafter the borehole would be progressively lined with steel casing cemented in place to a programme previously approved by the Environment Agency under Section 30 of the Water Resources Act 1991. **This would ensure that underground aquifers would be suitably protected.**

9.7.3 Air Quality

The mud logging unit used when drilling would be equipped with gas detectors and would continually monitor levels of gas components. Other potential emissions would be those from diesel exhausts from the generators powering the rig, vehicle exhausts and venting/flaring from any possible extended well testing. Such emissions would be negligible in terms of pollution to the atmosphere in view of the exposed nature of the site and adjoining industrial activities. **The threat of pollution to water (surface and underground) and air would be satisfactorily mitigated against by site design and adopting the tried and tested environmentally conscious operational techniques as proposed.**

9.8 Waste Disposal

4 sources of waste would require to be removed from the site: -

a) drilling mud and cuttings located in the mud tanks,
b) sanitary waste collected in the cess pit,
c) site drainage collected in the ditch surround,
d) general dry waste-paper, timber, scrap metal - collected in skips.

Mud cuttings, sanitary waste and produced fluids from drilling and testing operations would be removed by licensed operators and disposed of at authorised locations. Oil-based mud would be removed by its supply company for recycling. For most of the time water from site drainage is likely to be used in drilling-mud and make-up but otherwise, when conditions dictate, it would be collected for disposal at an authorised licensed site. Skips for dry waste would be obtained from a local contractor and exchanged when necessary. **With the above site management procedures in place, problems regarding waste disposal would not be an issue.**

9.9 Environmental Safety

Site specific Emergency Response Procedures would be put in place in consultation with the emergency services. Drilling and any subsequent testing operations would be conducted in accordance with good oilfield practice and all relevant controlling bodies and British Standards. Should any emergency situation occur the well would be instantaneously "closed in" by means of the fitted blow-out preventers. The flare area has been so located as to be within safe working distances of vegetation and the occupied area of the drillsite. **The adoption of normal emergency procedures applicable to oilfield operations would ensure compliance with the U.K. onshore environmental safety control regime.**

10.10 HEALTH & SAFETY

Borehole operations would be undertaken as required by the Borehole Sites & Regulations 1995, the Management of Health & Safety at Work Regulations 1992, the Construction (Design & Management) Regulations 1994, the Offshore Installations & Wells (Design & Construction etc) Regulations 1996 and Warwick's Health & Safety Manual. All construction, drilling, possible testing and restoration activities would be carried out in accordance with the U.K.'s health & safety controlling bodies.

11.11. SUMMARY

Government policy promotes the principle of exploring for the discovery and recovery of the nation's hydrocarbon reserves wherever possible providing environmental issues are properly taken into account. The proposal subject of this planning application ends at the discovery stage of hydrocarbon development. It is for the industry to demonstrate that adverse environmental effects have been either removed altogether or reduced to a level acceptable to the local community and relevant statutory bodies and agencies.

This Supporting Statement in its appraisal of environmental issues demonstrates that those regarding noise, pollution, waste disposal, safety, access and traffic have been removed altogether whilst those of visual impact, archaeology and ecology have been reduced to an acceptable level.

The applicant trusts that the local community and relevant statutory bodies and agencies concurs with its beliefs to the extent that its proposals can be supported. **The applicant hereby respectfully requests that planning permission be granted.**

White
Young
Green

NYM/ 2007 / 0901 / FL

EBBERSTON MOOR WELLSITE, NORTH YORKSHIRE

Ecological Impact Assessment

from strength to strength

NYM/ 2007 / 0 9 0 1 / F L

EBBERSTON MOOR – 2
NORTH YORKSHIRE

APPLICATION FOR
PLANNING PERMISSION

APPENDICES

David Langham Dip.TP, FRTPI.,
Thornborough Hall,
Leyburn, N. Yorkshire,
DL8 5AB.
(01969) 625800

OCTOBER 2007

NYM/ 2007 / 0901 / FL

LICENCE NO. PEDL 120
WARWICK ENERGY EXPLORATION AND PRODUCTION LIMITED

EBBERSTON MOOR – 2 WELL
NORTH YORKSHIRE

PLANNING APPLICATION
APPENDICES

A Planning Application
To Construct a Drillsite and
Carry Out Drilling Operations in the
Search for Underground Hydrocarbon Reserves

David Langham Dip.TP, FRTPI,
Thornborough Hall,
Leyburn,
N. Yorkshire,
DL8 5AB. (01969) 625800

October 2007

NYM/ 2007 / 0 9 0 1 / F L

EBBERSTON MOOR – 2 WELLSITE PLANNING APPLICATION

CONTENTS

I FORMAL APPLICATION

II PLANS AND DRAWINGS

No.	Description	Scale
WE/EB2/01	Proposed Target Area	1:25,000
WE/EB2/02	Site Location	1:10,000
WE/EB2/03	Site of Application	1:2,500
WE/EB2/04A	Site Entrance and Access Track Details	1:250
WE/EB2/05	Site Layout – Drilling Mode	1:500
WE/EB2/06	Site Layout – Drill Stem Test Mode	1:500
WE/EB2/07	Site Layout – Production Test Mode	1:500
WE/EB2/08a & b	Cross Sections – Drilling Mode	1:500

III SUPPORTING STATEMENT

IV FIGURES

V APPENDICES

White Young Green

NYM/ 2007 / 0901 / FL

EBBERSTON MOOR WELLSITE, NORTH YORKSHIRE

Ecological Impact Assessment

October 2007

Reference: E013756				
Issue		Prepared by	Checked by	Verified by
V1	-	Richard Penson	Stephen Parr	
V2	-	[redacted]	[redacted]	
V3	-			
V4	-			

White Young Green Environmental Ltd, Executive Park, Avalon Way, Anstey, Leicester LE7 7GR
Tel: 0116 234 8100 Fax: 0116 234 8002
Email: Humphries-rowell@wyg.com

CONTENTS

NYM/ 2007 / 0901 / FL

NYM/ 2007 / 0 9 0 1 / F L

Ebberston Moor Wellsite, North Yorkshire: Ecological Impact Assessment

1. Introduction & Background

CONFIDENTIAL: This report contains information on the location of badger setts and should not be included in any public dissemination of this report because of the risk of persecution of this species.

White Young Green Environmental (WYG) was commissioned by Egdon Resources to undertake an ecological impact assessment of a linear arable field, areas of adjacent woodland and access track at the edge of Wykeham Forest, near the village of Ebberston, North Yorkshire. It is proposed to construct a gas wellsite at the eastern end of the arable field and to construct an access road within the arable field, approximately 2m to the north of the existing stone wall along the northern side of the access track. Highway improvements are also proposed where the track diverges from Ebberston Lane at the western end of the survey area.

The extent of land subject to the planning application amounts to approximately 2.3 ha. This includes the access track and improvements to the highway entrance to Ebberston Lane.

The development is planned to take place in three phases, as follows:

1) Construction of the wellsite and its associated access,

2) Mobilisation and placement of drilling equipment at the site leading to the drilling of the exploratory borehole and,

3) The carrying out of a short-term test and evaluation programme (if applicable).

The timing of these phases is envisaged to be as follows:

Phase 1 – Access and site construction – 5 weeks,

Phase 2 – Equipment assembly and drilling operations – 5 weeks,

Phase 3 – Testing and evaluation (if applicable) – 1 to 2.5 years

Access into the site would be achieved by constructing a temporary track extending from Ebberston Lane, with a tarmac surface for the first 15m of its length, with a stone surface thereafter as far as the entrance to the drill site. To avoid damage to the stone wall, it is proposed to construct a hard standing area on the opposite side of Ebberston Lane that would allow vehicles to enter a much smaller entrance into the arable field. This would be subject to agreement with the Highway Authority.

The scope of the ecological investigations has included:

- A desktop data review of existing biological records and search for statutory and non-statutory designated sites of ecological importance through consultation with the relevant local biological records holders and investigation of English Nature's interactive, web-based MAGIC (Multi Agency Geographic Information for the Countryside) database;
- A review of ecological survey data for the site;
- Field surveys for flora and fauna involving:
- A Phase 1 Habitat survey (to standard JNCC method) to record type, location and extent of vegetation and habitats within the site boundary, including notable hedgerows
- An appraisal of habitats present at the site for their suitability to support protected or notable species of fauna, including birds, mammals, herpetofauna with a specific search for evidence of the presence of badgers.
- Further survey for notable and protected fauna as identified during the initial walkover/Phase 1 habitat survey, including:
    1. Badger
    2. Breeding Birds
- Consultation with The North and East Yorkshire Ecological Data Centre

The site comprises a linear arable field, the southern boundary of which is delimited by a stone wall, with a section of hedgerow at the eastern end. Plantation woodland (both broad-leaved and coniferous) forms the remainder of the boundaries to the arable field, including a linear plantation (Lingy Plantation) immediately to the south of the access track. The centre of the site is located at O/S Grid Reference SE 904872.

2. PLANNING & POLICY CONTEXT

NYM/ 2007 / 0901 / FL/

The principal European and UK legislation relating to biodiversity and nature conservation relevant to the proposed development are:

a) Conservation (Natural Habitats &c.) Regulations 1994.
b) The EC Directive on the Conservation of Wild Birds (791409/EEC).
c) The Wildlife & Countryside Act (1981) and subsequent amendments.
d) The CRoW Act 2000, particularly Section 74 habitats and species.

In addition to the primary legislation, there are a number of national and local planning guidance and policies relating to biodiversity and nature conservation. This includes Planning Policy Statement 9 (PPS9) Biodiversity and Geological Conservation and the North Yorkshire County Structure Plan.

The Structure Plan sets out broad policies for statutorily protected sites and also local nature conservation that seek to promote biodiversity conservation especially through appropriate Biodiversity Action Plans (BAPs). The following policies for the application site are considered relevant:

The BAPs that either directly or indirectly have a bearing on the scheme are:

a) Biodiversity Reporting and Information Group (2007): Report on the Species and Habitat Review. Report to the UK Biodiversity Partnership.
b) North Yorkshire Biodiversity Action Plan 2007-2012 (2005)

None of the above confers any additional statutory protection on habitats and species than already afforded under the primary legislation. However, PPS9 states that species and habitats listed in the UKBAP and LBAP, and biodiversity in general be engendered within policies at both national and local level.

Policy E2

Development in the open countryside outside the national parks, areas of outstanding natural beauty, areas of heritage coast and green belts will normally be permitted only where it relates to:

(i) Small scale proposals requiring an open countryside location for operational reasons; and

(ii) Small scale proposals for individual sites or for the re-use or

Adaptation of existing rural buildings to secure employment uses which benefit the rural economy and provided it would not harm the character and appearance, general amenity or nature conservation interests of the surrounding area.

Policy E6

Development will normally not be permitted within national nature reserves, local nature reserves and sites of special scientific interest or in adjoining locations where development would have an adverse effect on such sites. Special consideration will be given to other habitat sites of nature conservation significance and wildlife habitats in examining proposals for development.

3. SURVEY METHODS

3.1 Desktop Study

The North and East Yorkshire Ecological Data Centre was consulted to obtain information pertaining to records of protected or notable flora and fauna, and other habitats or features of nature conservation importance within 2km of the application site. In addition, the Multi-Agency Geographic Information for the Countryside (MAGIC) website was searched for details of SSSIs and other statutory designations.

3.2 Field Survey

A walk-over survey of the site was undertaken by two ecologists from WYGE on 15th June 2007 and by one ecologist from WYGE on 3rd July 2007, during which the following surveys were carried out.

3.2.1 Vegetation and Habitats

A Phase I vegetation and habitat survey was carried out during the walkover survey to identify any habitats of substantive nature conservation value and record the presence of any rare or protected species or flora, as well as any harmful or invasive species. Definitions of habitat types and methodology are taken from the Phase 1 Vegetation and Habitat Survey manual (Joint Nature Conservation Committee, 2003).

3.2.2 Protected & Notable Fauna Species

Badger

Badgers are protected under the Protection of Badgers Act 1992. Under this legislation it is an offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so. It is also an offence to interfere with a sett by damaging or destroying it, or to obstruct access to a sett, or to disturb a badger when it is occupying a sett. The walkover survey included a search for evidence of badger setts or other badger activity, such as paths, latrines or signs of foraging. Methodologies used and any setts recorded were classified according to published criteria (Harris, Cresswell & Jefferies, 1989).

Bats

Bats and their roosts afforded full protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation (Natural Habitats &c.) Regulations 1994.

Following Mitchell-Jones & McLeish (2004), trees at the application area were assessed for their suitability to be used by roosting bats. Tree inspection (undertaken from the ground using binoculars) involved a search for areas of flaking bark, dense ivy covering, cracks, rot-holes and crevices in trunks and stems of suitable size and structure for bats to roost in.

Birds

Although no specific breeding bird survey work was carried out as it was not part of the scope, breeding birds and their locations were recorded during the 3rd July Phase 1 survey. Breeding bird survey methods followed Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. (2000).

4 ASSESSMENT METHODS

The assessment identifies sites, habitats, species and other ecological features that are of national, regional or local ecological value. Key areas and/or species of ecological value within the application area are identified and the main factors contributing to their current ecological value are described. The assessment takes

NYM/ 2007 / 0 9 0 1 / F L

account of the main items of current relevant wildlife legislation and national guidance (e.g. PPS9) as well as non-statutory strategies such as national and local biodiversity action plans (UKBAP and LBAP respectively), which provide both national and local context to nature conservation aims.

The methodology for evaluation of the nature conservation value of ecological features affected by development (ecological receptors) is adapted from the current Institute of Ecology & Environmental Management (IEEM) guidelines for ecological impact assessment (IEEM 2006). These guidelines recommend assignment of value (or potential value) to ecological receptors in accordance with the following scale:

(i) International;

(ii) UK;

(iii) National (i.e. England/Northern Ireland/Scotland/Wales);

(iv) Regional;

(v) County (or Metropolitan - e.g. in London);

(vi) District (or Unitary Authority, City, or Borough);

(vii) Local or Parish; and/or

(viii) Within immediate zone of influence* only.

The zone of influence for a development is difficult to define, but for the purposes of this study, the zone of influence within which potential direct effects on flora and fauna may be reasonably anticipated is the application area boundary. The exception to this is in relation to potential

When describing impacts on ecosystem structure and function, reference is made to the following aspects where appropriate:

(i) extent;

(ii) magnitude;

(iii) duration;

(iv) reversibility;

(v) timing and frequency; and

(vi) cumulative effects.

NYM/ 2007 / 0 1 9 0 1 / F L

Understanding the nature of the impact enables determination of the effect on the ecological integrity of the ecological receptor. This in turn is assessed against the importance of the receptor to determine the significance of the effect on nature conservation interests as being (i) not significant, or (ii) a significant positive or adverse impact.

5. BASELINE CONDITIONS

5.1 The Site and Immediate Surrounds

The application site comprises a linear arable field with plantation woodland to the north, south and east and further agricultural land to the west.

5.2 Statutory and Non-Statutory Designated Sites

Troutsdale and Rosekirk Dale Fens SSSI comprises two separate units in close proximity, located approximately 0.5km and 0.75km north of the survey corridor respectively, in the narrow upper reaches of Troutsdale. The area covered by both sites totals 13.07ha. These two fen systems display examples of spring and flush fen typical of the local area where base-rich springs emanate from the Corallian Limestone. Such fen systems are nationally rare, being restricted to only four main areas, including the North York Moors (the other three areas being Norfolk, Oxfordshire and Anglesey).

The site lies within, and close to the southern fringe of the North York Moors National Park. Several habitats of importance for nature conservation within the wider park are located within 2km of the application site. Two areas of Section 3 Moor, Heath or Down (a landscape and nature conservation category, important within the National Park) occur within 0.5km of the site to the north and east. Another area of Section 3 habitat occurs approximately 1.5km to the north east of the site. Five areas of grassland of conservation value occur within 2km of the well site: including Rivendale Dike and Scamridge Dike located approximately 0.5km to the west and east of the wellsite respectively. There are also two sections of species-rich grassland on trackside verges located approximately 1km to the east of the application site, with a further section approximately 2km to the north east (no further details are available).

Statutory designated sites within the area of search are summarised below and details are provided within Appendix A.

NYM/ 2007 / 0901 / FL

Site Name	Distance from [Site]	Main Relevant Interests
Troutsdale and Rosekirk Dale Fens SSSI	0.5km and 0.75km to the north respectively	Two fen systems with base-rich springs supporting a diverse floral assemblage including several rare species and notable invertebrates
North York Moors National Park		
	0.5km of the site to the north and east.	Two areas of Section 3 Moor, Heath or Down (a landscape and nature conservation category, important within the National Park)
	Approximately 1.5km to the north east of the site	Another area of Section 3 habitat (no further details available)
Rivendale Dike and Scamridge Dike	Approximately 0.5km to the west and east of the wellsite respectively.	Species-rich Grassland of nature conservation value
Two sections of Trackside Verges	1km to the escarpment and 2km to the north east	Herbrich Grassland

The North and East Yorkshire Ecological Data Centre provided details of non-statutorily designated sites of nature conservation interest (Appendix B). There is only one non-statutorily protected site (SINC) within 2km of the application area: Cockmoor Hall SINC (site code: SE 98-04) at SE 914867 is 1km to the south east of the application area.

5.3 Previous Records Protected and Notable Flora and Fauna

Full details are found in Appendix C.

Vascular Plants

There are five records of notable plants (found within 25 or fewer sites within the North York Moors national Park) located within 1km of the application site, with the nearest of these being two records approximately 0.5km to the north, beyond the conifer plantation (no further details are available).

A series of locally notable plants have been recorded during the North York Moors Plant Atlas Survey in 1993, although the majority of these records are more than 2km away from the wellsite. Only one notable plant species was recorded within 2km of the wellsite in 1993. Fragrant orchid (*Gymnadenia conopsea*) was found within the 1km square SE 9088, approximately 1km to the north of the wellsite. There is also a historical record of stag's-horn clubmoss (*Lycopodium clavatum*) from the 1km square SE 9087, dating from 1966. There are no more recent records of this species.

Water Vole

There are historical records of water voles from Langdale Rigg, Hackness and Harwood Dale (within SE 99) although the most recent of these records dates from 1986. Surveys of Troutsdale Beck (SE 917874) during 1992 to 1999 inclusive failed to find any evidence of water voles. This location is approximately 1km to the east of the wellsite.

Otter

Otter spraints have been recorded from Troutsdale Beck at SE 917874 in 1999, approximately 1km to the east of the application area.

Badger

There are a number of badger setts located within 2km of the wellsite, further details can be found in the confidential badger report.

Bats

Bats have been systematically recorded from the Broadhead area (SE 896886 to SE 896881) during 1987 to 2002 when there was a catching and marking scheme in operation. This location is approximately 2km away from the application area. Bat species recorded during these operations comprised common pipistrelle, brown long-eared bat, Natterer's bat and noctule. This site is approximately 1.5km to the north west of the application site. Noctules were recorded roosting in bat boxes at the above location (SE 896886) during the Forestry Commission Bat Box Survey in 1991 and 1992. No other bat roosts were identified during these surveys.

Reptiles and Amphibians

There are historical records of adder from the 1km squares SE 8988 and SE 9087, the latter record is from the 1km square containing the wellsite and dates from 1988, with no further records. Common frogs and common toads have been recorded from the Snainton Burrows and Dyke area (between SE 906889 and 907889) in 1988 and 1989. These records are approximately 1.5km to the north of the wellsite. There are no records of great crested newt within 2km of the application area.

Birds

There is a record of willow tit from Troutsdale Mill at SE 917876 from 2004, approximately 1.5km to the east of the wellsite. This species is listed on the RSPB Red List of species of conservation concern, having undergone a reduction in both population and range of more than 50% over the last 25 years.

Butterflies

A range of notable butterflies have been recorded from the Deepdale area (SE 9190) between 2000 and 2001, approximately 2km to the north of the application area. These include two species listed as Priority Species in the UK Biodiversity Action Plan: dingy skipper and northern brown argus. Other species with restricted distributions in North Yorkshire that have been recorded from this area during the above time period include small pearl-bordered fritillary, wall brown, marbled white, brimstone and ringlet. Common and widespread butterfly species recorded from within 2km of the wellsite include common blue, orange tip, meadow brown, large skipper and small skipper. There are numerous species records within the area of search.

5.4 Vegetation and Habitat Survey Results

Phase 1 Habitat

5.4.1 *Arable Field*

The application area is located at the eastern end of a linear arable field which was under intensive cultivation at the time of the survey. Arable margin plants recorded

during the survey comprised common and widespread species such as common poppy (*Papaver rhoeas*), scentless mayweed (*Tripleurospermum inodorum*) and knot-grass (*Polygonum aviculare*).

5.4.2 *Plantation Broad-leaved Woodland*

Lingy Plantation is located immediately to the south of the access track and is of relative young age, trunk girths being estimated at less than 0.5m at breast height (1.3m above ground level). Ash (*Fraxinus excelsior*) and rowan (*Sorbus aucuparia*) appeared to be the dominant species with small amounts of soft downy-rose (*Rosa mollis*) which was mainly recorded along the northern edge adjacent to the track. The ground flora was rather sparse and was composed of species considered typical of secondary woodland such as bramble (*Rubus fruticosus agg.*), stinging nettle (*Urtica dioica*), red campion (*Silene dioica*) and wood avens (*Geum urbanum*). Small stands of dog's mercury (*Mercurialis perennis*) were present at the eastern end where the woodland graded into dense scrub.

5.4.3 *Dense Scrub*

This habitat occupied the disused Ebberston Quarries at the eastern end of Lingy Plantation. This area was dominated by mature hawthorn (*Crataegus monogyna*), up to 10m in height, with scattered sapling ash and sycamore (*Acer pseudoplatanus*). Ground flora species comprised herb robert (*Geranium robertianum*), with occasional male fern (*Dryopteris felix-mas*), wood avens and wood false-brome (*Brachypodium sylvaticum*). Wood sedge (*Carex sylvatica*) and wood sorrel (*Oxalis acetosella*) were recorded in small amounts, both characteristic indicators of ancient woodland.

Another, much smaller stand of dense scrub was located on the north side of the access track to the south of the plantation coniferous woodland. This was dominated by mature hawthorn with a species-poor ground flora dominated by brambles.

5.4.4 *Plantation Coniferous Woodland*

This habitat occupied all of the extensive woodland to the north of the wellsite and was dominated by young European larch (*Larix decidua*) with small amounts of sycamore and rowan. The eastern part of this woodland (directly to the north of the proposed wellsite) was at the thicket stage (approximately 5m in height) with that

elsewhere somewhat older. The ground flora in these areas was extremely sparse with large areas of deep needle-litter. Chickweed (*Stellaria media*) and stinging nettle were the only species recorded within the woodland with rank grasses along the perimeters, dominated by creeping soft-grass (*Holcus mollis*).

The block of plantation coniferous woodland to the east of the proposed wellsite was dominated by mature European larch of even age, with trunk girths estimated at 0.5m. The ground flora was very sparse, consisting of ivy, bramble and stinging nettles amongst a deep layer of larch needles. Both creeping soft-grass and common dog-violet (*Viola riviniana*) were recorded at the southern edge of the conifers. Bracken (*Pteridium aquilinum*) was present in the northern half of this conifer block, where some of the larch trees had died, common dog-violets being recorded underneath the frond layer. Further, mature plantation coniferous woodland occurred to the east of an access track leading north, to the east of the proposed wellsite. This area is marked "Wyedale Forest" on Plan 1.

5.4.5 *Relic Ancient Woodland*

This habitat occupied two opposite narrow fringes on either side of a track separating two blocks of coniferous woodland to the east of the proposed wellsite but within the survey area. Mature coppice stools of hazel (*Corylus avellana*) were dominant, with some young oak and rowan. Wood sorrel dominated the ground flora, with smaller amounts of male fern and common dog-violet and some small clumps of bilberry (*Vaccinium myrtillus*). The access track between the fringes of hazel had become rutted and was largely composed of wet mud with abundant creeping buttercup (*Ranunculus repens*) and creeping soft-grass.

5.4.6 *Hedgerow*

A short section of species-poor hedgerow occurred along the southern fringe of the plantation coniferous woodland and dense scrub to the east of the proposed wellsite. This was dominated by hawthorn, with a single ash tree.

5.4.7 *Grass Verges along Southern Access Track*

The access track to the south of the proposed wellsite (leading eastwards from Ebberston Lane) was bounded on both sides by grass verges, approximately 4m in width. These were dominated by Yorkshire-fog (*Holcus lanatus*), with frequent rough meadow-grass (*Poa trivialis*) and occasional tufted hair-grass (*Deschampsia*

caespitosa). There was a wide range of herb species associated with less improved swards and these included black knapweed (*Centaurea nigra*), meadow buttercup (*Ranunculus acris*), meadow vetchling (*Lathyrus pratensis*), pignut (*Conopodium majus*), red clover (*Trifolium pratense*), yellow-rattle (*Rhinanthus minor* agg.) and a [illegible] species (*Alchemilla* sp.).

5.4.8 Target Notes

The locations of badger activity can be found in the confidential badger report.

TN1 An area of bracken at the northern end of the mature larch plantation, with common dog-violet beneath the fronds. This habitat was considered suitable for small pearl-bordered fritillary butterfly

TN2 A singing male song thrush in the mature larch plantation

TN3 A singing male yellowhammer in Lingy Plantation

5.5 Protected and Notable Fauna

5.5.1 *Badger*

Evidence of badgers was found within 1km of the application area, further details can be found in the confidential badger report.

5.5.2 *Bats*

No direct evidence of the presence of bats was recorded during the survey though the work involved only an external inspection of trees from ground level.

All of the trees within the surveyed area were assessed as being of low bat roost potential due to either their relative young age and/or general lack of features such as [illegible].

The woodland rides to the north of the application area and also the edges of the plantation woodland (both broad-leaved and coniferous) provide sheltered bat foraging and commuting corridors.

5.5.3 *Amphibians and Reptiles*

There was no suitable breeding habitat for amphibians within or adjacent to the application area although the habitats present are considered to provide terrestrial habitat. No evidence of amphibians was recorded during the survey.

The habitats within the application area were considered to provide at best sub-optimal habitat for reptiles due to the general lack of suitable basking areas. No evidence of reptiles was found during the survey.

As the habitats within the application area were considered to be at best sub-optimal for amphibians and reptiles and no evidence was found, they will not be considered further in this report.

5.5.4 *Otter and Water Vole*

There is no suitable habitat for either species within the application area or in close proximity. These two species will not be considered further in this report for this reason.

5.5.5 *Nesting Birds*

Several bird species were recorded holding territories in the plantation woodland and these included two species of conservation concern: song thrush and yellowhammer. The song thrush was singing and holding territory in the mature larch plantation approximately 150m to the east of the application boundary (see target note TN2), whilst the yellowhammer was recorded singing from Lingy Plantation approximately 20m to the south of the southern application area boundary (TN3). Both birds were considered to be breeding within the survey area.

A flock of 14 common crossbills were recorded flying over the mature larch plantation to the east of the application boundary on 3rd July 2007. Crossbills are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) which protects them from disturbance whilst nesting. However, as crossbills breed early in the year (eggs can be laid as early as February and the chicks fledge by May) no inferences can be made that crossbills bred anywhere in the vicinity of the application area as they would have vacated their breeding locations some weeks prior to the surveys.

5.6 Other Protected or Notable Species

5.6.1 Butterflies

The area of bracken at the northern end of the mature larch plantation was considered to provide suitable habitat for small pearl-bordered fritillary (see target note TN1). This area was considered to be declining in quality due to bracken encroachment. The adjacent rides were also becoming overgrown by bramble and heavily shaded by trees, with a consequent decline in nectar sources and potential decline and shading of violets (the larval foodplant).

This species is a proposed priority species in the UK BAP due to its current rate of decline and has a very restricted distribution in Yorkshire, being largely restricted to the North York Moors National Park. There is a record of this species from the Deep Dale area, approximately 2km to the north of the application area, dating from 2001. However, Deep Dale is connected to the area of suitable habitat adjacent to the application area by sub-optimal habitat as the intervening rides through the forestry plantations have become intensely shaded and overgrown as the trees matured. For these reasons, the likelihood of small pearl-bordered fritillary being present is considered to be low.

5.6.2 *Flora*

The semi-improved neutral grassland verges on both sides of the southern unsurfaced access track support assemblages of plants that are indicative of less improved grassland and these may meet the county SINC selection criteria. A strip of relic ancient woodland adjacent to a ride to the east of the application area has associated ancient woodland indicator plant species besides ancient hazel coppice stools.

6. EVALUATION

6.1 Statutory and Non-Statutory Designations

There are no statutorily protected sites within the surveyed area. Troutsdale and Rosekirk Dale Fen SSSIs are located approximately 0.5 and 0.75km to the north of the application area respectively. The fen habitat in these two sites is of national importance due to the localised influences of the Coralline Limestone, providing base-rich conditions that support a diverse range of notable plants and associated invertebrates. Such fen systems are found in only four other areas within the UK. The integrity of either site will not be directly or indirectly affected by the construction of the proposed wellsite due to the highly localised nature of the proposed works and the distances involved.

Cockmoor Hall SINC is located approximately 1km to the north of the application area. This site will not be affected by the proposed wellsite due to the distance involved.

6.2 Protected and Notable Flora and Fauna

6.2.1 Badger

The population of badgers in proximity to the application area is considered to be of **Local Importance**. Further details can be found in the confidential badger report.

6.2.2 Bats

No direct evidence of bats was found during the surveys and all of the trees within or in close proximity to the application area were assessed as being of low bat roost potential due to their relative young age and lack of features suitable for roosting bats. The woodland edges and rides do however provide suitable bat foraging habitat, however bat foraging habitat is not protected by existing legislation. As there is abundant suitable bat foraging habitat within 2km of the application area, the habitats are considered to be of **Local Importance** for bats. A site of potential County Importance for bats is located approximately 2km north of the application area, which will not be affected by the proposed wellhead construction.

6.2.3 Breeding Birds

Two notable breeding birds were recorded adjacent to the application area during the survey, both of which are listed on Section 74 of the Countryside and Rights of Way Act (2000), comprising one pair each of song thrush and yellowhammer. A party of 14 common crossbills were recorded flying over the application area on the July visit. This species is protected on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) however as the survey was conducted outside the main crossbill nesting period (January to May inclusive), no inferences can be made that crossbills bred anywhere in proximity to the application area. Abundant suitable crossbill nesting habitat occurs within 2km of the application area. This breeding bird assemblage is considered to be of **Local Importance**.

6.2.4 Butterflies

No butterflies were recorded during the surveys due to adverse weather conditions although a small area of bracken approximately 50m to the east of the application area was considered to be suitable for small pearl-bordered fritillary. However this area was small and declining in quality, the likelihood of this species being present is considered to be low. There is a small population of small pearl-bordered fritillary approximately 2km to the north of the application area although these two areas are not connected by suitable habitat, the intervening terrain is overwooded and acting as a significant barrier to colonisation. This area was not considered to be important for butterflies due to overshading by adjacent trees and the consequent decline of nectar sources and available larval foodplants.

6.2.5 Flora

The semi-improved neutral grassland verges adjacent to the southern access track support assemblages of herbs associated with less improved swards, both verges possibly meeting the County SINC selection criteria (as do several verges approximately 2km away from the application area). These verges are considered to be of **Local Importance**.

The strip of relict ancient woodland and associated ancient woodland indicator plants is also considered to be of **Local Importance**, especially in an area that has become dominated by planted alien tree species.

Summary of Evaluation

Importance/Value	Habitats	Species
Local	Semi-improved grass verges	
Local	[illegible] woodland	
Local		Badger populations
Local		Breeding bird assemblage
Local	Bat foraging habitat	
Not important	Butterfly breeding habitat	Common and widespread species

7. PREDICTION OF IMPACTS

7.1 Outline Proposal

The development is planned to take place in three phases involving construction of the wellsite and its associated access, mobilisation and placement of drilling equipment at the site leading to the drilling of the exploratory borehole and; carrying out a short-term test and evaluation programme (if applicable). The planning application covers a period of three years.

The timing of these phases is envisaged to be as follows:

Phase 1 – Access and site construction – 5 weeks,

Phase 2 – Equipment assembly and drilling operations – [illegible] weeks,

Phase 3 – Testing and evaluation (if applicable) – 1 to 2.5 years

All these phases will be of a temporary nature, phases 1 and 2 will be of a short-term duration, with phase 3 being of medium term duration although it is understood that phase 3 will not be of a continuous nature over the timescale above.

The proposed work includes the construction of a temporary track extending from Ebberston Low along the southern boundary of the arable field (approximately 2m to the north of the existing stone wall), with a tarmac surface for the first 15m of its length, with a stone surface thereafter as far as the entrance to the drill site. The upgrading of the track will be of short duration and of a temporary nature as it will be removed at the end of the drilling operations.

During the construction of the wellsite, it is anticipated that there would be movements of site preparation plant comprising 360° excavator and articulated trucks at the outset of construction activity. The access, car park and site would require approximately 313 lorry loads of stone delivered over an approximately 4 week period plus between 5 and 10 personnel movements per day. The above movements equate to an average of 1 vehicle movement every 25 minutes during the normal working day. There will be no working on Sundays or during bank holidays.

The drilling equipment will be continuously illuminated by flood lights at night during the operation of the drillsite.

7.2 Vegetation & Habitats

The application area consists of an artificial habitat (arable field) of negligible ecological value. The construction of the temporary access track will be entirely within the arable field and this will not result in any loss of notable flora.

7.3 Protected & Notable Fauna Species

7.3.1 *Badger*

Due to the distances involved, a badger disturbance licence is not considered necessary.

The constant illumination of the drilling rig during darkness hours throughout its operation will result in a short term and temporary increase in light levels, which will result in disruption to badger social behaviour and foraging activity.

The construction of the access track within the existing arable field will not result in the loss of any significant badger foraging habitat.

7.3.2 *Bats*

No bat roosts were identified within or in proximity to the application area although the forestry plantations and rides were considered to be of local importance for foraging bats. However, these areas will not be affected by the proposed works and no negative impacts are anticipated on bat foraging habitat

The constant illumination of the drilling rig will also have a short-term and temporary adverse impact on bat foraging behaviour patterns although this will affect only a small proportion of the available bat foraging habitat. It is considered that this short term impact will have a negligible impact on the bat population in the local area, as alternative foraging habitat is abundant within 2km of the application area. Once drilling and testing operations are complete, the light levels will return to normal.

None of the bat roosts identified through consultation will be affected by the proposed development due to the distances involved.

7.3.3 *Breeding Birds*

The proposed works will not result in any loss of habitat for breeding birds; no direct negative impacts are anticipated on a purely locally important species assemblage (which does however include species of conservation concern). There will be a degree of temporary, short-term noise disturbance which may lead to a short-term and reversible decline in breeding song birds, however this is not considered to be significant and will have a negligible adverse impact on the breeding bird assemblage in the local area. Abundant alternative breeding habitat occurs within 2km of the application area. Breeding birds will still be able to use the habitats within and surrounding the application area after the development has taken place.

7.3.4 *Butterflies*

The proposed works will result in no loss of butterfly habitat due to the artificial nature of the habitats within the application area. None of the notable species identified through consultation will be affected by the proposed works due to the distances involved and lack of suitable habitat within the application area.

8. EVALUATION OF IMPACTS

8.1 Construction of the Drillsite and Drilling Operations

The construction of the drill site, assemblage of equipment and drilling operations are envisaged to take a total of approximately 10 weeks. The

construction of the drillsite will not result in the loss of any natural habitat as this work will take place in the centre of an arable field. However, there will be a short-term increase in noise levels from increased vehicle movements besides construction noise which will have a short-term and reversible impact on the population of breeding song birds in the plantation in proximity to the drillsite.

The populations of badgers in adjoining woodland will also be subject to short-term and temporary increase in noise levels and vibrations. The constant illumination of the drilling rig during darkness hours throughout the construction and operation of the works will lead to a short term and temporary substantial increase in light levels, which could have a short term and temporary negative impact on badger and bat foraging activity. However, this is not thought to be significant as abundant alternative foraging habitat for both bats and badgers occurs within 2km of the application area. Once drilling and testing operations are complete, the area will return to existing light conditions.

8.2 Construction of a Temporary Access Track

The construction of the access track will take place entirely within the arable field, approximately 2m to the north of the existing dry stone wall. This will not result in the loss of any significant natural vegetation.

8.3 Summary Evaluation of Impacts

Attribute	Impact
Construction of drillsite	Increase in noise levels, resulting in short-term and reversible decline in breeding song bird population. Increase in noise levels and vibration will also have a short term and reversible impact on the local badger population.
Illumination of drill rig during darkness hours	The substantial increase in light levels will have short term and temporary impact on badger and bat foraging activity. The effects of this will be reversible and of short term duration.
Construction of temporary access track	The construction of the temporary access track will be within the arable field and will not result in the loss of any significant semi-natural vegetation.

9. OPPORTUNITIES FOR MITIGATION AND ENHANCEMENT

The construction and operation of the site will not result in the loss of any significant semi-natural vegetation, no mitigation is therefore required in relation to vegetation and habitats.

NYM/ 2007 / 0 9 0 1 / F L

The locations of the main drill site, flare pit and placement of temporary buildings (cabins, mess room etc) are all outwith 100m from the badger setts located within the survey area. It is considered that a badger disturbance licence would not be required due to the distances involved.

As the application area will be returned to agricultural use after drilling operations have ceased, there are no opportunities for enhancement.

10. Residual Effects

The construction of the drill site and drilling operations are envisaged to take a total of approximately 10 weeks, with the potential for further testing taking place over a time period of between 1 and 2.5 years. These operations are clearly of a temporary nature, taking place within an artificial habitat (arable field). The well site will be capped once drilling operations have ceased and the site will be returned to agriculture. The temporary access track and soil bunds within the arable field will also be removed. The increase in noise levels, illumination and vibration during the operation and construction of the drill site will also be of a temporary nature. There will thus be no residual impacts or cumulative impacts.

11. Summary and Conclusions

- A gas drilling site is proposed to be constructed in an arable field close to the village of Ebberston in North Yorkshire.
- The construction, operation and testing of the wellsite is envisaged to take place over approximately 3 years and will include the construction of a temporary access track within the arable field.
- There will be a substantial increase in vehicle movements during the construction phase of the drilling operation over a period of approximately 10 weeks, amounting to one vehicle movement every 25-35 minutes during office hours. The drilling rig will also be constantly illuminated during darkness hours throughout the operation of the site.
- There are two SSSIs within 0.5km of the application area, Jeudale and Rosekirk Dale Fens which are of National Importance for their fen

vegetation assemblages and invertebrate populations. Neither of these will be affected due to the localised nature of the proposed works and the distances involved.

- The application site is located on the southern boundary of the North York Moors National Park. Two areas of Section 3 Moor, Heath or Down (a landscape and nature conservation category, important within the National Park) occur within 0.5km of the application area to the north and east. Another area of Section 3 habitat occurs approximately 1.5km to the north east of the application area. Neither of these areas will be affected due to the localised nature of the proposed works and the distances involved.

- Locally notable areas of semi-improved grassland occur on two ancient earthworks and a network of trackside verges within 1km of the application area. These areas will not be affected by the proposed works.

- There are recent and historical records of a variety of protected and notable species within 2kms of the application area, including badger setts, known bat roosts and recent records of otter from Troutsdale Beck. None of these species will be affected by the proposed works due to its localised nature and the distances involved.

- There are no records of amphibians within 2km of the application area, within which there is no suitable breeding habitat.

- The drillsite is located within an arable field of negligible ecological value. The temporary access track will also be constructed within this arable field, resulting in no net loss of any significant semi-natural vegetation.

- The construction and operation of the drill site will result in the short term and temporary increase in noise and vibration levels due to an increase in vehicle movements during the construction phase in addition to the operation of the works.

- This will result in a short-term and temporary decline in the population of breeding songbirds in the vicinity of the application area, including species of conservation concern. However this effect will be reversible and is not considered to have any significant impact on the local songbird population."

- The increase in noise and vibration levels will have a short-term and temporary impact on the local badger population although there will be no direct impact on any setts.

- Due to the distances involved, a badger disturbance licence will not be required.

- Constant illumination of the drilling rig during darkness hours will result in short-term and temporary disruption to badger and bat foraging activity in proximity to the application area. However, abundant alternative badger and bat foraging habitat occurs within 2km of the application area and there will be no significant impacts on the locally important badger or bat populations as a result of the proposed works.

12. References and Documents Consulted

Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. (2000). Bird Census Techniques: 2nd edition. Academic Press, London.

Foster, J (2001) Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.

Harris, S., Cresswell, P. & Jefferies, D. (1989) Surveying Badgers. Occasional Publication of the Mammal Society No 9. The Mammal Society, London.

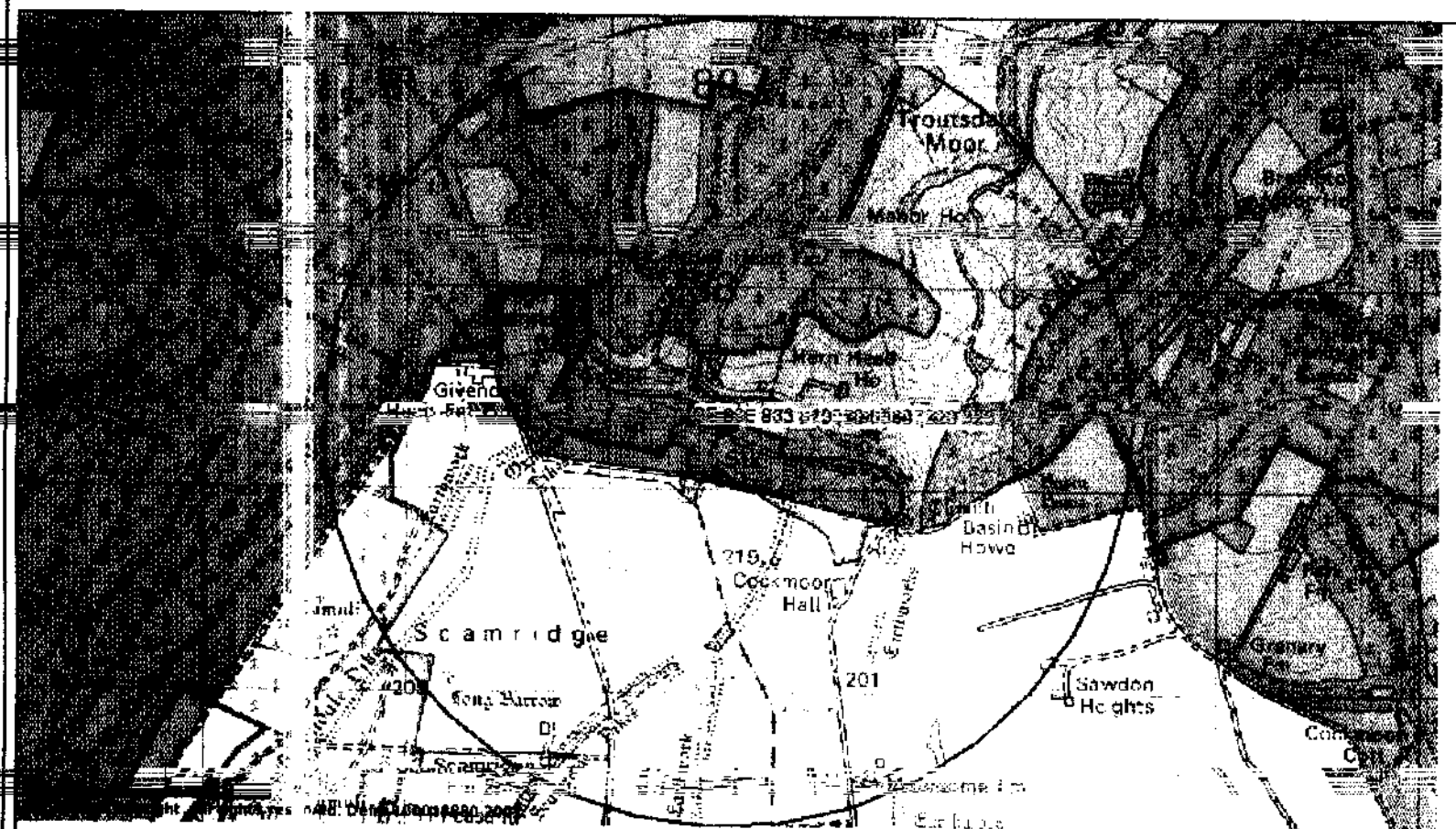
Institute for Ecology & Environmental Management (2006) Guidelines for Ecological Impact Assessment in the United Kingdom (ver 7, July 2006). www.ieem.org.uk/ecia/index.

Joint Nature Conservation Committee (2003) Handbook for Phase 1 Habitat Survey - A Technique for Environmental Audit. Joint Nature Conservation Committee, Peterborough.

Mitchell-Jones, A.J. & McLeish, A.P. (Eds) (2004). Bat Workers Manual, 3rd Ed. JNCC, Peterborough.

ODPM (2005) Government Circular: Biodiversity and Geological Conservation - Statutory obligations and their impact within the planning system. ODPM 06/2005 & DEFRA 01/2005.

Strachan, R and Moorhouse,T (2006) Water Vole Conservation Handbook, 2nd Edition: WildCru: Oxford.



MAGIC

Ancient Woodland (England)

Ancient & Semi-Natural

Ancient Replanted

National Nature Reserves (England)

Ramsar Sites (England)

Special Protection Areas (SPA)

Special Areas of Conservation (England)

Sites of Special Scientific Interest (England)

National Parks (England)

(Layers Missing? - Help)

Scale: 1: 29819

NYM/2007/0901/F

Site Check Report

Report generated on October 16 2007.

You clicked on the point:
Grid Ref: SE 905 873
Full Grid Ref: 490594 , 487323

The following features have been found within 2,000 metres of your search point:

Ancient Woodland (England)
There are no features within your search area.

National Nature Reserves (England)
There are no features within your search area.

Ramsar Sites (England)
There are no features within your search area.

Special Protection Areas (England)
There are no features within your search area.

Special Areas of Conservation (England)
There are no features within your search area.

Sites of Special Scientific Interest (England)

Reference	Name	Citation
1003503	TROUTSDALE & ROSEKIRK DALE FENS	1004518

National Parks (England)

Reference	Name	Date of Confirmation Order	Hotlink
7	NORTH YORK MOORS	NOVEMBER 1952	HTTP://WWW.COUNTRYSIDE.GOV.UK/LAR/LANDSCAPE/DL/NATIONAL_PARKS/NORTHYORKMOORS.ASP

To save the report, select "Save As" from the File menu. Give the report a name of your choice and save it in "Web Page, HTML only" format. You can then open your report using your web browser software.

Print Report | Close Window

NYM/ 2007 / 0901 / FL

DATE NOTIFIED: 6 MARCH 1992

County: North Yorkshire **Site name: Troutsdale and Rosekirk Dale Fens**

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981, as amended.

Local Planning Authority: North York Moors National Park, Ryedale District Council, Scarborough District Council

National Grid Reference: SE 900876 and SE 903879 **Area:** 13.07 (ha) 32.30 (ac)

Ordnance Survey Sheet 1: 50,000: 101 1:10,0000: SE 88 NE, SE 98 NW

First Notified: 1984* **Date of Revision:** 1992[X]

Other Information:
1. The site lies in the North York Moors National Park.

*Under Section 28 of the Wildlife and Countryside Act, 1981.

[X]Under Section 28 of the Wildlife and Countryside Act, 1981, (as amended).

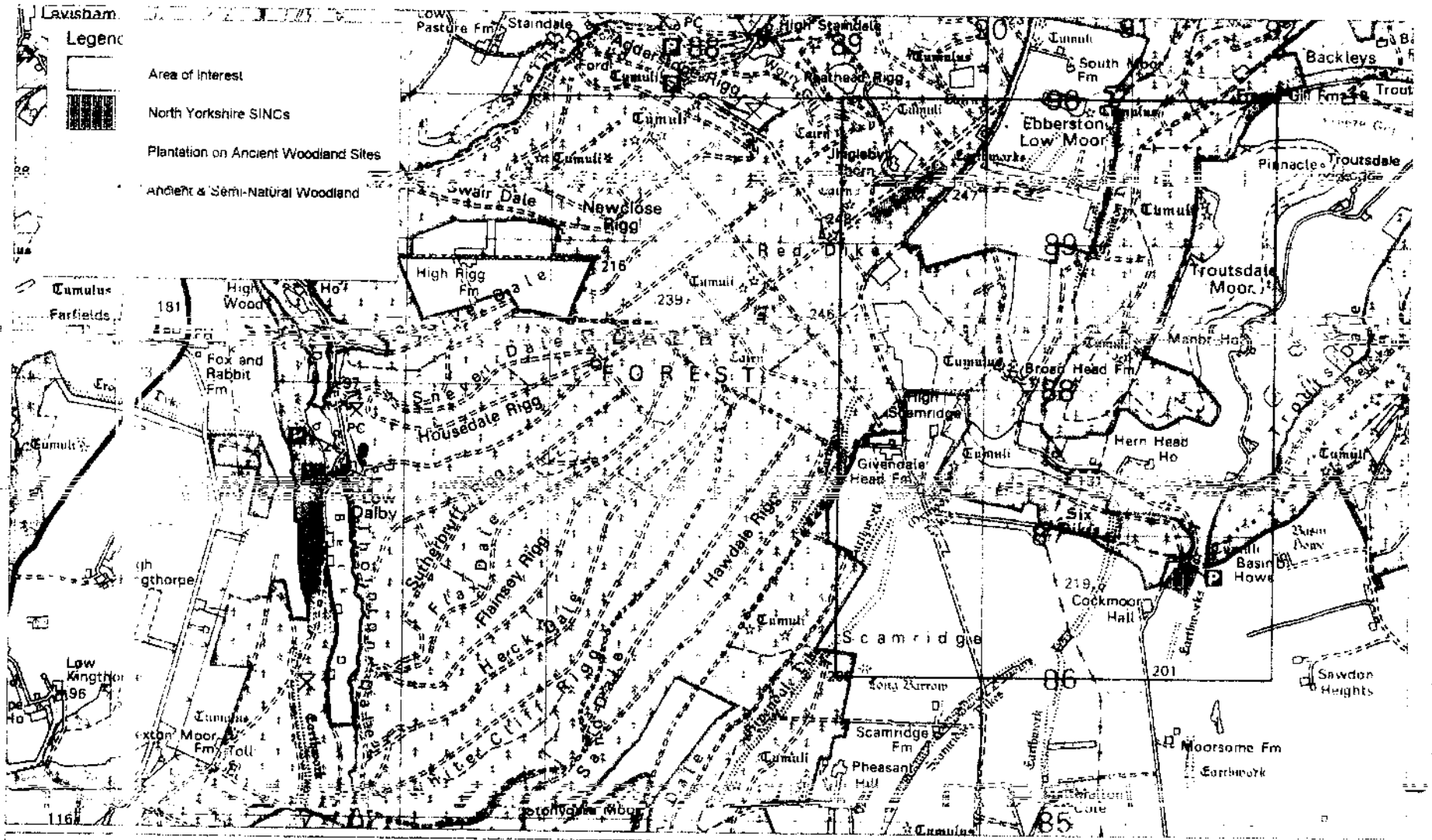
Description:
These two fen systems lie in the narrow upper reaches of Troutsdale. They display examples of spring and flush fen typical in the local area where base-rich springs emanate from the Corallian Limestone. Such fen systems are nationally rare, being restricted to only four main areas in Norfolk, Oxfordshire, Anglesey and North York Moors. These communities are particularly vulnerable to degradation either by ditching, excess water abstraction or by neglect. Typically the communities exhibit active precipitation and deposition of calcium carbonate in the form of marl and tufa respectively.

Two main plant communities are present at this site. Troutsdale Fen supports a large area of fen meadow dominated by rushes including soft rush *Juncus effusus*, compact rush *J. conglomeratus* and the rarer blunt-flowered rush *J. subnodulosus*. Sedges are well represented including long-stalked yellow sedge *Carex lepidocarpa*, glaucous sedge *C. flacca* and carnation sedge *C. panicea*, together with wetland herbs such as marsh valerian *Valeriana dioica*, meadowsweet *Filipendula ulmaria* and devil's-bit scabious *Succisa pratensis*. Other herbs of note are meadow thistle *Cirsium dissectum* and several orchid species, including marsh helleborine *Epipactis palustris*. The tall common reed *Phragmites australis* occurs in a few places.

Within Troutsdale Fen the above community grades into a coarser one dominated by tussocks of the black bog rush *Schoenus nigricans*, but this community is more common within the fen to the north-east, known as Rosekirk Dale fen. Typical plants include purple moor-grass *Molinia caerulea*, the insect feeding butterwort *Pinguicula vulgaris*, broad-leaved cotton-grass *Eriophorum latifolium* and common cotton-grass *E. angustifolium*. In places mounds of bog mosses *Sphagnum spp.* allow some plants to grown in a more acidic environment above the influence of the calcareous flushes. Here species more typical of heathland survive such as cross-leaved heath *Erica tetralix*, bilberry *Vaccinium myrtillus*, crowberry *V. vitis-idaea* and crowberry *Empetrum nigrum*.

Small areas of scrub occur within both fen systems and include hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa* and grey willow *Salix cinerea*.

It is known that calcareous fen systems support distinctive insect faunas. Although this site has not been well studied, it is known that the flush systems are particularly important for soldier flies. A species of crane fly *Limonia occidua*, which is commonly found in Scotland, also occurs at Troutsdale Fen and this is one of the very few English locations for this species.



Non-Statutory Nature Conservation Sites in the environs of Dalby Forest, Near Snainton
Map produced by NEYEDC on behalf of White Young Green Environmental, May 2007

NYM / 2007 / 0901 / FI

SITE INDEX ENTRY FORM NYM/ 2007 / 0901 / FL

Region/chq/country code (eg 30.11) : 18)
Origin/record type (eg W=SSSI) :) Index Number:( )
Record Number :)
Author : JA Harris
Data source/s reference : 18.8.1 H: 75' 22'9 ?
Title : North York Moors Phase I Survey
Location of original data/source : York Sub Office, National Park office
Original reference number : SE 98 NW/007
Keywords habitats : [illegible] flush
Keywords other :

Level of survey/evaluation : Phase I
Site name : Cockmoor Hall

10 Km square/s : SE 98 NW
Grid reference/s (eg SJ234234) : SE 911872
Area of search :

LA district/s (codes) : SCAR : : : :
Area (Ha) by district/s : : : : :

Vice county number/s : 62

SSSI code/s : NO
Conservation status code/s
Habitat records entered ? (Yes/No) :
Species records entered ? (Yes/No) :
Site description/notes (brief) :

Site comprises a range of vegetation types, from areas of dry to wet grassland (marshy/flush) with scattered and dense scrub merging into woodland. The area on the slope below the road is dominated by grasses in the Eastern end and other species present include Dactylorhiza fuschii, Lotus corniculatus and Ajuga reptans. As the area grades into marshy grassland, Caltha palustris and Cardamine flexuosa are present. ~~In the flushed areas~~ there's Chrysosplenium oppositifolium, Mentha aquatica and Angelica sylvestris.

NB Pedicularis palustris } both noted on a previous survey
Orchis morio } 15/8/84

Checked? | Entered on Computer? | | Version 25-3-87

Data search for 12km area at Dalby Forest, Near Scampton.

NEYEDC, May 2007

Species	Survey name	Location	Grid ref.	Date	Recorder(s)	Record type
Achillea ptarmica	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Adoxa moschatellina	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Adoxa moschatellina	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Aeshna juncea	Odonata Report 2000	Deepdale Ponds	SE 91 90	18/08/2000	John Hume	None
Agrimonia eupatoria	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Agrimonia eupatoria	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Aira praecox	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Aira praecox	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Alauda arvensis	North Yorkshire SINC Survey	North Yorkshire	SE913867	20/07/1998	Andrew Weston	field record
Alchemilla filicaulis vestita	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Alchemilla vulgaris s.l.	North York Moors Road Verge Survey	North York Moors road verge no. 50	SE91258721	13/06/2004	James Mortimer	field record
Alchemilla xanthochlora	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Alchemilla xanthochlora	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Alchemilla xanthochlora	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Alisma plantago-aquatica	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Allium ursinum	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Allium ursinum	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Allium ursinum	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Allium ursinum	North York Moors Road Verge Survey	North York Moors road verge no. 51	SE91468735	13/06/2004	James Mortimer	field record
Andrena bicolor	Hymenoptera: Aculeata	Givendale Head	SE8987	28/06/1998	Auckland	field record
Andrena fucata	Hymenoptera: Aculeata	Troutsdale	SE9188	25/06/1927	Walsh	Collection
Anemone nemorosa	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Anemone nemorosa	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Anemone nemorosa	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Anemone nemorosa	North York Moors Road Verge Survey	North York Moors road verge no. 50	SE91258721	13/06/2004	James Mortimer	field record
Anemone nemorosa	North York Moors Road Verge Survey	North York Moors road verge no. 51	SE91468735	13/06/2004	James Mortimer	field record
Anepsiomyia flavivenris	Diptera of Forestry Commission Sites	Troutsdale Fen SSSI	SE 903 879	14/07/1996	Unknown	None
Aquilegia vulgaris	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Arabis hirsuta	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Arvicola terrestris	Environment Agency crayfish/ water voles/ mussels	Langdale Rigg	SE 9 9	18970708	Unknown	None
Arvicola terrestris	Environment Agency crayfish/ water voles/ mussels	Harwood Dale	SE 9 9	21/05/1904	Unknown	None

NYM / 2007 / 0901 / FL

On Behalf of White Young Green Environmental.

Data search for 12km area at Dalby Forest, Near Sinnington.

NEYEDC, May 2007

Arvicola terrestris	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/08/1999	Laura Winter	absence of sign
Arvicola terrestris	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/01/1992	Laura Winter	absence of sign
Arvicola terrestris	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/01/1993	Laura Winter	absence of sign
Arvicola terrestris	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/01/1994	Laura Winter	absence of sign
Arvicola terrestris	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/01/1995	Laura Winter	absence of sign
Arvicola terrestris	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/01/1996	Laura Winter	absence of sign
Arvicola terrestris	Yorkshire water vole record (positive)	Langdale Rigg	SE99	13970708	Unknown	None
Arvicola terrestris	Yorkshire water vole record (positive)	Langdale Rigg	SE99	13970708	Unknown	None
Arvicola terrestris	Yorkshire water vole record (positive)	Hackness	SE99	11/07/1936	Unknown	None
Arvicola terrestris	Yorkshire water vole record (positive)	Harwood Dale	SE99	21/05/1904	Unknown	None
Arvicola terrestris	Yorkshire water vole record (positive)	Harwood Dale	SE99	21/05/1904	Unknown	None
Blechnum spicant	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Blechnum spicant	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Blechnum spicant	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Blechnum spicant	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Blechnum spicant	North Yorkshire SINC Survey	North Yorkshire	SE913867	20/07/1998	Andrew Veston	field record
Blechnum spicant	North York Moors Road Verge Survey	North York Moors road verge no. 50	SE91258721	13/06/2004	James Mortimer	field record
Blechnum spicant	North York Moors Road Verge Survey	North York Moors road verge no. 51	SE91468735	13/06/2004	James Mortimer	field record
Brimstone	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	07/04/2000	Gwenda Wadsworth	field record
Brown Hare	Yorkshire Mammal Group records	Nettledale Lane, Snainton	SE911862	06/05/2004	James Mortimer	field record

NYM / 2007 / 0901 / EL

On Behalf of White Young Green Environmental

Brown Long-Eared Bat	Yorkshire Mammal Group records	North York Moors	SE896881	21/05/1998	Michael Thompson	field record
Buzzard	Gordon Simpson's bird records	North Yorkshire	SE 9 9	20/08/1965	Gordon Simpson	None
Carex dioica	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Carex echinata	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Carex hostiana	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Carex hostiana	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Carex laevigata	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Carex panicea	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Carex panicea	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Carex panicea	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Carex pilulifera	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Carex pilulifera	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Carex sylvatica	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Carex sylvatica	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Carex viridula brachyrrhyncha	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Carex viridula brachyrrhyncha	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Carex viridula brachyrrhyncha	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Carex viridula oedocarpa	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Carex viridula oedocarpa	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Carex viridula oedocarpa	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Chrysosplenium alternifolium	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Comma	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	07/04/2000	Gwenda Wainsworth	field record
Common Blue	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	19/06/2000	Derek Hardcastle	field record
Common Frog	Forest Enterprise amphibian & reptile records	Steel Burrows, Snainton Dyke	SE 906 889	01/01/1989	Charles Critchley	spawn
Common Frog	Forest Enterprise amphibian & reptile records	Steel Burrows, Snainton Dyke	SE 907 889	01/01/1988	Charles Critchley	spawn
Common Frog	Herpetofauna records from The Naturalist	North Yorkshire	SE99	01/01/1970	Unknown	None
Common Toad	Forest Enterprise amphibian & reptile records	Steel Burrows, Snainton Dyke	SE 906 889	01/01/1989	Charles Critchley	spawn
Common Toad	Forest Enterprise amphibian & reptile records	Steel Burrows, Snainton Dyke	SE 907 889	01/01/1988	Charles Critchley	field record
Common Toad	Herpetofauna records from The Naturalist	North Yorkshire	SE99	01/01/1970	Unknown	None
Common Wintergreen	Gordon Simpson's vascular plant records	North Yorkshire	SE 9 9	16/06/1966	Gordon Simpson	None

On Behalf of White Young Green Environmental.

NYM/2007/0901/FL

NYM/ 2007 / 0901 / FL

Cruciata laevipes	North York Moors Road Verge Survey	North York Moors road verge no. 50	SE91258721	13/06/2004	James Mortimer	field record
Dactylorhiza fuchsii	North York Moors Road Verge Survey	North York Moors road verge no. 50	SE91258721	13/06/2004	James Mortimer	field record
Dactylorhiza fuchsii	North York Moors Road Verge Survey	North York Moors road verge no. 51	SE91468735	13/06/2004	James Mortimer	field record
Danthonia decumbens	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Danthonia decumbens	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Danthonia decumbens	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Dingy Skipper	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	18/06/2000	John Hunte	field record
Eupatorium cannabinum	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Eupatorium cannabinum	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Eupatorium cannabinum	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Eupatorium cannabinum	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Greater Wintergreen	Gordon Simpson's vascular plant records	North Yorkshire	SE 9 9	16/06/1966	Gordon Simpson	None
Gymnadenia conopsea	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Gymnadenia conopsea	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Gymnadenia conopsea	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Gymnocarpium dryopteris	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Gymnocarpium dryopteris	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Gymnocarpium dryopteris	North York Moors Plant Atlas	North York Moors	SE909900	01/01/1993	Nan Sykes	field record
Hyacinthoides non-scripta	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Hyacinthoides non-scripta	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Hyacinthoides non-scripta	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Hyacinthoides non-scripta	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Hyacinthoides non-scripta	North York Moors Road Verge Survey	North York Moors road verge no. 50	SE91258721	13/06/2004	James Mortimer	field record
Hyacinthoides non-scripta	North York Moors Road Verge Survey	North York Moors road verge no. 51	SE91468735	13/06/2004	James Mortimer	field record
Hypericum elodes	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Hypericum humifusum	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Hypericum pulchrum	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Hypericum pulchrum	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Hypericum pulchrum	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Hypericum pulchrum	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Hypericum tetrapterum	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Hypericum tetrapterum	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Hypericum tetrapterum	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record

Data search for 12km area at Dalby Forest, Near Snainton.

NEYEDC, May 2007

Hypericum tetrapterum	North York Moors Road Verge Survey	North York Moors road verge no. 51	SE9146 9735	13/06/2004	James Mortimer	field record
Large Skipper	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	24/06/2001	Peter Robinson	field record
Lathyrus linifolius	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Lathyrus linifolius	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Lathyrus linifolius	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Ligustrum vulgare	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Linum catharticum	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Linum catharticum	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Linum catharticum	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Linum catharticum	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Listera ovata	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Listera ovata	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Listera ovata	North York Moors Road Verge Survey	North York Moors road verge no. 50	SE9125 9721	13/06/2004	James Mortimer	field record
Lutra lutra	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/08/1999	Laura Winter	absence of sign
Lutra lutra	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/01/1992	Laura Winter	absence of sign
Lutra lutra	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/01/1993	Laura Winter	absence of sign
Lutra lutra	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/01/1994	Laura Winter	absence of sign
Lutra lutra	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/01/1995	Laura Winter	absence of sign
Lutra lutra	Otters, Mink & Water Voles in the Upper Derwent & Scalby Beck (negative records)	Troutsdale Beck	SE 917 874	01/01/1996	Laura Winter	absence of sign
Marbled White	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	01/08/2001	Gwenda Wadsworth	field record
Marbled White	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	15/08/2001	John Hume	field record
Myotis nattereri	Forestry Commission bat box survey	Broad Head	SE 896 986	30/04/1998	Charles Critchley	ringing/tagging. record

On Behalf of White Young Green Environmental.

NYM / 2007 / 0901 / FL

Data search for 12km area at Dalby Forest, Near Snainton.

NEYEDC, May 2007

Myotis nattereri	Forestry Commission bat box survey	Broad Head	SE 896 886	20/05/1999	Charles Critchley	ringing/tagging record
Myotis nattereri	Forestry Commission bat box survey	Broad Head	SE 896 886	13/04/2000	Charles Critchley	ringing/tagging record
Myotis nattereri	Forestry Commission bat box survey	Broad Head	SE 896 886	06/09/2001	Charles Critchley	ringing/tagging record
Myriophyllum alterniflorum	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Narcissus	North York Moors Road Verge Survey	North York Moors road verge no. 51	SE91468735	13/06/2004	James Mortimer	field record
Narcissus pseudonarcissus	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Northern Brown Argus	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	01/08/2001	John Hume	field record
Nyctalus noctula	Forestry Commission bat box survey	Broad Head	SE 896 886	19/09/1991	Charles Critchley	ringing/tagging record
Nyctalus noctula	Forestry Commission bat box survey	Broad Head	SE 896 886	22/10/1992	Charles Critchley	ringing/tagging record
Oak Fern	Gordon Simpson's vascular plant records	North Yorkshire	SE 890 899	06/08/1965	Gordon Simpson	None
Oak Fern	Gordon Simpson's vascular plant records	North Yorkshire	SE 890 899	28/08/1967	Gordon Simpson	None
Oak Fern	Gordon Simpson's vascular plant records	North Yorkshire	SE 890 899	26/09/1968	Gordon Simpson	None
Ophioglossum vulgatum	North York Moors Plant Atlas	North York Moors	SE913878	01/01/1993	Nan Sykes	field record
Ophioglossum vulgatum	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Orange Tip	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	26/05/2001	Peter Robinson	field record
Orchis mascula	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Orchis morio	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Otter	Otter, water vole and crayfish records	Troutsdale	SE91708740	01/01/1999	Unknown	spraint
Otter	Yorkshire Mammals	North Yorkshire	SE98J	18991230	Delany	None
Otter	Water for Wildlife Project	Troutsdale Beck, Troutsdale, Pickering	SE 917 874	01/09/1999	Laura Winter	spraint
Otter	Water for Wildlife Project	Troutsdale Beck, Troutsdale	SE 917 874	01/09/1999	Laura Winter	spraint
Oxalis acetosella	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Oxalis acetosella	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Oxalis acetosella	North York Moors Plant Atlas	North York Moors	SE9288	01/01/1993	Nan Sykes	field record
Oxalis acetosella	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Oxalis acetosella	North Yorkshire SINC Survey	North Yorkshire	SE913867	20/07/1998	Andrew Weston	field record

NYM / 2007 / 0901 / FL

On Behalf of White Young Green Environmental

Data search for 12km area at Dalby Forest, Near Snainton

Oxalis acetosella	North York Moors Road Verge Survey	North York Moors road verge no. 50	SE91258721	13/06/2004	James Mortimer	field record
Oxalis acetosella	North York Moors Road Verge Survey	North York Moors road verge no. 51	SE91468735	13/06/2004	James Mortimer	field record
Palmate Newt	Forest Enterprise amphibian & reptile record	Steel Burrows, Snainton Dyke	SE 906 889	01/01/1989	Charles Critchley	field record
Palmate Newt	Forest Enterprise amphibian & reptile record	Steel Burrows, Snainton Dyke	SE 907 889	01/01/1988	Charles Critchley	field record
Paris quadrifolia	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Peacock	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	07/04/2000	Gwenda Wadsworth	field record
Pinguicula vulgaris	North York Moors Plant Atlas	North York Moors	SE9088	01/01/1993	Nan Sykes	field record
Pinguicula vulgaris	North York Moors Plant Atlas	North York Moors	SE9090	01/01/1993	Nan Sykes	field record
Pipistrelle	Yorkshire Mammal Group records	North Yorkshire	SE896881	22/06/2000	Michael Thompson	field record
Pipistrelle	Yorkshire Mammal Group records	Broad Head	SE896886	24/04/1997	Michael Thompson	field record
Pipistrellus pipistrellus 45kHz	Forestry Commission bat box survey	Broad Head	SE 896 886	09/08/2001	Charles Critchley	ringing/tagging record
Pipistrellus pipistrellus 45kHz	Forestry Commission bat box survey	Broad Head	SE 896 886	06/09/2001	Charles Critchley	ringing/tagging record
Pipistrellus pipistrellus 45kHz	Forestry Commission bat box survey	Broad Head	SE896886	09/09/2002	Charles Critchley	ringing/tagging record
Pipistrellus pipistrellus 45kHz	Forestry Commission bat box survey	Broad Head	SE896886	09/09/2002	Charles Critchley	ringing/tagging record
Platanthera chloranth	North York Moors Plant Atlas	North York Moors	SE9290	01/01/1993	Nan Sykes	field record
Plecotus auritus	Forestry Commission bat box survey	Broad Head	SE 896 886	01/05/1987	Charles Critchley	ringing/tagging record
Plecotus auritus	Forestry Commission bat box survey	Broad Head	SE 896 886	15/06/1988	Charles Critchley	ringing/tagging record
Plecotus auritus	Forestry Commission bat box survey	Broad Head	SE 896 886	0/08/2000	Charles Critchley	ringing/tagging record
Plecotus auritus	Forestry Commission bat box survey	Broad Head	SE896886	09/09/2002	Charles Critchley	ringing/tagging record
Ringlet	North York Moors Forest District Butterfly Records	Deepdale	SE 91 90	8/07/2000	Len Auckland	field record
Roe Deer	Yorkshire Mammal Group records	North Yorkshire	SE9087	1/10/1999	Michael Thompson	field record
Sanicula europaea	North York Moors Road Verge Survey	North York Moors road verge no. 50	SE91258721	3/06/2004	James Mortimer	field record

On Behalf of White Young Green Environmental.

NYM/2007/0901/FL

Data search for 12km area at Dalby Forest, Near Snainton

EYEDC, May 2007

Small Heath	North York Moors Forest District Butterfly Records	Deepdale	SE [illegible] 90	04/07/2001	Gwenda Wadsworth	None
Small Pearl-Bordered Fritillary	North York Moors Forest District Butterfly Records	Deepdale	SE [illegible] 90	17/06/2000	Gwenda Wadsworth	field record
Small Pearl-Bordered Fritillary	North York Moors Forest District Butterfly Records	Deepdale	SE [illegible] 90	18/06/2000	John Hume	field record
Small Pearl-Bordered Fritillary	North York Moors Forest District Butterfly Records	Deepdale	SE [illegible] 90	19/06/2000	Derek Hardcastle	field record
Small Pearl-Bordered Fritillary	North York Moors Forest District Butterfly Records	Deepdale	SE [illegible] 90	24/06/2001	Gwenda Wadsworth	field record
Small Pearl-Bordered Fritillary	North York Moors Forest District Butterfly Records	Deepdale	SE [illegible] 90	24/06/2001	Peter Robinson	field record
Small Pearl-Bordered Fritillary	North York Moors Forest District Butterfly Records	Deepdale	SE [illegible] 90	04/07/2001	Gwenda Wadsworth	field record
Small Pearl-Bordered Fritillary	North York Moors Forest District Butterfly Records	Deepdale	SE [illegible] 90	14/07/2001	Gwenda Wadsworth	field record
Small Skipper	North York Moors Forest District Butterfly Records	Deepdale	SE [illegible] 90	17/07/2000	Gwenda Wadsworth	field record
Vaccinium myrtillus	North York Moors Road Verge Survey	North York Moors road verge no. 5	SE[illegible]58721	13/06/2004	James Mortimer	field record
Vaccinium vitis-idaea	North York Moors Plant Atlas	North York Moors	SE[illegible]8	01/01/1993	Nan Sykes	field record
Vaccinium vitis-idaea	North York Moors Plant Atlas	North York Moors	SE[illegible]0	01/01/1993	Nan Sykes	field record
Valeriana dioica	North York Moors Plant Atlas	North York Moors	SE[illegible]8	01/01/1993	Nan Sykes	field record
Valeriana dioica	North York Moors Plant Atlas	North York Moors	SE[illegible]0	01/01/1993	Nan Sykes	field record
Valeriana dioica	North York Moors Plant Atlas	North York Moors	SE[illegible]8	01/01/1993	Nan Sykes	field record
Valeriana dioica	North York Moors Road Verge Survey	North York Moors road verge no. 5	SE[illegible]58721	13/06/2004	James Mortimer	field record
Valeriana officinalis	North York Moors Plant Atlas	North York Moors	SE[illegible]8	01/01/1993	Nan Sykes	field record
Valeriana officinalis	North York Moors Plant Atlas	North York Moors	SE[illegible]0	01/01/1993	Nan Sykes	field record
Vipera berus	Adder Records	Broad Head, Wydale	SE [illegible] 88	09/10/1980	Charles Crichley	field record
Vipera berus	Adder Records	Broad Head, Wydale	SE [illegible] 88	10/10/1980	Charles Crichley	field record
Vipera berus	Adder Records	Broad Head, Wydale	SE [illegible] 88	11/10/1980	Charles Crichley	field record
Vipera berus	Adder Records	Rosekirkdale Fen, Wydale	SE [illegible] 87	17/04/1985	Charles Crichley	field record
Vipera berus	Adder Records	Rosekirkdale Fen, Wydale	SE [illegible] 87	19/04/1988	Charles Crichley	field record
Wall Brown	North York Moors Forest District Butterfly Records	Deepdale	SE [illegible] 90	23/08/2000	Peter Robinson	field record
Water Vole	Yorkshire Mammals	North Yorkshire	SE9[illegible]17	18991230	Delany	field record
Willow Tit	JMs casual records (1999 to 2002)	Troutsdale Mill	SE9[illegible]874	15/04/2004	Simon Pickup	None
Willow Tit	JMs casual records (1999 to 2002)	Troutsdale Mill	SE9[illegible]874	15/04/2004	James Mortimer	None

NYM/2007/0901/EL

On behalf of White Young Green Environmental

Data search for 12km area at Dalby Forest, Near Thainton.

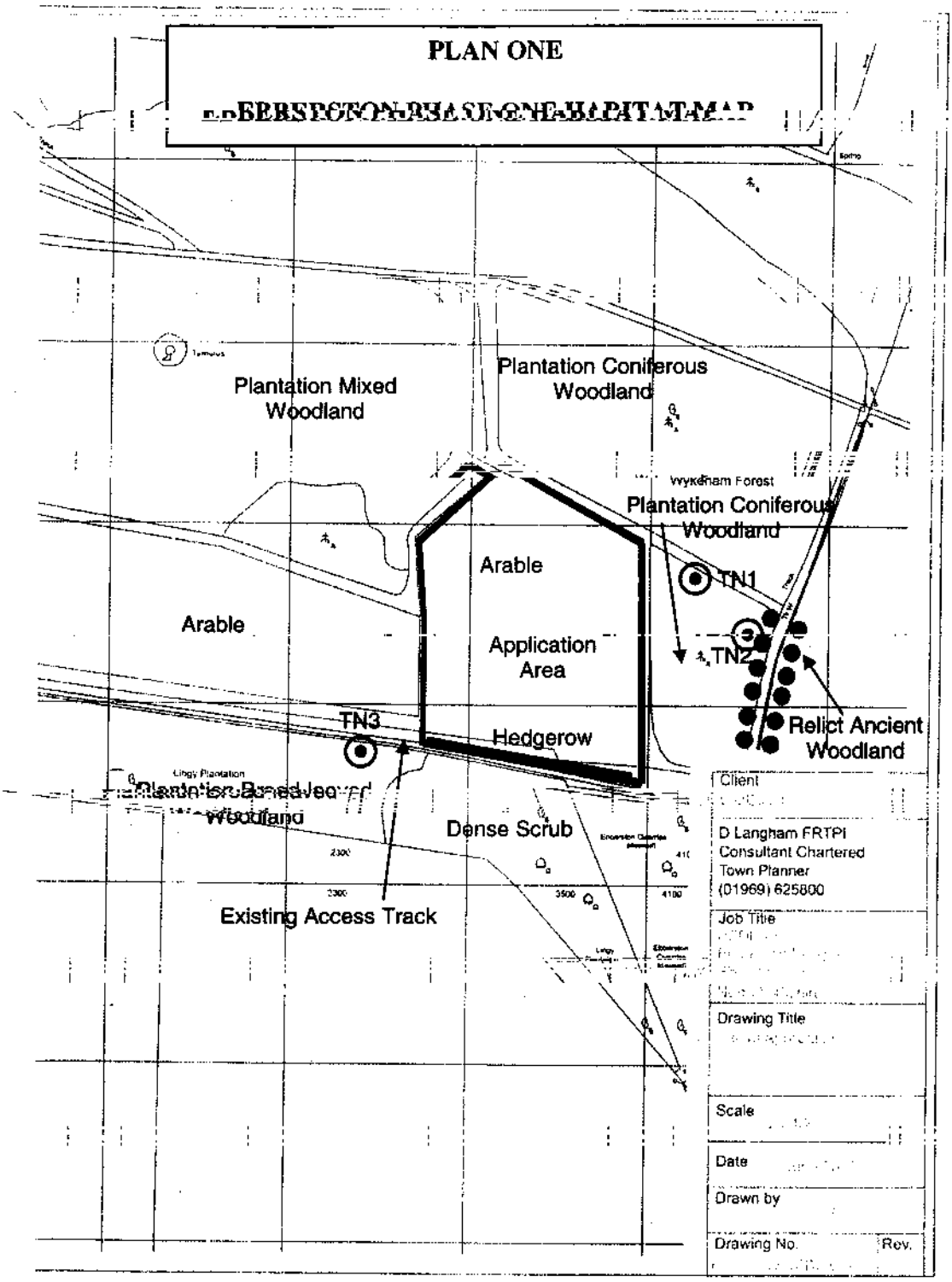
NEYEDC, May 2007

Yellowhammer	Gordon Simpson's bird records	North Yorkshire	SE 916 868	23/02/1965	Gordon Simpson	None

On Behalf of White Young Green Environmental.

NYM/2007/0901/EIA

NYM/ 2007 / 0 9 0 1 / F L



NYM/ 2007 / 0901 / FL

WARWICK ENERGY LTD

EBBERSTON MOOR (EB2) EXPLORATORY WELL SITE
NORTH YORKSHIRE

ARCHAEOLOGICAL ASSESSMENT

Summary

An archaeological desk-based assessment and site walkover inspection of the area of a proposed exploratory well site (EB2) and associated access road on Ebberston Low Moor has identified probable Neolithic settlement within or adjacent to the area of the proposed well site compound. Occupation is evident in the form of a sample of flint artefacts collected from the surface of the field and concentrated towards the south-western corner of the proposed well site. Other artefacts of Neolithic date have also been recovered from other locations in the vicinity of the proposed development.

The proposed development is also located within an area of the Tabular Hills that contains a significant number of nationally important Scheduled Monuments. The majority of these are the visible earthwork remains of round barrows (burial mounds) and linear boundaries (multiple dyke systems) of probable Bronze Age date. No such sites are, however, located within the area of proposed development and there is no evidence to indicate a significant potential that any previously unrecorded site of a similar date or type is located within the area.

Other archaeological features recorded within the proposed development area are restricted to those of former and extant historic field boundaries of both 18th and 19th century date.

Although there are a number of Scheduled Monuments located within the vicinity of the proposed development, including a round barrow and multiple dyke system to the north of the proposed access road, no significant impacts upon the setting of these monuments are predicted. Other Scheduled Monuments within the study area would largely be screened from the proposed development by the surrounding forestry plantations.

In order to establish in more detail the potential physical impacts of the proposed development upon any surviving remains of the probable Neolithic settlement site within the area a staged programme of further evaluation of the well site and adjacent length of access road (by means of fieldwalking, geophysical survey and trial trenching as necessary) is proposed. The scale and scope of each stage of evaluation, together with the mitigation of any potential impacts upon significant archaeological remains in advance of, or during, construction works should the development be granted planning consent, would be agreed in advance with the North York Moors National Park Authority.

1.0 INTRODUCTION

1.1 Peter Cardwell was commissioned by Warwick Energy Ltd to undertake an archaeological assessment study of a proposed exploratory gas well site (EB2) on Ebberston Low Moor near Pickering in North Yorkshire. The aim of the assessment is to identify any significant archaeological constraints within the study area, identify any predicted impacts and propose appropriate mitigation measures. The report has been prepared to support the planning application to be submitted to the North York Moors National Park Authority for the well site.

1.2 The report describes the location of the proposed well site and its environs, and the methodology and information sources utilised while undertaking the study. It describes any known archaeological and other cultural heritage sites within the study area and assesses the potential for any previously unknown or unrecorded archaeological sites to survive within the area. The potential impacts (including those on the setting of Scheduled Monuments and Listed Buildings in the vicinity) and appropriate mitigation strategies are discussed. Consultation was maintained with the North York Moors National Park Authority during the preparation of the assessment study, and a draft of this report submitted to the Authority's Archaeologist for comment prior to finalisation and agreement of the proposed mitigation strategy.

1.3 The assessment was undertaken between April and October 2007.

2.0 LOCATION, TOPOGRAPHY AND GEOLOGY

2.1 The proposed exploratory well site would be located 4km to the north of Ebberston, some 11km to the north-east of Pickering and 14km to the west of Scarborough (Figure 1). The study area (Figure 2) for the assessment extends up to 1km from the proposed site (SE 9030 8715), which would be located on the edge of an area of afforestation with Lingy Plantation to the south and Cockmoor Hall Plantation to the north and east. The proposed well site is within the Ryedale District of North Yorkshire and the civil parish of Ebberston and Yedingham. The boundary with the civil parish of Snainton and the Borough of Scarborough lies some 50m to the east of the proposed well site. All parts of the development proposal are located within the North York Moors National Park, although the track along the north side of Lingy Plantation defines the boundary with the administrative area of North Yorkshire County Council to the south.

2.2 The proposed well site would be located on a plateau area on the southern edge of the Tabular Hills defined by gentle slopes towards the south and east and by the steep east to west aligned valley of Troutsdale Beck to the north. Elsewhere the plateau is relatively level and attains a height of some 223m OD immediately to the west of the proposed well site. The solid geology within the area consists of limestone of the Upper Jurassic Series (British Geological Survey 1995) with areas of sandstone. The soils within most of the study area consist of shallow and stony and sandy soils of the Fyfield association with clayey soils of the Dale association towards and within the valley to the north (Jarvis *et al* 1984).

2.3 The proposed development would consist of a drill site compound and associated length of access road to the west (Figure 3). The compound would measure up to

some 155m by 130m in extent, and would contain the rig platform with a flare pit to the north, site compound and storage area to the west and south, and topsoil and subsoil bunds along the western boundary. The area is currently an arable field defined on the north-west, north-east and eastern sides by a forestry plantation (Plate 1). The associated access road would be some 5m wide and would extend westwards within the same field for a distance of some 640m parallel to the north side of an existing track then north of Unby Plantation (Plates 2 and 3). Improvements would be made at the site entrance from the minor road to the south of Givendale Head Farm. The total area of the proposed development would amount to some 2.8ha.

3.0 METHODOLOGY AND INFORMATION SOURCES

3.1 The principal aims of the archaeological assessment are:

- to identify known archaeological and other cultural heritage sites within the study area
- to identify areas with the potential to contain previously unrecorded archaeological remains
- to assess the effects of the proposed development and ancillary works upon the archaeological sites and their settings, and Listed Buildings
- to propose appropriate mitigation measures that could be built into the development proposals in order to avoid, reduce or remedy any potential adverse effects identified

3.2 The report is based upon a review of existing available information and desk studies, supplemented by site walkover inspections. The following organisations or individuals were consulted for the assessment:

- North York Moors National Park Authority
- North Yorkshire County Council (Heritage and Environment Section)
- English Heritage
- North Yorkshire County Record Office
- the landowner

3.3 The following data sources were utilised for the assessment:

- Sites and Monuments or Historic Environment Records
- National Monuments Record
- published and unpublished historical and archaeological studies
- cartographic sources (enclosure and historic Ordnance Survey maps)
- vertical and oblique aerial photographs

3.4 A site inspection of the proposed development area was undertaken in May 2007 when the area was mostly under a cereal crop, with the northern part of the well

site being 'set aside'. A further detailed walkover survey of the proposed well site and access road was undertaken in September 2007 after the entire field had been recently sown and rolled. The area within the proposed development boundary was walked along transects approximately 10m apart and any artefacts noted within these areas (which represents a sample of some 15–20% of the proposed well site) were collected and the position recorded with a hand-held GPS (giving an accuracy of some 5m). All of the artefacts recovered were of worked flint, and after processing were submitted to Peter Makey for specialist assessment (see appendix). The immediate vicinity of the development was also inspected, including an assessment of views to and from adjacent Scheduled Monuments and Listed Buildings.

4.0 ARCHAEOLOGICAL BASELINE INFORMATION

4.1 Archaeological sites recorded within the study area are listed in Tables 1 and 2 below. Table 1 lists sites recorded on the North York Moors National Park Authority Sites and Monuments Record (SMR). Unless otherwise stated, and sites recorded on the North Yorkshire County Council Historic Environment Record (MNY) and National Monuments Record (NMR) as indicated. The relevant Scheduled Monument (SM) number is also provided if applicable. A central grid reference, suggested classification and date are provided for each site. The sites are graded as being of 1 (national), 2 (regional) and 3 (local) importance based upon their designation, professional judgement and the criteria set out in Annex 4 of Planning Policy Guidance Note 16 (DoE 1990). Listed buildings (LB) are graded by their designation. The location of the sites is indicated on Figure 2.

Table 1: Archaeological sites within study area (Figure 2)

Site	*Grid Reference*	*Classification*	*Period*	*Grade*
3517.206 SM 35444	SE 9080 8670	Multiple linear boundary (Scamridge Dikes)	Prehistoric	1*
3517.4 SM 35443	SE 8960 8703	Multiple linear boundary (Scamridge Dikes)	Late Bronze Age - Early Iron Age	1*
3517.65 SM 35437	SE 9013 8730	Round barrow	Bronze Age	1*
3517.66 SM 35438	SE 9066 8707	Round barrow	Bronze Age	1*
3517.67 SM 35444	SE 9083 8703	Round barrow	Bronze Age	1*
3517.71	SE 9009 8750	Rabbit trap	Post-medieval	3
3525	SE 9044 8713	Flint arrowhead (find)	Prehistoric	-
3624	SE 903 873	Axe fragment (find)	Neolithic	-
8091 SM 35436	SE 8991 8724	Round barrow	Bronze Age	1*
8094 SM 35435	SE 8978 8745	Round barrow	Bronze Age	1*
MNY 3423	SE 9084 8657	Ditch	Unknown	3

MNY 5424	SE 9091 8648	Ditch	Unknown	3
MNY 5425	SE 9092 8672	Round barrow	Bronze Age	2
MNY 5426	SE 9090 8677	Square barrow	Iron Age	2
MNY 5429	SE 9094 8689	Hollow-way	Post-medieval	3
MNY 5430	SE 9095 8678	Ditches	Unknown	3
MNY 5432	SE 9046 8663	Ditches	Unknown	3
MNY 5433	SE 9041 8654	Ditch	Unknown	3
MNY 5434	SE 9053 8673	Ditch	Unknown	3
MNY 5468	SE 8953 8658	Ditch	Unknown	3
MNY 5469	SE 8960 8706	Bank	Unknown	3
MNY 5520	SE 9018 8672	Round barrow	Bronze Age	2
MNY 5577	SE 9084 8678	Flint arrowhead (find)	Prehistoric	-
MNY 12178	SE 894 872	Boundary stone	Unknown	3
MNY 327423	SE 9116 8648	Farmhouse (Cockmoor Hall)	Late 18th century	LBII
MNY 327424	SE 9116 8649	Farm buildings (Cockmoor Hall)	Late 18th century	LBII
MNY 329660	SE 9049 8756	White House	18th century	LBII
SE 88 NE 33	SE 893 873	Flint arrowheads (finds)	Prehistoric	-
SE 98 NW 97	SE 911 865	Flint microlith (find)	Mesolithic	-

* Scheduled Monument

4.2 In addition to the above 29 previously recorded sites, flint artefacts collected from within the proposed site boundary, archaeological features identified in the Phase 2 Forest Survey (NAA 1996) within the vicinity of the development and other features identified from historic map sources within the vicinity, are listed in Table 2 and indicated on Figure 3. These are identified by a unique reference number (between 1 and 16). Field boundaries within the proposed development area are not listed, but are referred to in the text and indicated on Figure 3 as 1 - 4.

Table 2: Archaeological sites within vicinity of proposed well site (Figure 3)

Site	*Ref*	*Grid Reference*	*Classification*	*Period*	*Grade*
1	-	SE 9018 8710	Retouched flint flake	Late Neolithic Late Bronze Age	-
2	-	SE 9023 8710	Retouched flint flake	Late Neolithic Late Bronze Age	-
3	-	SE 9027 8710	Notched flint flake	Late Neolithic Late Bronze Age	-
4	-	SE 9027 8712	Edged flint bladelet	Late Neolithic Late Bronze Age	-
5	-	SE 9028 8709	Shouldered flint flake	Late Neolithic Late Bronze Age	-

6	-	SE 9029 8710	Flint scraper	Late Neolithic Late Bronze Age	-
7	-	SE 9029 8713	Flint bladelets (2)	Late Mesolithic Late Neolithic	-
8	-	SE 9033 8719	Flint piercer (bladelet)	Late Mesolithic Late Neolithic	-
9	-	SE 9033 8721	Flint blade	Neolithic	-
10	-	SE 9036 8718	Flint bladelet	Late Neolithic Late Bronze Age	-
11	-	SE 9022 8710	Flint core	Late Neolithic Late Bronze Age	-
12	-	SE 8998 8714	Flint flake	Prehistoric	-
13	11\573	SE 9047 8712	Rabbit trap	Post-medieval	3
14	-	SE 9043 8731	Structure	18th–19th century	3
15	-	SE 9041 8699	Quarries	19th century	3
16	-	SE 8970 8709	Barn	19th century	3

4.2 The majority of the archaeological sites or finds recorded within the study area are boundary features, burial mounds or artefacts of prehistoric date. Most of the boundary features and burial mounds that survive as earthworks are scheduled Monuments and accordingly regarded as of national importance. The extent of these Scheduled Monuments is indicated on Figure 2.

Mesolithic

4.3 The earliest recorded evidence for archaeological remains within the study area dates to the Mesolithic period. This consists of stray finds, and include a flint microlith (SE 98 NW 97) recovered from near Cockmoor Hall Farm, some 900m to the south-east of the proposed development site. A further microlith and quartzite pebble macehead have also been recovered from the area of Scamridge Dykes (MNY 16204) but are not accurately provenanced. It is possible that three of the flints (sites 7, 8 and 9) collected from within the area of the proposed well site may be late Mesolithic in date, but are more probably Neolithic given the likely date for the overall assemblage.

Neolithic

4.4 The assemblage of 13 flints (sites 1–12) collected from within the boundary of the proposed well site and adjacent length of access road consist of a core, three bladelets, two blades, a piercer, a scraper and five flakes (four with retouch). Details of the flint assemblage are provided as an appendix. Individual flints may date from between the late Mesolithic to the early Bronze Age, but collectively the assemblage is probably late Neolithic in date. Most of the material is in a relatively fresh state, which could be indicative of being incorporated into the ploughsoil as a result of the disturbance of *in situ* subsurface deposits – the field having only being under arable cultivation for about a decade (J. Gwilliam, pers. comm.). Although the density of material is relatively low (and only a sample was

collected), the majority of the flints are from the south-western corner of the proposed well site and adjacent length of access road, from an area where there is a slight but distinct break in slope down to the east parallel to the western boundary of the proposed compound. It is considered that the nature of the material and density of the assemblage are probably indicative of an occupation site of late Neolithic date within the area.

4.5 Additional evidence of activity of Neolithic date within the vicinity of the proposed development is suggested by further recorded stray finds of an axe fragment (3624) recovered some 70m to the north of the proposed well site, and a leaf-shaped arrowhead from near High Givendale (SE 88 NE 63). Further arrowheads of unknown prehistoric date have been recovered some 40m to the east of the proposed well site (3525) and from the area of Scamridge Dykes some 500m to the south-east (MNY 5577). In addition, two Neolithic long barrows (including Rob Howe) are located to the north-east of Low Scamridge Farm some 1.1km to the south (outwith the study area).

Bronze Age

4.6 Both the earliest recorded archaeological sites (as opposed to finds) and visible remains within the vicinity of the proposed development are probably round barrows or cairns of Bronze Age date. The sites of a number of these burial mounds survive as earthworks within the study area, the majority of which are also Scheduled Monuments. The closest scheduled barrow (3517.65) is located within an area of forestry plantation some 160m to the north-west of the proposed well site. This survives as a well-defined earthen mound up to 17m in diameter and 0.8m high. Another scheduled barrow (3517.66) is also located within Cockmoor Hall Plantation some 240m to the east of the proposed well site. This survives as an earthen mound up to 12m in diameter and 1m high, which appears to have been partially excavated. Another scheduled barrow (3517.68) is located on the edge of the forestry plantation some 340m to the west of the proposed well site and 90m to the north of the access road. This survives as a substantial and well-defined earth and stone mound up to 22m in diameter and 2m high. Partial excavation has left a hollow in the middle of the mound (Plate 4).

4.7 Two further scheduled burial mounds are located at a greater distance from the proposed development in close proximity to the linear boundaries in the vicinity. These are a round cairn (8094) within a forestry plantation to the north of the Oxmoor Dikes some 530m to the north-west, and another (3517.67) within Cockmoor Hall Plantation some 470m to the east and immediately to the west of the Scamridge Dikes. In addition to these scheduled barrows, further less substantial or ploughed-out barrows are located within the study area. These are located to the south of Lingy Plantation (MNY 5520) some 360m to the south of the proposed well site, and to the east of Scamridge Dikes (MNY 5425). Although not recorded as associated with a barrow, a Bronze Age cinerary urn (MNY 5609) is recorded as being found in Cockmoor Hall Warren, but the exact provenance is unclear.

4.8 Where a direct relationship can be established the multiple linear boundary features appear to post-date the round barrows, and are therefore usually dated to the late Bronze Age or early Iron Age. Some of the boundaries, and particularly the Scamridge Dikes, are considered earlier, possibly dating to the Late Neolithic

or early Bronze Age, and may have originated as tribal or political boundaries (Spratt 1989, 14-16). Most boundaries within this part of the Tabular Hills are however considered to form part of an extensive network of land division, defining territories or 'estates'. They augment natural landscape divisions, and are primarily aligned approximately north to south across the plateau and terminate at the heads of adjacent natural valleys (*ibid*, 43-51). The boundaries consist of comprise dykes of multiple ditches or dykes and adjacent earthwork banks.

4.9 The Oxmoor Dikes are located 450m to the north-west of the proposed well site and 60m north of the proposed access road and site entrance (Plate 5). This monument consists of three ditches between four parallel banks aligned north-east to south-west between the slope into Troutsdale and the head of Given Dale. The ditches are up to 2m deep from the tops of the banks, and the whole monument up to 38m wide. At its southern end the boundary links with Givendale Dike, and forms part of an extensive Scheduled Monument. Much of the monument is located within forestry plantation and scrub, and is cut by the road to the west of the proposed development. A bank (MNY 5469) of unknown date has been recorded extending southwards from the boundary, together with a ditch (MNY 5468) extending south-eastwards from Givendale Dike, but no visible evidence of these survive.

4.10 That section of Scamridge Dike located some 470m to the south-east of the proposed well site consists of up to five ditches between six parallel banks and has an overall width of up to 70m. This section forms the northern extent of an extensive multiple boundary (and Scheduled Monument) extending on an approximately north-east to south-west alignment between the steep slope into Troutsdale to the north and the edge of Kirk Dale to the south. A further length of bank and ditch extends to the south-east, with parallel ditches (MNY 5430) to the south recorded from aerial photographs. Further ditches (MNY 5423 and MNY 5434) are recorded parallel to the east side of the main complex of earthworks, and also as cropmarks (MNY 5432, MNY 5433 and MNY 5434) on a north-east to south-east alignment to the west of Scamridge Dikes and some 360m south of the proposed well site. Although of unknown origin, these may represent later subsidiary land divisions of either late Bronze Age or Iron Age date.

Iron Age

4.11 The archaeological evidence suggests that the multiple linear boundaries within the vicinity of the proposed development continued in use into the Iron Age, with continued maintenance of, and additions to, the boundaries being undertaken. This is further suggested by the proximity of square barrows of Iron Age date recorded in the vicinity of the boundaries, including a single barrow (MNY 5426) to the east of the Scamridge Dikes, with a further scheduled barrow recorded outwith the study area to the north-east of Cockmoor Hall.

Romano-British

4.12 No sites or finds of specifically Romano-British date are recorded within the study area, although some of the linear boundaries may have continued in use into the Roman period. The potential for previously unrecorded sites of this period to survive within the area is considered to be low.

Medieval

4.13 There are no recorded sites of definite medieval date within the study area. A hollow-way (MNY 5429) that cuts through the northern end of the Scamridge Dikes on an east to west alignment may be either medieval or post-medieval in date, and possibly part of 'The Kings Highway' (Spratt 1989, 49). Another site of possible medieval date is that of a boundary stone (MNY 12178) located on the line of the Oxmoor Dikes, although a post-medieval date may be more probable.

Post-medieval and modern

4.14 The northern part of the study area appears to have remained as unenclosed moorland until the early 19th century. The northern extent of the enclosed land at the time when part of the lordship of Ebberston was enclosed in 1770 appears to have been defined by the Oxmoor Dikes and then followed the northern edge of the field in which the proposed well site and access road are located as far as the boundary with the lordship of Snainton. This would suggest that the boundary of the enclosed land therefore passed through the proposed well site, but whether there was any physical demarcation of this parcel of land is uncertain. The area immediately to the north (currently afforested) is labelled on the enclosure map as *Grundale brow* and Troutsdale Beck as *Grundale Beck*. Much of the area of the southern half of the proposed well site and all of the proposed access road were accordingly located within a large parcel of land that extended almost as far south as Malton Cotes (some 1.5km).

4.15 Agricultural activity during this period was probably limited, with the land being utilised for pasture for sheep. The structure (Site 14) located some 120m to the north-east of the proposed well site may have been an associated barn. Given that this is labelled as a 'ruin' at the time of the 1854 Ordnance Survey map then this could date to the 18th century. The other documented agricultural activity during this period is rabbit warrening, with numerous warrens and rabbit types recorded within the study area and the vicinity. Larger more extensive warrens are recorded at Scamridge to the south and Cockmoor to the south-east (MNY 24240 and MNY 24224 respectively). Individual rabbit types are recorded both 350m to the north-west and 70m to the east of the proposed well site (3517.71 and 3518 respectively).

4.16 The enclosure of land in the late 18th century in the vicinity of the proposed well site is associated with the establishment of a number of farmsteads in the area. Two such farms that have their origin during this period (and both of which are Listed Buildings) are the White House (MNY 329660) located within Troutsdale some 670m to the north and the farmhouse and associated range of farm buildings at Cockmoor Hall (MNY 327423 and MNY 327424 respectively) located some 950m to the south-east. By the mid 19th century further farmsteads had been established within the area, including Givendale Head and High Scamridge to the north-west and Hern Head House to the north-east.

4.17 The intensification of agricultural activity during this period led to both the further enclosure of land and the subdivision of earlier enclosures. At the time of the 1854 Ordnance Survey map the existing field within which the proposed development would be located consisted of five separate fields, with a boundary through the proposed well site and three further boundaries aligned north to south

within that part of the field transected by the proposed access road (Figures 3 and 4). All of these boundaries have subsequently been removed (aerial photographic evidence indicates that all are in existence in 1958, but by 1973 only the central field boundary on the line of the proposed access road remains extant). The area has been under arable cultivation as a single field for about a decade (J. Gwilliam, pers. comm.). No evidence of the former boundaries currently survives. It is probable that the boundaries consisted of stone field walls, similar to those which partially survive around the boundary of the proposed well site and along the south side of the access road. This wall is some 0.5m wide and now survives in a semi-ruinous and partially overgrown state to a maximum height of some 1.1m.

4.18 The stone used to construct these boundaries was probably obtained from the quarries (Ebberston Quarries) located immediately to the south of the proposed well site. The two limestone quarries (Site 15) are first mapped in 1854, but are labelled as 'disused' by 1912.

4.19 The principal change to the landscape over the course of the last century has been the establishment of the extensive coniferous plantations within the study area. Lingy Plantation had been planted to the south of the proposed access road by 1912, and a stone field barn (Site 16) constructed immediately to the south. Cockmoor Hall Plantation had also been planted to the east of the proposed well site by the same date, with the plantation to the north of the access road being established later in the century.

5.0 ASSESSMENT OF DEVELOPMENT IMPACT

Direct (physical) impacts

5.1 The only potential direct (physical) impacts upon any significant archaeological remains would be those of the construction of the proposed well site and adjacent length of access road (and specifically topsoil removal, movement of plant, compaction and any ground reduction) upon an area of probable late Neolithic settlement. Evidence for this area of settlement is based upon the assemblage of worked flints (Sites 1–12) collected during the site walkover inspection. Although the flints recovered represent only a limited sample, their distribution does suggest a concentration towards the south-west corner of the proposed well site compound and adjacent length of access road, in the vicinity of a slight but marked slope in this area. Development in this area would primarily consist of the site compound and storage area, with bunding for topsoil and subsoil. A further smaller concentration of flints was collected within the northern part of the proposed compound in the area to the east of the field barn. The nature of any settlement site at this stage remains unknown and would require further evaluation, although the fresh nature of the flint (most probably as a result of the field only being in arable cultivation for about a decade) suggests that the material is derived from *in situ* subsurface deposits. Any surviving remains of a settlement site of late Neolithic date at this location would be considered to be of regional importance.

5.2 Former field boundaries of probable 19th century date are recorded both within the area of the proposed well site and along the length of the access road. These

were probably originally stone walls, but have subsequently been removed and there is no evidence for any surviving remains. A possible enclosure boundary of late 18th century date may also have crossed the area of the proposed well site compound, but this may not have been a physical boundary of which any remains might survive. All of these former boundaries are considered to be of local importance, and any predicted impacts would be on a small part of a more extensive feature and therefore of negligible significance.

5.3 The construction of the site entrance off the existing minor road would involve the removal of a length of some 15m of the surviving remains of the existing field wall. This field boundary is considered to be a feature of local importance, and the predicted impact would be on a small part of a more extensive feature and therefore of minor significance. The remains recorded all appear to be aligned along an earlier historic trackway of at least 18th century date, evidence for which may survive beneath the existing road. The proposed improvements to the site entrance would also be in relatively close proximity to the Oxmoor Dikes to the north, although no archaeological remains associated with the monument area are recorded within the area of the entrance.

Effects upon setting

5.4 The proposed development is located within relatively close proximity to a number of Scheduled Monuments, and the potential impact upon the setting of these monuments has been assessed. The closest Scheduled Monuments to the proposed well site are two round barrows located some 160m to the north-west (3517.65; SM 35437) and some 240m to the east (3517.66; SM 35438). Both of these monuments are located within areas of woodland plantation to which there is no public access. The well site is not predicted to be visible from these monuments (with the possible exception of the upper part of the drilling rig from the barrow to the north-west (3517.65)). Given the existing forestry setting and the immediate vicinity of the barrows no impacts upon the setting of either of these monuments is predicted. Neither is any impact predicted on the setting of Scamridge Dikes to the east as a result of both the intervening distance and the existing setting of the monument.

5.5 A further scheduled round barrow (3517; SM 35436) is located on the edge of the forestry plantation some 340m to the west of the proposed well site and some 90m north of the access road (Plate 4). From this monument (to which there is no public access) there are predicted to be partial views of the well site and of the access road. However, given the nature of the existing setting of the monument and the distance and scale of those aspects of the proposed development that would be visible from the site, the impact on the setting of this monument is predicted to be of negligible to minor significance.

5.6 The proposed site entrance and the improvements to the adjacent minor road would be located some 60m to the south of the Oxmoor Dikes (3517.4; SM 35436). These would involve the construction of an entrance up to 50m wide and an extension to the west side of the existing road 6m wide and extending southwards for up to 55m in order to provide an adequate turning area for vehicles entering and exiting the site. Given that the existing minor road cuts across this monument, the proposed improvements mostly extend southwards from the proposed site entrance, an existing lay-by is already located to the south

of the monument and that much of the complex of earthworks is covered by woodland and scrub, any predicted impacts upon the setting of the monument would be upon a small component of a much more extensive feature and therefore considered of negligible to minor significance.

5.7.7 Two listed buildings are located within 1km of the proposed development. The farm at White House is located within the valley of Troutsdale Beck some 370m to the north. The immediate setting of the building is that of pasture fields within a valley, and is therefore distinct from that of the proposed development on the higher plateau to the south. There would be no predicted views of the development compound from the building with the possible exception of the upper part of the drilling rig, and any such views would be temporary. Any impacts upon the setting of the building are therefore predicted to be of negligible significance. The farmhouse and associated farmbuildings at Cockmoor Hall would be screened from the proposed development by the areas of intervening woodland to the north-west, and no impact upon the setting of the Listed Buildings is therefore predicted.

6.0 MITIGATION

6.1 On the basis of current evidence, the extent, nature and degree of preservation of the probable area of late Neolithic settlement within the area, or vicinity, of the proposed well site and adjacent access road is at present uncertain. The flint collected during the site walkover inspection appears to be derived from *in situ* archaeological features or deposits. A staged approach to the further evaluation of the development area is therefore proposed in accordance with Policy AR3 of the *North York Moors Local Plan* (2003) and would consist of the follow possible elements:

- detailed fieldwalking (total recovery of surface artefacts)
- geophysical survey
- trial trenching

6.2 The scale, scope and need for each stage of evaluation would be dependent upon the results of the previous phase. A methods statement for each stage of the evaluation would be prepared by the relevant archaeological contractor and agreed in writing with the North York Moors National Park Authority. This methods statement would detail the on-site recording methodology and allow for any specialist assessments of finds recovered or samples taken, as well as the preparation of a report on the results of the work, in accordance with both national and local guidance (English Heritage 1991).

6.3 The preservation of any significant archaeological deposits or features *in situ* (such as beneath areas of undisturbed ground used for topsoil storage where this can be achieved in such a way as to avoid damage from compaction, wheelings or the later removal of materials) would be the preferred method of mitigation of any potential impacts. Alternatively, excavation in advance of construction, or a watching brief (a scheme of observation, investigation and recording during construction, may be an acceptable method of mitigating any predicted impacts

on archaeological remains based upon the results of the evaluation in accordance with Policy AR2 of the *North York Moors Local Plan*.

6.4 The existing design proposals are considered adequate with respect to the mitigation of any potential impacts upon the setting of Scheduled Monuments.

7.0 CONCLUSION

7.1 The archaeological desk-based assessment and site walkover inspection of the area of the proposed exploratory well site and associated access road on Ebberston Low Moor has identified a probable area of late Neolithic settlement within or adjacent to the area of the proposed well site compound. Occupation is evident in the form of a sample of flint artefacts collected from the surface of the field and concentrated towards the south-western corner of the proposed well site. Other artefacts of Neolithic date have also been recovered from other location in the vicinity of the proposed development.

7.2 The proposed development is located within an area of the Tabular Hills that contains a significant number of nationally important Scheduled Monuments. The majority of these are the visible earthwork remains of round barrows and cairns (burial mounds) or linear boundaries (multiple dyke systems) of probable Bronze Age date. No such sites are, however, located within the area of proposed development, and there is no evidence to indicate a significant potential that any previously unrecorded site of a similar type or date is located within the area.

7.3 Other archaeological features recorded within the proposed development area are restricted to those of former and extant historic field boundaries of both 18th and 19th century date.

7.4 Although there are a number of Scheduled Monuments located within the vicinity of the proposed development, including a round barrow and multiple dyke system to the north of the proposed access road, no significant impacts upon the setting of these monuments are predicted. Other Scheduled Monuments within the study area would largely be screened from the proposed development by the surrounding forestry plantations.

7.5 In order to establish in more detail the potential physical impacts of the proposed development upon any surviving remains of the probable Neolithic settlement site within the area, a staged programme of further evaluation of the well site and adjacent length of access road (by means of fieldwalking, geophysical survey and trial trenching as necessary) is proposed. The scale and scope of each stage of evaluation, together with the mitigation of any potential impacts upon significant archaeological remains in advance of, or during, construction works should the development be granted planning consent, would be agreed in advance with the North York Moors National Park Authority.

October 2007
Report No: 10/1
Text: Peter Cardwell
Illustrations: Archaeological Services Durham University

REFERENCES

Published sources

Jarvis *et al* (1984): *Soils and Their Use in Northern England* Soils Survey of England and Wales Bulletin No. **10**

Department of the Environment (1990) *Planning Policy Guidance Note **16**: Archaeology and Planning*

English Heritage (1991) *Management of Archaeological Projects*

Northern Archaeological Associates (1996) *North York Moors Forest Survey: Phase Two* NAA **96/22**

North York Moors National Park Authority (2003) *North York Moors Local Plan*

Spratt D A (1989) *Linear Earthworks of the Tabular Hills, Northeast Yorkshire*

Maps and plans

1770 *A Plan of Part of the Lordship of Ebberston Inclosed 1770 L Thompson Esqr Lord thereof J Foord Delin* (NYCRO ZJQ 1)

1854 Ordnance Survey 1st edition 6" to 1 mile, Yorkshire sheets 76/15 and 92/3

1892 Ordnance Survey 1st edition 25" to 1 mile, Yorkshire sheet 76/15

1912 Ordnance Survey 1st edition 25" to 1 mile, Yorkshire sheet 92/3

1995 British Geological Survey, Tyne Tees (Solid) 1:250,000

Aerial photographs (verticals)

01.04.46 RAF/106G/UK/1342 Frames 3053 and 3108

12.09.53 RAF/58/1274 Frame 11

01.05.71 Ordnance Survey OS/71119 Frame 10

22.03.73 Ordnance Survey OS/73027 Frame 2

11.05.73 Meridian Airmaps Ltd North Riding 021 73 Frames 151-152

24.11.94 Ordnance Survey OS/74387B Frame 250

Aerial photographs (oblique)

13.08.03 NMR 17916 Frames 20 and 22

APPENDIX

EBBERSTON EB2 EXPLORATORY WELL SITE

FLINT ARTEFACT ASSESSMENT

Peter Makey

All 13 pieces of flint recovered are struck and of prehistoric date, eight of which are intentionally retouched implement types.

The assemblage comprises one core, one flake, one blade, one bladelet, one edge utilised bladelet, two miscellaneous retouched flakes, one notched flake, one spurred or shouldered flake (similar to a notched flake) with ancillary retouch, one serrated edged blade (broken), one edge blunted bladelet (resembles an edge blunted point microlith), one piercer (micro) and one extended end scraper (see catalogue).

Despite the dispersed nature of the assemblage there is high degree of consistency in the use of raw material and the quality of knapping (which is high). It is tempting to assume that most of the pieces are contemporary and *c.*7% of the material may have even been struck by the same hand.

State

Most of the material (nine pieces) are in a fresh to very fresh state. Possible post-depositional damage is only present on the scraper (small find 6). The assemblage contains only three broken pieces (small finds 4, 7b and 9) and all the breakages appear to be ancient.

Raw material

All the flint has been struck on local till derived raw material.

Date

At first glance the physically small size of the material appears to have later Mesolithic characteristics. However, the core (small find 11), the notch (small find 3) the serrated edged bladelet (small find 4) and both miscellaneously retouched flakes (small finds 1 and 2) are all characteristic of a restricted range of local later Neolithic assemblages. All of the forms present can be found in Grooved Ware associated assemblages.

Discussion

Despite the low overall finds density *c.*1 flint per 20-60m interval, the material is in a fresh state that suggests that most of the flint has only recently been exposed. The finds recovery rate is far lower than might be expected. However, this probably indicates that the assemblages are residual in nature and it is probable a prehistoric settlement site of later Neolithic date exists within the area. The serrated edged bladelet (small find 4), micro-piercer (small find 8), notched flake (small find 3) edge blunted bladelet (small find 7a) and spur or shouldered flake (small find 5) are all implements that are usually very scarce in surface assemblages but are far more common on an

occupation site. The suite of retouched implements would appear to suggest that this site might be associated with prehistoric pottery of Grooved Ware form.

Table: Summary of catalogue.

Find No	Grid Reference	Flint ID	Probable date
1	SE 90177 87105	Miscellaneous retouched flake (two areas)	L Neo/EBA
2	SE 90233 87097	Miscellaneous retouched flake (one area)	L Neo/EBA
3	SE 90270 87097	Notched flake (LHS)	L Neo/EBA
4	SE 90271 87117	Serrated edged bladelet RHS/broken	L Neo/EBA
5	SE 90283 87089	Spur/shouldered flake; ancillary retouch	L Neo/EBA
6	SE 90287 87105	Scraper; extended end	L Neo/EBA
7a	SE 90292 87130	Edge blunted bladelet, RHS	L Meso/L Neo
7b	SE 90292 87130	Edge utilised bladelet (two areas); broken	L Meso/L Neo
8	SE 90328 87195	Micro piercer on a bladelet (DLHS retouch)	L Meso/L Neo
9	[illegible]	Bladelet [illegible]; broken	Neolithic
10	SE 90357 87178	Bladelet (flake)	L Neo/EBA
11	SE 90223 87130	Core (globular); four platforms	L Neo/EBA
12	SE 89957 87138	Flake	Any

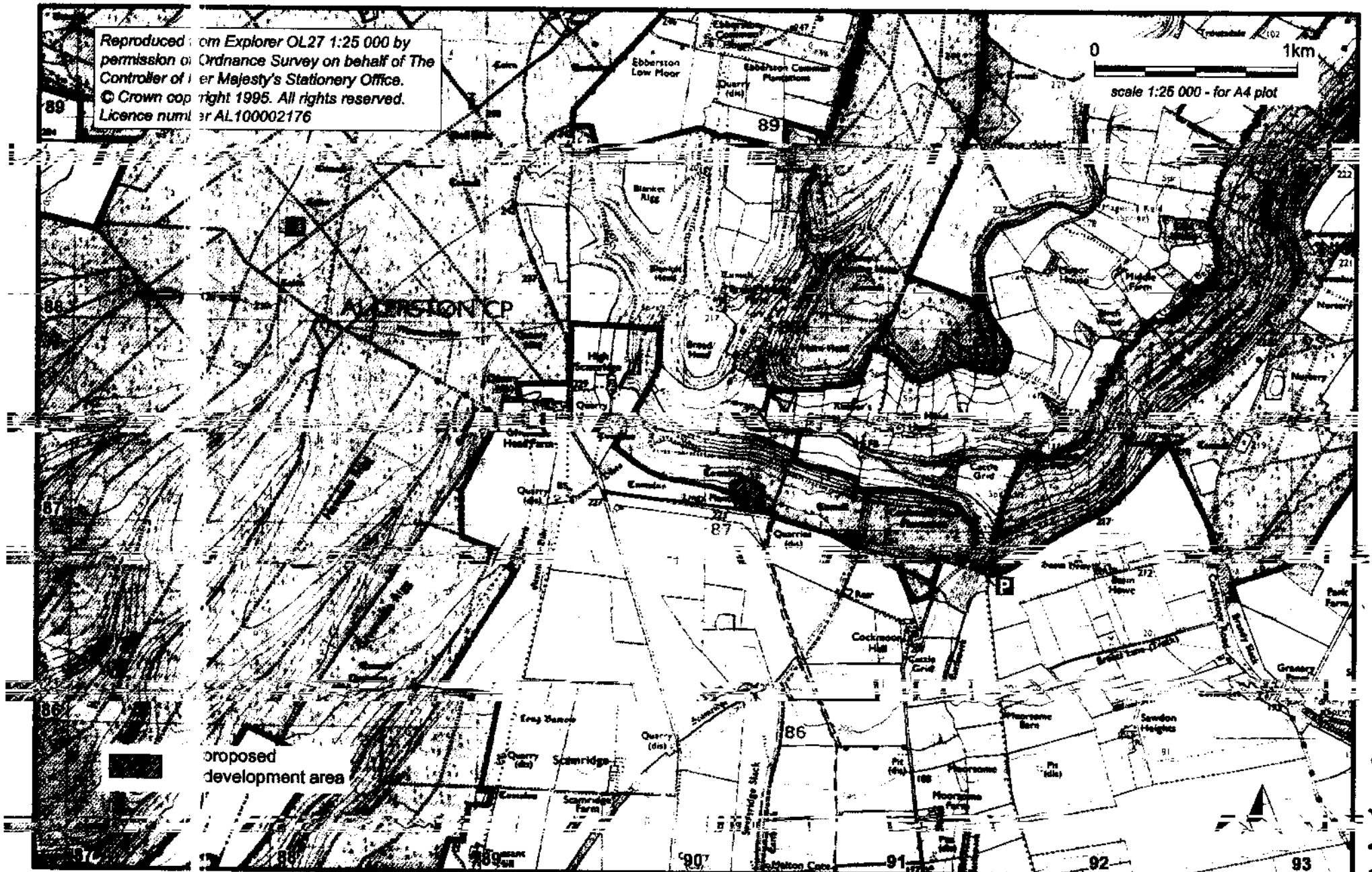


Figure 1 - Ebberston Moor Exploratory Well Site (EB2): Area of proposed compound and access road

NYM/ 2007 / 0901 / PL

0 250m

scale 1:5000 - for A3 plot

propose[illegible]
develop[illegible]ent area
archaeo[illegible]gical sites
Schedul[illegible]d Monuments
Listed B[illegible]ildings
flint arte[illegible]acts

Figure 2 - Ebberston Moor Exploratory Well Site (EB2): Area of proposed compound and archaeological sites in the vicinity

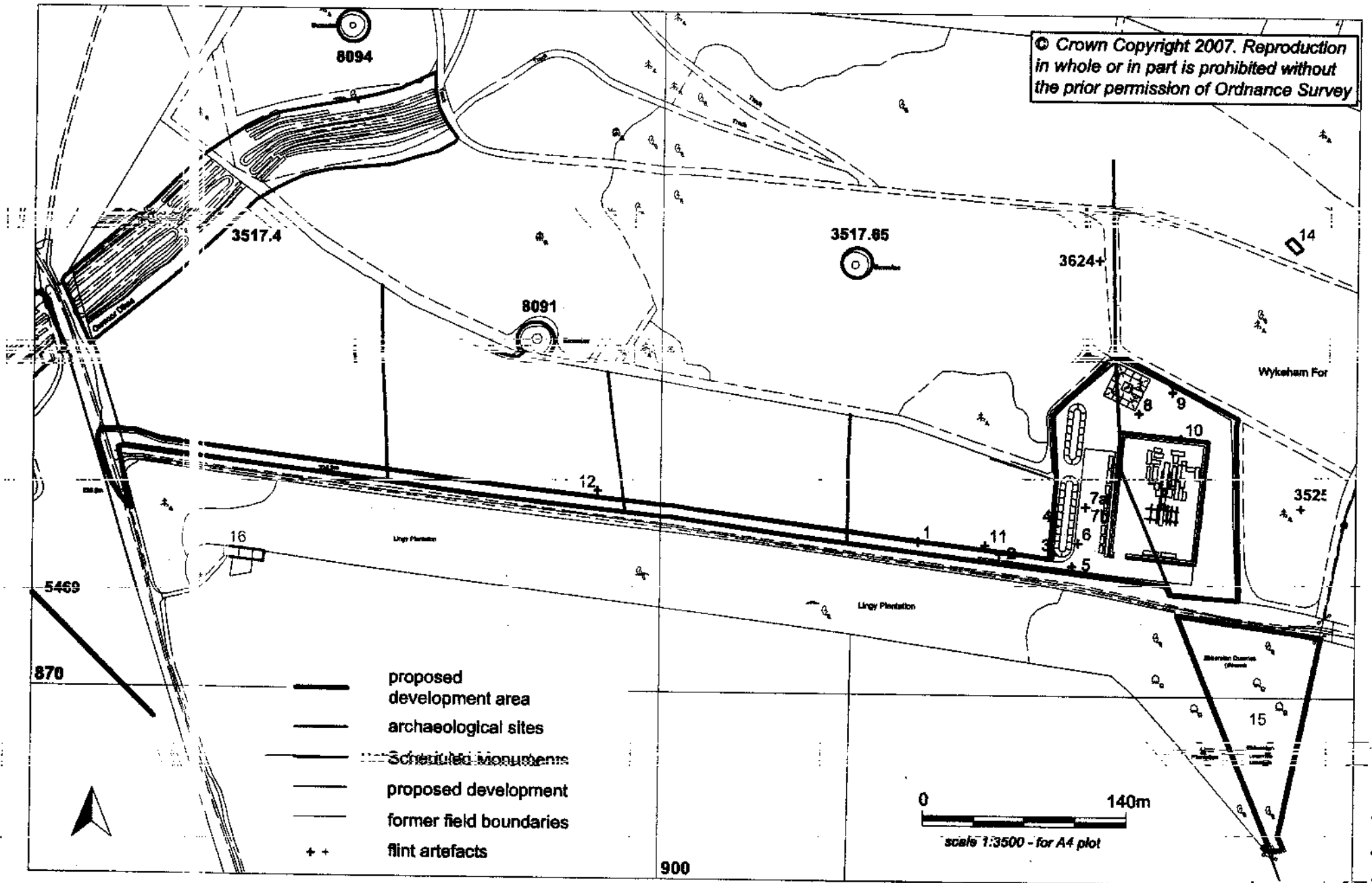


Figure 2: Ebberston Moor Exploratory Well Site (EMEW): Archaeological sites within the vicinity, and area of proposed compound and access road

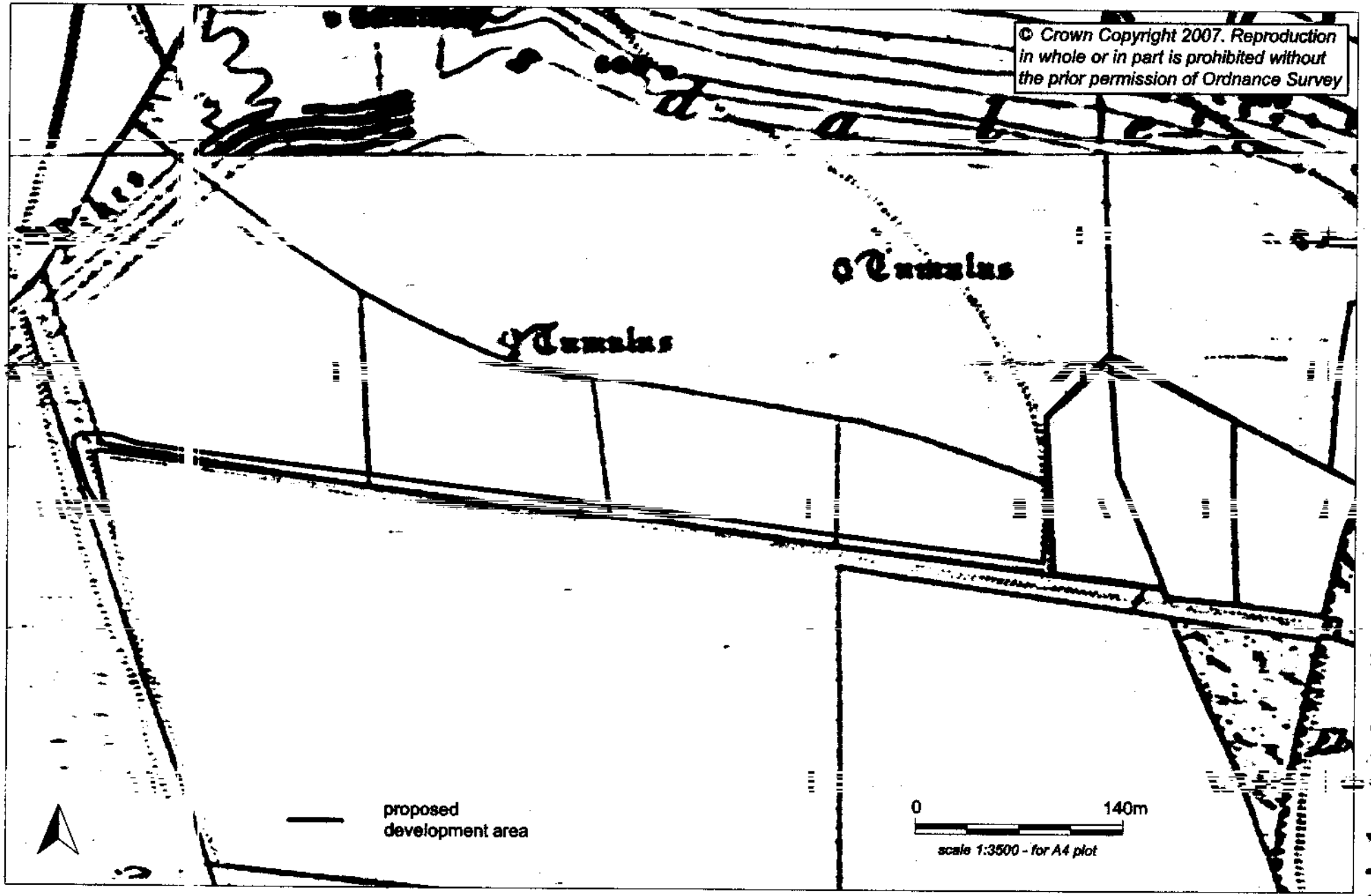


Figure 4 - Ebbeston Moor Exploratory Well Site (EB2): Proposed compound and access overlain on the 1st edition Ordnance Survey map of 1854

acia

Report number: 2186-01/ifb

NYM/ 2007 / 0 9 0 1 / F L

WARWICK ENERGY EXPLORATION AND PRODUCTION LTD
PROPOSED EBBERSTON MOOR-2 WELL SITE
ASSESSMENT OF ENVIRONMENTAL NOISE EMISSIONS

Prepared on the instructions of:
David Langham, Consultant Chartered Town Planner
Thornborough Hall
Leyburn
North Yorkshire
DL8 5AB

[redacted]
Ian F. Bennett BSc CEng MIOA
28 September 2007

ACIA Engineering Acoustics 39 Garners Lane Stockport SK3 8SD
tel: 0161-487 2225 fax: 0871-994 1778 e-mail: ian@acia-acoustics.co.uk

1 INTRODUCTION

ACIA was commissioned to provide acoustic consultancy services in connection with Warwick Energy's proposed well site on the Ebberston prospect, North Yorkshire. The site is in a rural setting with a few residential properties nearby.

This report follows on from work carried out in connection with the Ebberston-1 well site in 2004. No additional noise survey was carried out in connection with the current proposals, as the general levels of background noise in the area are already know to be low. The results of a survey of ambient noise performed nearby on the night of 1-2 December 2004 are, however, repeated here for information.

The results of the noise assessment are reviewed in the light of official guidance and recent experience in the industry. The noise levels likely to result from the drilling programme, and from test flaring should gas be found, are presented in this report.

2 NOISE SURVEYS

2.1 Date, times, surveyor

A survey of ambient noise levels in the area of the Ebberston-1 well site, some 2.5km to the north, was made on Thursday 2 December 2004 between midnight and 04:00h. All measurements were taken by Ian Bennett, consulting engineer, ACIA.

2.2 Weather

The night of the survey was cloudy but dry with no significant wind. The air temperature was 3°C.

2.3 Instrumentation

A Bruel & Kjær 2260 precision integrating sound level meter was used for all noise measurements. The meter was fitted with type 4189 condenser microphone, mounted near-vertically 1.2m above ground level. A foam windshield was fitted for all measurements. The calibration of the measurement chain was checked before and after the series of measurements using a Bruel & Kjær type 4231 calibrator, and no drift was observed. The equipment is subject to a periodic laboratory calibration traceable to national standards.

2.4 Method

The sound level meter was set up at a location at the junction of the track leading to Ebberston Common Farm from Ebberston Common Lane, at grid reference 489820E, 489543N. This convenient location was chosen as it would be readily identifiable in the future.

A sequence of five-minute measurements was conducted at the measurement location during the 'small hours' of the night. The overall L_{Aeq} and the usual statistical indices L_{A90}, L_{A50}, and L_{A10} were recorded by the instrument for each five-minute sample, and the results were downloaded to computer at the conclusion of the survey.

NYM/2007/0901/FL

3 RESULTS

TABLE 1: Results of ambient noise survey, dB, 2 December 2004

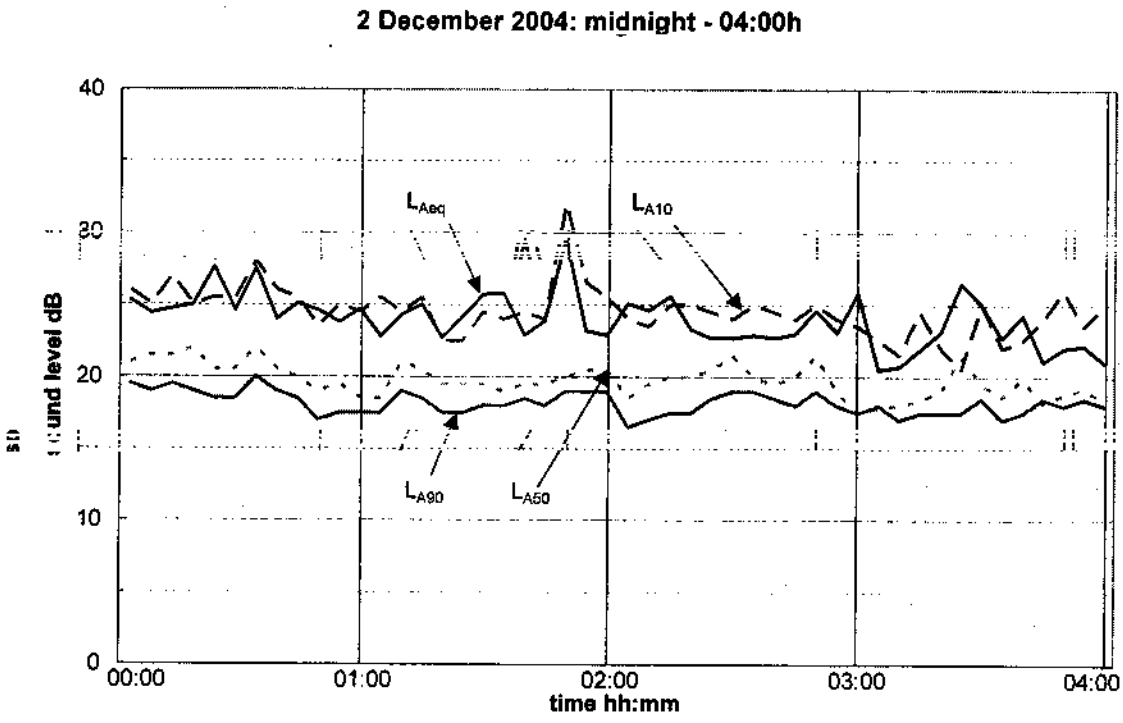
start time	end time	L_{Aeq}	L_{A90}	L_{A50}	L_{A10}
00:00	00:05	25.3	19.5	21.0	26.0
00:05	00:10	24.4	19.0	21.5	25.0
00:10	00:15	24.7	19.5	21.5	27.0
00:15	00:20	25.0	19.0	22.0	25.0
00:20	00:25	27.6	18.5	20.5	25.5
00:25	00:30	24.6	18.5	20.5	25.5
00:30	00:35	27.5	20.0	22.0	28.0
00:35	00:40	24.0	19.0	20.5	26.0
00:40	00:45	25.1	18.5	20.0	25.5
00:45	00:50	24.6	17.0	19.0	23.5
00:50	00:55	23.8	17.5	19.5	25.0
00:55	01:00	24.7	17.5	18.5	24.5
01:00	01:05	22.8	17.5	18.5	25.5
01:05	01:10	24.3	19.0	21.0	24.5
01:10	01:15	25.0	18.5	20.5	25.5
01:15	01:20	22.7	17.5	19.5	22.5
01:20	01:25	24.2	17.5	19.5	22.5
01:25	01:30	25.7	18.0	19.5	24.5
01:30	01:35	25.8	18.0	19.0	24.0
01:35	01:40	22.9	18.5	19.5	24.5
01:40	01:45	23.9	18.0	19.5	24.0
01:45	01:50	29.5	19.0	20.0	32.0
01:50	01:55	23.2	19.0	20.5	26.5
01:55	02:00	22.9	19.0	20.5	25.5
02:00	02:05	25.1	16.5	18.5	24.0
02:05	02:10	24.6	17.0	19.5	23.5
02:10	02:15	25.6	17.5	20.0	25.0
02:15	02:20	23.3	17.5	20.0	25.0
02:20	02:25	22.7	18.5	20.5	24.5
02:25	02:30	22.7	19.0	21.5	24.0
02:30	02:35	22.9	19.0	20.0	25.0
02:35	02:40	22.7	18.5	19.5	24.5
02:40	02:45	23.0	18.0	20.0	24.0
02:45	02:50	24.6	19.0	21.5	25.0
02:50	02:55	23.1	18.0	19.0	24.0
02:55	03:00	25.8	17.5	17.4	23.5
03:00	03:05	20.5	18.0	17.9	22.5
03:05	03:10	20.7	17.0	18.0	21.5
03:10	03:15	21.9	17.5	18.4	24.5
03:15	03:20	23.1	17.5	19.0	22.0
03:20	03:25	26.5	17.5	21.4	20.5
03:25	03:30	25.0	18.5	19.5	25.0
03:30	03:35	22.7	17.0	18.6	22.0
03:35	03:40	24.3	17.5	19.9	22.5
03:40	03:45	21.1	18.5	18.2	24.0
03:45	03:50	22.0	18.0	18.8	26.0
03:50	03:55	22.2	18.5	19.2	23.5
03:55	04:00	21.0	18.0	18.4	25.0

The results show that on a calm night the ambient noise levels in the area barely reach 20dB L_{A90}. This is not surprising, as the nearest industrial noise source is several miles away, and the nearest major roads are about 8km distant. At the time of year when the survey was conducted, there were very few remaining leaves on trees, and

NYM/ 2007 / 0 9 0 1 / F L

the only variation in noise levels was the result of the movements of domestic and wild animals.

A time history of the measured levels is presented below.



4 NOISE CRITERIA

MWM/2007/0901/FL

4.1 Definitions

It is appropriate at this stage to define some of the terms used in the measurement and specification of noise levels in the environment.

A-weighting

The A-weighted sound pressure level results from filtering a signal by an 'A' filter (BS.4197) whereby both low-frequency and high-frequency components have been attenuated without affecting the components near 1000Hz.

Equivalent continuous noise level (L_{Aeq})

This is the A-weighted noise level which if present for the entire measurement period would produce the same sound energy to be received as was actually received as a result of a signal which varied with time. It is normally abbreviated to 'L_{eq}' or 'L_{Aeq}', and is often followed by a specification of the time period (such as 1 hour, or 5 minutes) indicating the period of time to which the measured value has been normalised; for example, '$L_{Aeq,1hr}$'.

L_n Index

The L_n resulting from an environmental noise measurement is the level which was exceeded for n percent of the measurement period. Thus, an L_{A90} of 35dB represents the A-weighted sound pressure level which was exceeded at the microphone for 90% of the measurement period. Any value of *n* between 0 and 100 is meaningful, but the indices in general use in the UK are L_{A90}, L_{A50} and L_{A10}. The L_{A90} index is generally taken to be representative of the steady background noise level. The L_{A50} is the arithmetic average of all the instantaneous values during the measurement period. The principal use of L_{A10} is in the assessment of road traffic noise.

4.2 Acceptable noise emissions from drilling

4.2.1 BS.4142:1997

The acceptability of environmental noise is usually assessed with reference to this latest revision of an old-established standard. It recommends that a 'new' industrial noise be compared with the pre-existing background level. Corrections can be made for the additional effects of tonal or impulsive noise, and the likelihood of complaints from the local community determined.

The use of these methods in considering noise emissions from onshore drilling operations has several shortcomings. A major problem arises from the fact that a drilling rig cannot be considered a fixed installation, and therefore falls outside the scope of the standard. An onshore rig is seldom on location for more than a few weeks: noise emissions that would clearly constitute a nuisance if they continued for several months may be perfectly acceptable in the short term.

BS.4142 also calls for caution where the ambient noise level is below 30dB(A). Clearly, this is the case at the site under consideration, so it follows that any analysis of the acceptability or unacceptability of the proposed exploration drilling must be based on the absolute levels of noise the process creates, rather than the excess over background noise, which will be considerable. Even using the best available noise control technology it may be difficult to select a site from which to drill a particular prospect that is far enough away for residential property to ensure that operations are inaudible at all residential locations all the time.

NYM/2007/0901/FUL

4.2.2 Other guidance

These points were addressed in the Department of the Environment's Report of the Noise Review Working Party 1990, wherein the transitory nature of noise from onshore oil and gas exploration sites was discussed. The point was made that noise from such sites may be better controlled by use of Section 60 of the Control of Pollution Act, in conjunction with a specific Code of Practice for such sites.

In a report by the ISVR, Southampton University, for Hampshire County Council, a noise limit of 35dB L_{A90} was recommended for a long-term oilfield development in a rural area with nearby housing. For the short-term drilling expected at the Ebberston Moor-1 site, the ISVR determined that noise levels up to 5dB noisier than the long-term criterion would probably not cause significant nuisance, so values of 40dB L_{A90} were therefore acceptable. It is a characteristic of conventional rotary drilling that for the typical rig the L_{Aeq} emitted is generally 3 to 4 dB numerically higher than the L_{A90}. Thus, making an appropriate adjustment, it follows that the environmental noise limit for noise levels during drilling would be in the range 43 to 44 dB L_{Aeq} at the nearest properties at night.

4.2.3 MPG 11

The Department of the Environment Mineral Planning Guidance MPG 11 'The control of noise at surface mineral workings' reinforces the views expressed above. It states at paragraph 34 that the night-time noise limit at noise-sensitive dwellings should be 42dB L_{Aeq}. This limit is based on the assumption of permanent night-time working, whereas the present case is a temporary one, drilling an exploratory well over a period of a few weeks. It may be considered appropriate to allow up to 5dB above this level in view of the transient nature of the work, but 45dB L_{Aeq} at night would be an acceptable limit.

Daytime noise limits can often be considerably more relaxed, partly because residents are not sleeping and are going about their business, but mainly because the levels of background noise during the day are considerably higher than at night. MPG11 states at paragraph 34 that the daytime noise limit should normally be 55dB $L_{Aeq,1hr}$, a value that follows the recommendations of the World Health Organisation in their publication 'Environmental Health Criteria 12 - Noise'.

4.3 North Yorkshire County Council policy

Planning consent is sought from the North York Moors National Park Authority, and it is established that such consent would not be withheld provided that the environmental impact of the development can be controlled to the extent appropriate for a national park. ACIA has been unable to discover any specific noise guidance policy adopted by the authority, but the Local Plan requires that noise from minerals extraction should be mitigated to the greatest extent possible, or eliminated altogether.

However, North Yorkshire County Council's planning guidance covers the exploration and development of hydrocarbons. The North Yorkshire Minerals Local Plan adopted in 1997 recognises the existence of gas deposits beneath the county, and was published with due regard to the council's experience with the Vale of Pickering gas field. Section 7 of the plan deals specifically with oil and gas exploration. The recommended noise limits are reproduced below.

Noise limits will be imposed on planning permissions for the drilling of exploration and appraisal boreholes and production wells. The free field measurement of noise at the nearest noise-sensitive property should not exceed the following levels:

- *07:00 - 19:00 Background levels plus 10dB up to a maximum of 50dB $L_{Aeq,1hr}$*
- *19:00 - 07:00 Background levels plus 10dB up to a maximum of 42dB $L_{Aeq,1hr}$*

In certain specific cases lower levels may be set relative to quiet rural areas or to dawn, summer evening or weekend periods.'

4.4 Acceptable noise emissions from flaring

Should gas be found in quantity, it may be necessary to implement a test programme over several days. The gas produced during the programme would flow to the surface and be flared off in a controlled manner using the flare boom equipment previously used by Perenco UK Ltd. This approach was used on gas finds in the North Yorkshire area, and there is inevitably some noise associated with the process.

The concept of Speech Interference Level (SIL) has been found to give a reasonable indication of the residents' response to daytime flaring noise at other North Yorkshire sites. The SIL is the arithmetic average of the sound pressure levels centred on the octave band centre frequencies 500 Hz, 1 kHz and 2 kHz. SIL values up to 60 dB have previously been regarded as acceptable, provided that local residents are fully informed that flaring noise is temporary and very short-term in nature.

However, it may be more appropriate for a location within a national park to adopt similar noise limits to those for drilling. Daytime noise levels up to 50dB L_{Aeq} would therefore be acceptable. Flaring would not be undertaken between the hours of 19:00h and 07:00h.

NYCC 2007 / 0901 / FL

5 PREDICTED NOISE LEVELS

5.1 Prediction locations

The predicted noise levels from the site were calculated for the noise-sensitive locations shown in Table 2. All the noise sources on site were assumed to be lumped together at the centre of the site. The Ordnance Survey grid references have an assumed accuracy of ±5m, which is more than adequate for the purpose of noise propagation calculations.

TABLE 2: OS coordinates of noise prediction locations

location	E	N
R1: Keepers Cottage	490745	487520
R2: Hern Head House	491190	487475
R3: Cockmoor Hall	491110	486530
R4: Low Scamridge Farm	489695	485670
R5: Givendale Head Farm	489440	487585
R6: High Scamridge Farm	489660	487665
R7: Broad Head Farm	490205	488145
centre of proposed well site	490345	487140

5.2 Drilling noise

5.2.1 *Basis of predictions*

It is Warwick Energy's intention to use a truck-mounted rotary drilling rig. The typical sound pressure levels emitted by such rigs under steady drilling conditions have been measured by ACIA and by others on several occasions over the last ten years and the typical overall sound power level L_{WA} is 106dB. In the worst case this means that the typical equivalent continuous noise level L_{Aeq} at a distance of 100m is 58dB. However, most rigs have directional characteristics so the actual value measured at a particular point may be lower according to the actual rig used and its orientation. The resultant sound levels are also subject to additional atmospheric, ground and barrier attenuation, not least because of the presence of significant areas of woodland between the site and most of the receiver locations.

The orientation of the rig on this particular site is likely to be with the pipe racks towards the south. On that basis the calculated resultant noise levels may be regarded as the maximum likely.

5.2.2 *Calculated noise levels*

Noise levels (L_{Aeq}) at the noise-sensitive properties nearest to the proposed sites were calculated using the octave band sound power levels in Table 3. The actual levels experienced would vary slightly depending on weather and wind direction, but the calculated values may be taken as typical for drilling ahead in calm weather.

TABLE 3: Sound power levels emitted by a typical drilling rig

Hz	63	125	250	500	1k	2k	4k	8k	A-wtd
dB	113	112	109	104	99	94	89	82	106

Table 4 shows the predicted levels of the noise produced by the rig itself (in the absence of background noise) at each of the properties. It should be noted that the levels indicated take account of the soft ground attenuation between noise

NYM/2007/0901/FL

source and receiver. Some additional attenuation has been assumed, where applicable, to allow for the depth of woodland between the site and the receivers.

TABLE 4: Predicted noise levels resulting from steady drilling

Location	Distance to well	Level, dB
R1: Keepers Cottage	552	20
R2: Hern Head House	909	13
R3: Cockmoor Hall	978	27
R4: Low Scamridge Farm	1607	24
R5: Silverdale Head Farm	1008	17
R6: High Scamridge Farm	863	13
R7: Broad Head Farm	1015	7

5.2.3 *Noise from drilling activities*

Since drilling continues 24 hours a day, seven days a week, noise problems are most likely to occur at night. As can be seen from the results the predicted level at night, L_{Aeq}, from the rig alone is 27dB at Cockmoor Hall, which does not benefit from any significant screening by woodland. More significantly, at Keepers Cottage, the closest residential property to the site, the levels are only 20dB because of the presence of a broad band of trees. The levels will be barely in excess of the minimum conceivable nighttime background level of 10dB, L_{A90}.

The effects of the weather on noise emissions sometimes give cause for concern, especially at properties perceived to be downwind of the noise source. It is ACIA's experience with drilling sites, however, that the increase in background noise because of the wind rustling through vegetation is more than sufficient to mask the increased noise resulting from downwind enhancement. This will certainly be the case at this site, where the background noise in any significant wind is confidently expected to increase by 10 to 20 dB.

In general, 'tripping' the type of drilling rig contemplated for this site is no noisier in terms of the $L_{Aeq,1hr}$ than drilling ahead. It would be quite usual for there to be occasional impact sounds or increases in noise during the tripping out and tripping in operations, or, when additional stands of pipe are added to the drillstring, but these would not affect the equivalent continuous sound level measured at a location remote from the rig.

5.3 Flaring noise

If hydrocarbons were to be found, gas would flow to the surface and would be flared off with a Mardair 4-burner unit. The maximum rate of gas flow would be 10mmscfd, although for most of the time the flow rate would be considerably less. The noise levels emitted by the Mardair four-burner unit at the maximum flow rate have previously been measured on several occasions, and are shown in Table 5. The flare head consists of four burners arranged in a square formation, and does not have any significant directional noise characteristics.

TABLE 5: Sound power levels emitted by Mardair four-burner flare

Hz	63	125	250	500	1k	2k	4k	8k	A-wtd
dB	114	109	102	101	97	93	90	94	103

The noise levels resulting from flaring at 10mmscfd are shown in Table 6. In the same manner as the drilling noise calculations described above, the levels take account of the soft ground attenuation between noise source and receiver, and additional

attenuation has been assumed, where applicable, to allow for the depth of woodland between the flare and the receivers.

TABLE 6: Predicted noise levels resulting from flaring

location	m from well	L_{Aeq} dB
R1: Keepers Cottage	552	18
R2: Hern Head House	909	11
R3: Cockmoor Hall	978	24
R4: Low Scamridge Farm	1607	21
R5: Givendale Head Farm	1008	10
R6: High Scamridge Farm	863	12
R7: Broad Head Farm	1015	6

Depending on the layout of the temporary equipment required for flaring purposes on site, there may be additional screening of the flare burner from the point of view of the nearest noise-sensitive properties. However, no allowance has been made for this additional noise mitigation.

It may be safely deduced that if any flaring were to take place, it would not cause significant disturbance to the local residents.

NYM/2007/0901/FL

6 CONCLUSIONS

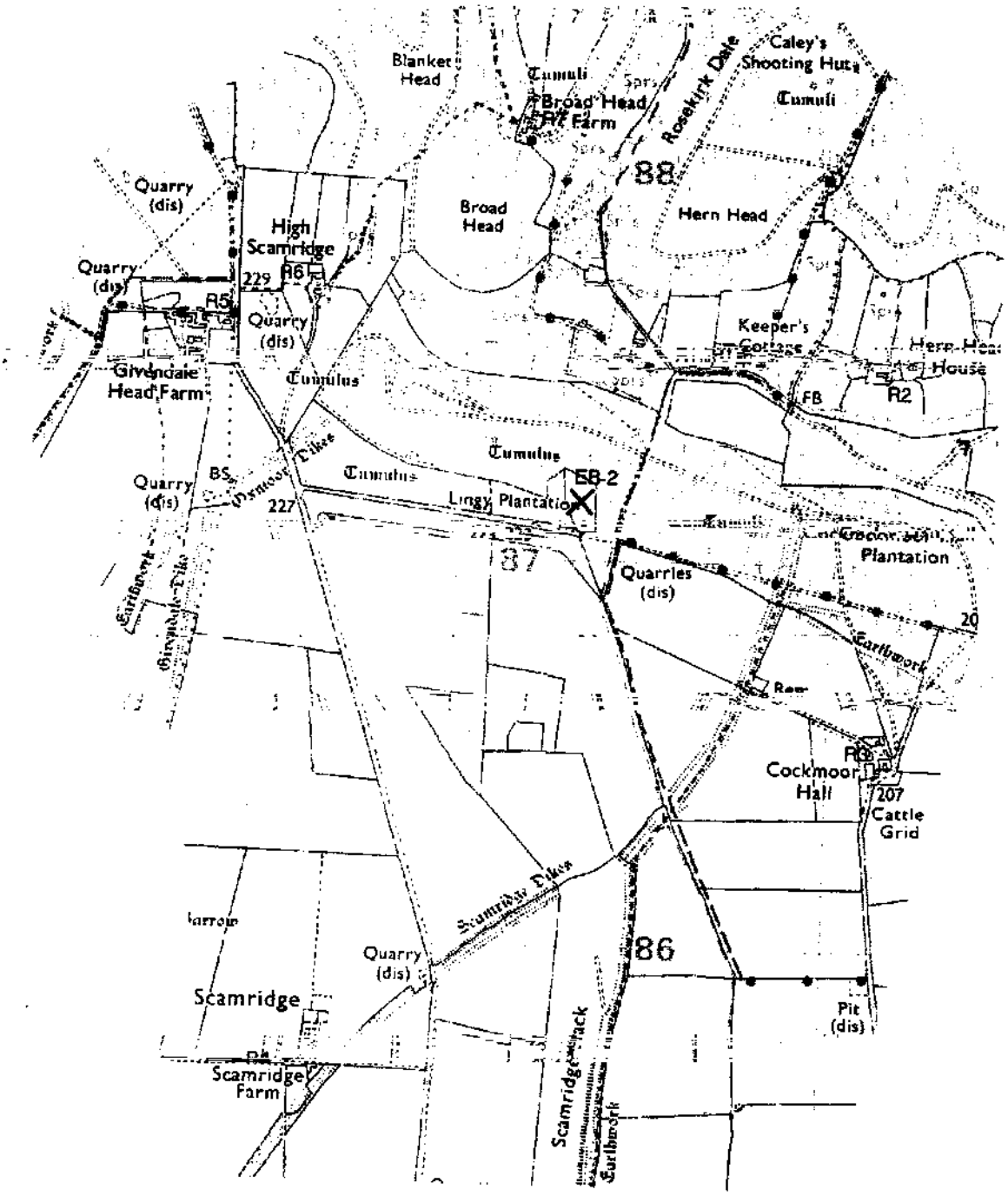
The study of environmental noise levels shows that noise limits of 50dB $L_{Aeq,1hr}$ during the daytime and 42dB, $L_{Aeq,1h}$ at night are entirely appropriate for this development in view of the intermittent and short-term nature of operations. Even on the quietest of nights, the requirement that noise at the nearest noise-sensitive property should not exceed the background level by more than 10dB can be met.

The same noise limits can be met using the proposed four-burner flare unit even when gas is flowing at the maximum anticipated flow rate. For much of the time during the reservoir appraisal exercise, the gas flow, and thus the noise emitted, would be considerably lower.

It is concluded that the proposed gas exploration well would not be a source of noise nuisance.

NYM/ 2007 / 0 9 0 1 / F L

APPENDIX: map showing noise prediction locations



TYPICAL TESTING PROGRAMME

DRILL STEM TEST

Philosophy

The only form of testing carried out with the rig on location would be short duration drillstem tests (DSTs). Flow periods consist of an initial flow (5-10 minutes) followed by a second flow period (4-6 hours). The well would not be allowed to surface during the hours of darkness.

Procedure

1 Determine the test intervals from an evaluation of wireline electric logs and core samples.

2 Perforate the test interval if necessary i.e. if the zone has been cased.

3 Run the test string in the hole and set the packer. Surface lines and equipment would be connected and pressure tested.

4 If the test string had been run in during the night then it would be necessary to wait until 0700 hrs to commence the initial flow period.

5 Open the downhole tester valve and flow for an initial period of up to 30 minutes.

6 Shut in and wait for 60 minutes in order to obtain a stabilised initial reservoir pressure.

7 Depending on the reservoir properties estimated from electric logs and core data, open the well for a final flow period of up to 12 hours. The maximum rate would be controlled at less than 10 mmscfd.

8 Shut in for a period of two times the flow period.

9 Reserve out the tubing contents and kill the well.

10 Recover the testing string.

PRODUCTION TEST

Philosophy

Production testing would be performed after the rig has moved off leaving the well completed ready for testing. Flow periods would take place during daylight hours only.

1 Rig up testing equipment, separator, heater, lines, gauge tank and flare.

2 Pressure test all lines and equipment

3 Rig up coil and displace tubing contents to nitrogen.

4 Perforate and clean up the interval.

REINSTATEMENT OPERATIONS FOR FORMER RELEASE

When the decision is made to restore the site to its former usage the well(s) will be plugged, hydrostatically tested, and abandoned with an agreed programme or method approved by the Health & Safety Executive and the Department of Trade and Industry.

Pre-Restoration Site Clearance

The wellhead and Xmas-tree will be removed and the welt casing cut off not less than 1 .83 metres (6 feet) below the finished ground level, a metal plate welded on top, and a concrete slab placed on top of the plate.

All plant, equipment, buildings, security fencing, and surface installations, will be dismantled and removed from the site, either to a re-location or to storage.

The site ditches, sump(s), cellar(s), and septic tank(s) will be drained and any contaminated materials removed from the site, such wastes will be disposed of at approved locations, in accordance with the prevailing legislation of the time.

All pipes, cables, ducting, and items above the impermeable lining will be disconnected, excavated, and removed from the site for disposal.

If weather conditions permit:

All uncontaminated hardcore and stone will be removed, with a flat bladed grader or bucket, for re-use or disposal. Concrete installations will be broken up and removed, the geotextile membrane (Terram), sand, and impermeable linings will then be removed, with disposal to an approved location.

Any installations, cables, and pipes, below the linings level will then be excavated and removed from the site.

The cellar, sump and ditching voids will be infilled with any sub-soil stored on site, in layers of not more than 200 mm thickness, ready for the site area to be then re-graded to the original contour levels.

Any header drains installed will be rodded to check their integrity prior to their retention as part of the reinstatement scheme.

Following a satisfactory inspection by the Landowner or his Agents:

Sub-Soil Cultivation

Any weed growth on any subsoil stockpiles will be eliminated by non-persistent, contact weedkiller such as "Roundup", prior to the re-grading of the sub-soil to reform the falls and gradients which existed prior to occupation of the site and to the original site contours. The subsoil will be deep cultivated using a crawler or four wheel driven tractor, drawing a winged, deep tine cultivator to a depth of 600 mm at 1000 mm centres, so as to achieve a good heave across the full width of the site.

Work will be carried out in dry conditions, and as far as practical at right angles to the field drainage system. Any extraneous material brought to the surface will be removed to a tip with stones picked to approximately 75 mm.

Works for the replacement and spreading of the topsoil to an even depth, will be carried out following the fine grading of subsoil and following an inspection by the Landowner or his Agents.

Replacement and Cultivation of Topsoil

Any weed growth on the topsoil stockpiles will be eliminated by non-persistent, contact weedkiller such as "Roundup". Topsoil will then be spread from the stockpile, using agricultural machinery, crawler or four wheel driven tractor. Topsoil will be spread to give a uniform depth over the whole site, to avoid the formation of depressions which could hold water, and to grade to the original levels.

All operations will be carried out when both the ground and topsoil are dry and crumbly.

All topsoil areas within the site, including areas not affected by construction operation will be ploughed and cultivated to ensure that all stones, rubble, vegetation and other extraneous material larger than 75 mm in any direction are removed from site to a suitable tip.

The topsoil will be worked to a fine tilth by rotovator or harrowing to not less than 100 mm depth. Subject to a soil sample analysis, three (3) tonnes of lime, or sufficient to achieve a pH level between 6 and 6.5, will be applied and 3 cwts of 20-10-10 fertiliser per acre (less if seeding carried out in the autumn to reduce leaching into nearby watercourses). Seeding will be with perennial ryegrass or an agricultural alternative to the Landowner's reasonable satisfaction.

If it should prove necessary to import topsoil into the site, disease and pest free material as near as practicable to that on site will be used, all topsoil being subject to BS 3882 and subject to the approval of the Landowner.

Removal of Site Boundary Fencing

The boundary fencing will only be dismantled and removed if it is not required to protect the restoration area from stock animals.

Reinstatement of Fences & Gates

Any fences and gates removed during the use of the site will be replaced with new materials which match as closely as practicable those previously existing on site.

Any hedgerow removed will be replanted with container grown "quick's" spaced in a double row of plants 9 inches apart. A tannalised timber post and four rail fence with livestock and rabbit proof netting wilt be constructed on either side of the newly planted hedge.

Any fence, gate or hedgerow planting will be maintained for a period of five years.

New Field Drainage

If necessary, a scheme of field drainage in the site area will be prepared and agreed with the Landowner, to comply with MAFF requirements, and for works to be carried out by a specialist land drainage contractor in year two, or earlier at the request of the Landowner.

Any construction header drains installed to intercept the field drains will be retained, these will be rodded to check their integrity prior to their incorporation as part of the drainage reinstatement scheme.

Perforated plastic pipe or clay tiles, as required by the Landowner, of minimum diameter, 110 mm, will be laid at the bottom of the trench surrounded by and backfilled with clean washed 10 to 20 mm pea-gravel (depending on drainage machine to be used, and will be back filled to within 225 mm of surface allowing for settlement for the gravel. Drains will be laid to the maximum available falls and, at depths not less than 600 mm cover.

Any outfall of the drainage system will consist of 2m lengths of frost resistant plastic pipe set into a suitable headwall (concrete or gabion) with a splash plate, discharging at whatever level the ditches.

If it is not possible to lay drains at a depth of at least 600 mm of cover, Independent Energy UK Limited will consult with the Landowner and his written approval will be sought to an amended specification.

MANAGEMENT AND AFTER CARE

The whole former operational site will be returned to agriculture after completion of the works, subject to the Landowner's agreement. Annual inspections will be made in August/September for each year, for a period of five years, with the Landowner or his Agent, to review the progress and crop productivity of the restoration area.

Subsequent Management

A If Subject to Grass Planting

Year 1

1 Initial treatment will be carried out as described above.

2 In Spring the sward will be rolled with a lightgrass land roller and spread with a compound fertiliser as recommended by soil sample analysis.

3 The grass will be cut for Silage or hay in May/June and subsequently grazed.

4 Any weeds will be sprayed with an appropriate weedkiller,

5 All stock/cattle will be removed before the end of October or earlier if the season is wet and all stock will be removed in adverse weather conditions to prevent poaching.

Year 2

6 Fertiliser, as indicated by soil sample analysis, will be applied hi two applications in spring and summer.

7 Any areas where the grass sward has not established will be seeded.

8 Grass produced will be cut for silage or hay or, grazed in a controlled manner.

9 Any weeds will be sprayed with an appropriate weedkiller.

10 The need for further subsoiling or a comprehensive field drainage scheme will be considered at the annual inspection.

11 If subsoiling or installation of field drains is carried out, the areas affected will be cultivated, any large stones removed and the areas affected will be seeded with a suitable grass mixture.

12 Stock/cattle will be removed before the end of October, or earlier, if the season is wet and all stock will be removed in adverse weather conditions to prevent poaching.

Year 3

Repeat steps 6 to 9 inclusive and 12 above.

13. Any localised settlement that is creating problems will be regraded or filled with topsoil and seeded.

Years 4 and 5

Repeat steps 6, 8, 9 and 13 above.

B If subject to Arable Planting

Year 1

1. Initial treatment will be carried out as described above.

2. Appropriate crops will be planted with appropriate compound and/or nitrogen fertiliser as recommended by soil sample analysis.

3. The crop will be assessed prior to harvest with regard to production levels and compared to production levels from adjoining undisturbed land.

Year 2

5. Any localised settlement that is creating problems will be regraded and filled with topsoil.

6. The need for further subsoiling or a comprehensive field drainage scheme will be considered at the annual inspection.

7. If subsoiling or installation of field drains is carried out the areas affected will be cultivated, and any large stones removed.

8. Appropriate crops will be planted.

9. The crop will be assessed prior to harvest with regard to production levels and compared to production levels from adjoining undisturbed land.

Years 3, 4, & 5

Repeat steps 5, 8 & 9 above.

C If subject to Woodland Planting

1. To be advised following consultations.